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PHYSICAL DEVELOPMENT STATUS OF 5TH GRADE STUDENTS

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Abstract

Physical development is one of the most important criteria for an individual's health status. It is frequently used as an objective indicator of the effectiveness of physical education instruction. The aim of the present study was to determine the level of physical development among fifth-grade students. Within a two-week period at the beginning of the 2024/2025 academic year, testing was conducted using anthropometric and motor assessments. The study was carried out at Secondary School No. 22 “G. S. Rakovski”, Sofia. A total of 100 fifth-grade students participated in the research, including 48 girls and 52 boys. Although the results indicate that fifth-grade girls achieved slightly better physical development indicators compared to boys, these differences were not supported by the required level of statistical significance. Overall, the examined girls and boys demonstrated relatively similar levels of physical development.

Keywords: physical education, physical development, physical fitness, students

Introduction

Physical development during childhood is a fundamental component of overall health and well-being and represents a key outcome of school-based physical education. In the context of increasing sedentary behavior and declining physical activity levels among youth, the monitoring of anthropometric characteristics and motor performance has become an essential task for educators and researchers (World Health Organization, 2020). These indicators not only reflect biological growth processes but also provide objective information about the effectiveness of physical education programs.

The primary school period, particularly around the age of 10–11 years, is considered a sensitive stage for the development of motor abilities and the establishment of long-term health-related habits. At this stage, regular assessment of physical development enables early identification of potential deviations and supports the optimization of instructional approaches in physical education (UNESCO, 2015).

Despite the recognized importance of such assessments, contemporary data on the physical development of school-aged children in specific national contexts remain limited. European reports continue to highlight variability in youth physical fitness and the need for systematic monitoring across countries (European Commission, 2018). This creates a need for updated empirical evidence that can serve both as a reference point for practitioners and as a basis for future research.

Therefore, the present study aims to determine the level of physical development among fifth-grade students through the application of anthropometric and motor assessments at the beginning of the academic year.

Material and methods

The present study employed a cross-sectional research design aimed at assessing the level of physical development among fifth-grade students. The research was conducted within a two-week period at the beginning of the 2024/2025 academic year at Secondary School No. 22 “G. S. Rakovski”, Sofia, Bulgaria.

A total of 100 students (48 girls and 52 boys), aged 10–11 years, participated in the study. All participants were clinically healthy and regularly attended physical education classes. Prior to data collection, informed consent was obtained from the parents or legal guardians of all participants. Physical development was assessed through anthropometric and functional measurements. The anthropometric indicators included body height, body weight, and chest circumference, measured using standard procedures and a measuring tape. Handgrip strength was assessed for both the left and right hand using a hand dynamometer.

All measurements were conducted under standardized conditions during physical education classes by trained personnel.

The collected data were processed using IBM SPSS Statistics (version 27.0). Descriptive statistics were applied, including variation and frequency analysis. Differences between boys and girls were analyzed using an independent samples t-test. The level of statistical significance was set at $p < 0.05$.

Results and discussion

The analysis of physical development indicators revealed relatively similar values between boys and girls across all examined variables.

Regarding anthropometric characteristics, boys (table 1) demonstrated a mean body height of 159.5 cm (SD = 13.4) and body weight of 40.1 kg (SD = 10.8), while girls showed slightly higher mean values for both height (160.2 cm; SD = 12.3) and weight (49.8 kg; SD = 11.1). Waist circumference was higher in boys (M = 76 cm; SD = 2.8) compared to girls (M = 72.5 cm; SD = 7.7).

Table 1 Physical development variables of boys

	Variables test	n	min.	max.	$\bar{X}$	S	V%
1	Body weight	52	32.5	47.8	40.1	10.8	26.9
2	Body height	52	150	169	159.5	13.4	8.4
3	Waist circumference	52	74	78	76	2.8	3.6
4	Handgrip – left hand	52	9	19	14	7	50
5	Handgrip – right hand	52	11	22	16.5	7.7	46.6

In terms of functional indicators, girls (table 2) demonstrated slightly higher handgrip strength in both the left hand (M = 16 kg; SD = 8.4) and the right hand (M = 17 kg; SD = 7.0), compared to boys (left hand: M = 14 kg; SD = 7.0; right hand: M = 16.5 kg; SD = 7.7).

Table 2 Physical development variables of girls

	Variables test	n	min.	max.	$\bar{X}$	S	V%
1	Body weight	48	42	57.7	49.8	11.1	22.2
2	Body height	48	151.5	169	160.2	12.3	7.6
3	Waist circumference	48	67	78	72.5	7.7	10.6
4	Handgrip – left hand	48	10	22	16	8.4	52.5
5	Handgrip – right hand	48	12	22	17	7	41.1

The variability of the indicators, expressed through the coefficient of variation (V%), showed moderate to high dispersion, particularly in handgrip strength, where values exceeded 40% in both groups, indicating substantial individual differences.

The independent samples t-test did not reveal statistically significant differences between boys and girls in any of the examined variables ($p > 0.05$). Although girls demonstrated slightly better values in most indicators, these differences were not statistically supported (table 3).

Table.. Independent samples t-test of variables

№	Variables	boys		Girls		t _{emp}	P%
	Test	$\bar{X}_1$	s	$\bar{X}_2$	s		
1	Body height	159.5	13.4	160	12.3	-.058	4.1%
2	Body weight	40.1	10.8	49.8	11.1	-.885	53%
3	Weist circumference	76	2.8	72.5	7.7	.598	36.1%
4	Handgrip – left hand	14	7	16	8.4	-.256	17.7%
5	Handgrip – right hand	16.5	7.7	17	7	-.067	4.7%

Overall, the results indicate a relatively homogeneous level of physical development between boys and girls at this age.

The present study aimed to assess the level of physical development among fifth-grade students and to examine potential gender differences. The findings indicate relatively similar levels of physical development between boys and girls, with no statistically significant differences across all examined variables. These results are consistent with previous research suggesting that gender-related differences in anthropometric and strength indicators during late childhood are often minimal or not yet fully expressed due to the pre-pubertal stage of development (Malina et al., 2004; Armstrong & Welsman, 2005).

The slightly higher values observed in girls for body height and body weight in the present study may be explained by earlier biological maturation, which is commonly reported in the literature (Malina et al., 2004). At the same time, the absence of statistically significant differences suggests that biological variability at this age remains within relatively narrow limits, supporting the idea of a homogeneous developmental stage.

In terms of functional indicators, girls demonstrated marginally higher handgrip strength values, which contrasts with some studies reporting higher strength levels in boys (Armstrong & Welsman, 2005; Tomkinson et al., 2017). However, similar findings have been reported in studies where differences are influenced by sample characteristics, physical activity levels, and methodological approaches (Gontarev et al., 2014). This suggests that environmental and behavioral factors may play a more substantial role than gender alone at this age.

The relatively high coefficients of variation observed in handgrip strength indicate considerable inter-individual variability, which aligns with previous findings highlighting the heterogeneous nature of motor and functional development in children (Tomkinson et al., 2017). Such variability can be interpreted as a result of differences in physical activity participation, motor experience, and individual growth trajectories.

From a broader perspective, the results correspond with European and global reports emphasizing variability in children's physical development and fitness levels, as well as the need for systematic monitoring within school settings (World Health Organization, 2020; European Commission, 2018). School-based assessments, such as those applied in the present study, are therefore essential tools for evaluating the effectiveness of physical education and for identifying potential developmental trends (UNESCO, 2015).

The lack of significant gender differences in the present study supports the application of unified methodological approaches in physical education at this stage, while still accounting for individual variability. This aligns with contemporary pedagogical perspectives that emphasize individualized and adaptive instruction rather than strictly gender-based differentiation.

A limitation of the study is the cross-sectional design, which does not allow for tracking developmental changes over time. Future research should incorporate longitudinal approaches and include additional motor and functional indicators to provide a more comprehensive understanding of children's physical development.

Conclusion

The present study examined the level of physical development among fifth-grade students and explored potential gender differences. The results demonstrated relatively similar values between boys and girls across all anthropometric and functional indicators, with no statistically significant differences observed.

Although girls showed slightly higher mean values in most variables, these differences were not statistically supported, indicating a relatively homogeneous level of physical development at this age. The findings highlight the importance of regular monitoring of physical development in school settings as an essential component of physical education. Such assessments provide valuable information for evaluating students' health status and for supporting the planning and optimization of the educational process.

Future research should focus on larger samples and longitudinal designs in order to better understand developmental trends and influencing factors in children's physical development.

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EVALUATION OF THE IMPACT OF A SPORT+ PROJECT ON AT-RISK YOUTHS

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Abstract

Introduction: The instrumentalisation of sports for accomplishing a range of social, educational and developmental goals among youths is a well-established policy and practice everywhere. Most studies however focus predominately on quantifiable data to demonstrate some success and largely fail to explain how and why reported outcomes come about. The current research uses a realist evaluation perspective to unveil what worked, how, and to what effect in the specific circumstances of at-risk youth participants in a Sport+ project. **Methods:** Given the temporal aspect of impacts in terms of their

form, meaning and subjective perception by the individual participant, semi-structured interviews with a group of total 50 participants were conducted at four different time points. The cohort consisted of youths who had committed a criminal act and facing some deficit model in their behavior. Results: The results show that the leading motivation for taking part in proposed sport and art activities was influencing certain determinants of their behavior and social relationships. In addition, the demonstration of commitment, systematic work and personal traits of the coaches and teachers, along with conducting activities in a familiar environment emerged as key motivational mechanisms. Thus, a strong relation is based on trust, positive attitude, gained authority, quality of communication, reciprocity, and the extent to which the activities are motivating and engaging. Discussion: The identified outcomes represent a combination of mutually complementary social, behavioral, psychological and resource characteristics. One of the key practical implications is that the act of participation in sport and/or other activities per se is not sufficient for creating any significant impacts, rather they are produced by the interpretations and judgements of the individual beholder as to what is valuable for him/her at a given point in time. In this way, the focus shifts from the generally accepted abstract claims that sport is by default able to change the life of at-risk youth to the strictly subjective perceptions, experiences and assessments by the participants.

Keywords: impacts, realist evaluation, at-risk youths, mechanisms, context

Introduction

The instrumentalisation of sport for accomplishing a range of social, educational and developmental goals targeted at youths is a well-established policy and practice everywhere. Different sports have different potential to trigger the process of social interactions, which are responsible for creating various benefits and contributing to the wider processes of social change. This has led to ascribing to sport spiralling over-expectations for solving complex social problems of postmodern society. In this sense, the use of sport in the arsenal of the “social problems industry” (Pitter & Andrews, 1997), as a means of preventing, controlling or overcoming various issues of a behavioral, identity, educational, health, integration or communication nature, is not something new. In this vein, Coakley (2002) explicated that sports-based programmes have been viewed as a cost-effective tool to policy implementation among youths in domains such as socialization, building character, cultivating self-discipline, preventing antisocial behavior and personal development. As Allison (1982) demonstrated, sport has always been associated to the process of socialisation, which is the underlying mechanism of learning and transfer of values, beliefs, expectations and rules guiding youths’ behavior.

In terms of their meaning, significance and functions, any outcomes and benefits created are contextually determined and should be viewed within the specific socio-cultural and resource environment. In this regard Green (2008, p. 131) emphasized that “it is the specific socializing experiences that particular sport settings provide (or do not provide) that result in particular outcomes”. What follows is that it is not sport per se that automatically leads to expected outcomes, but the way the participation in a sport activity is perceived and experienced. Put differently, participation in sport activities alone is “a necessary, but not a sufficient condition to obtain any supposed benefits” (Coalter, 2015, p. 20). The gist of this line of reasoning is that the attention should be pointed to “the processes and mechanisms responsible for producing those positive impacts and benefits” (Girginov and Hills, 2009, p. 167). The use of sports in combination with other activities as a platform for social inclusion, moral development and socialization of youths including those with deviant behavior and at-risk is a well-established approach.

The implementation of sports-related projects/programmes can be considered as social interventions introduced in complex and contradictory social systems and characterised by complexity and uncertainty. More specifically, researching and evaluating the effectiveness of sports- and recreation-based interventions aimed at reducing risk and crime prevention, scholars like Morris et al. (2003), Mulvey et al. (1993), Sherman et al. (1998) and Witt and Crompton (1996) challenged the sustainability of outcomes and impacts of such tools. Hartman and Depro’s (2006) study of the effects of midnight basketball programme on community-level crime rates also substantiated its complexity and limitations in terms of scope and design as well as the need of more robust evidence to support any claims about sustainable outcomes which can be attributed to the workings of sports-based prevention instruments. Furthermore, they suggested the need these programmes to be conceived and implemented in a combination with other risk-reduction means.

Sport+ interventions usually combine practicing sport activities with other interactive components such as arts, dances, voluntary work, travel, psychological support, etc. What these interventions aim mostly is building skills for decision-making and conflict resolution, demonstration of responsible behavior, compliance with norms and rules, creating a sense of order.

The current research aims to unveil what embedded mechanisms were activated, how, and to what effect in the specific circumstances of at-risk youth participants in a Sport+ project. For this purpose, a realist evaluation perspective has been employed.

Realist evaluation as a research strategy

The concept of the current study has been informed by Girginov's (2016) critical analysis of the workings and proclaimed outcomes of the London 2012 Olympic Inspire programme through the lens of realist evaluation. More specifically, interpreting the Olympic Games as an educational project, he unpacked the underlying theory, mechanisms, context and outcomes of the Inspire programme and challenged the established wisdom about the universalistic power of sport and the Olympics in particular to change the behavior of young people.

In their seminal work on the theme Pawson and Tilley (1997) and Pawson (2013) outlined five key properties of realist evaluation as a research framework. Its first premise is that it seeks to explain what works, for whom, how, to what effect, and in what specific conditions. The key point here is that any outcomes and effects of a planned social intervention result from the interpretations of its subjects, who do not react automatically but actively construe the offering and messages of the programme and assess the costs and benefits before deciding to participate. A second premise of realist evaluation is that it is a theory-driven form of inquiry based on the 'if-then' proposition. As Pawson asserts (2013, p. 87), "the preliminary idea, ambitions, expectation, hypothesis or 'programme theory' is that if certain resources (sometimes material, sometimes social, and sometimes cognitive) are provided then they will initiate subjects' reasoning, generating a change in collective behaviour". Unpacking the underlying theory behind an intervention is the third premise of realist evaluation. A sports-based programme/project consists of a combination of resource inputs, activated processes, interactions, context, and resulting outputs and impacts. Understanding the relationships between all composing elements is the main unit of analysis. The next property of realist evaluation is the configuration between context, mechanism and outcome, which means that sports-based interventions work (i.e. produce outcome) on the basis of their embedded mechanisms being activated in a specific context. The mechanisms of a project are the agents of change. These include planned activities, communication channels, the implementing team, the combination of resources inputted and opportunities provided, which instigate processes of social interactions and ultimately, the behavior of the participants. Finally, a key aspect of realist evaluation is dealing with intervention complexity, which results from a combination of interacting subjective and objective elements. Understanding context is also vital in terms of attributing causal relationships. It is worth noting that sports-related interventions follow logic models which offers a 'step-by-step' algorithm for their planning, design, management, implementation and evaluation. Given the one-year period of implementation of the Sport+ project titled 'Complex Integrated Social and Health Services for Children', such an approach allowed to reveal what key mechanisms were activated to instigate social interactions resulting into a set of perceived benefits and outcomes in the case of at-risk youths.

Materials and Methods

Data collection

Given the temporal aspect of impacts in terms of their form, meaning and subjective perception as well as some particularities of the informants in terms of cognitive and intellectual abilities, age, literacy and living environment, interviews were the method of primary data collection. The interviews were conducted at four different time points with a group of total 50 participants. Following the conceptual framework of the realist evaluation proposed by Pawson (2013) an interview guide was developed. The guide included eleven main themes derived from the employed theoretical framework and supplemented by a range of questions. The interview format was semi-structured to allow the interviewer to expand on a point of interest as well as for interviewees to elaborate further. Interviews were conducted by the author in informants' place of schooling and living between October 2024 and November 2025 and were tape recorded and transcribed verbatim.

The interviews lasted between 10 and 15 minutes. The cohort consisted of youths who had committed a criminal act and facing some deficit in their behavior. A key requirement was the school students had participated in at least one of the proposed activities as well as the condition of reproducing the interviews with the same individuals throughout the duration of the project. In addition, notes were taken during the process of personal communications with informants.

Data analysis

Data analysis was theory-driven as it has sought to address the main research question of what mechanisms were activated to produce a set of identified outcomes in a highly controlled environment in which the project activities took place. Drawing on Robson (2011) a data coding and thematic analysis protocol was developed. Thus, the development of the themes themselves involves interpretative work where the produced analysis is not merely descriptive but is already theorised. The analytic procedure used three analytic codes (i.e. project's underlying theory, inherent mechanisms and perceptions of benefits). The identification of themes related to the research questions is itself both a deductive (i.e. arising from the extant literature and the author's theses) and an inductive (i.e. arising from interactions with the informants) process. Subsequently, the data were coded in the NVIVO10 software programme.

Results and Discussion

The theory of change behind the project

In general, the goal of the project was to prevent intellectual backwardness and improve personal development of youths with devianting behavior. The main assumption was that an active and motivated participation in popular sports, folklore dancing, and painting will impact positively their behaviors and social relationships, thus creating a supportive milieu for a successful life adaptation after leaving school. Although not explicitly articulated, the theory of change in this particular case is based on the understanding that by providing an open access to participate in both sporting and other activities delivered by qualified teachers, this will motivate the target group of participants to interact, socialize, share, learn and experience, benefitting their personal development and impacting positively certain determinants of their behavior.

Participants' context

The impact of an intervention cannot be fully determined without information about the context in which the activities took place and the interactions occurred. Understanding the specific conditions is therefore key to attributing causality as well as reproducing the project in future situations (Blamey and Mackenzie, 2007). The activities were carried out in a 'controlled' physical and social environment, that is, daily social relations occurred mainly between members from the same group; the services were delivered exclusively in the school which facilitated the organisation of work. The boarding school is of the so-called 'schools with restricted regime', i.e. school students from all over the country study and live there year-round and cannot leave its territory at their own discretion without the principal's permission. Most children come from Centers for Youth and Social Services and the duration of their stay varies from several months to three years. All students who were included in the project had committed some criminal act (mainly thefts, beatings, escapes, drug use); some do not have any elementary hygiene and upbringing habits; many of them are quasi- or completely illiterate; disrespectful of authority; some exhibit distorted ideas about relationships, law and order. Some are half-orphans or come from broken families, others are completely homeless and grew up 'on the street'. The team of teachers has many years of experience in working with such children. It is also worth mentioning that older boys act as mentors to younger ones in terms of protection, improving discipline and adhering to the rules established in the school. What all youths have in common is that they are overly energetic and need to be constantly involved in doing something and where maintaining a normal learning process with vocational training and opportunities for doing sports is a priority.

Mechanisms of the project

These include all the opportunities provided in the form of planned activities, motivation channels for access and communication of messages and offerings, competencies and skills of the delivery team,

the combination of embedded intellectual, human and material resources which activate the processes of social interactions and ultimately, the reactions of the participants. The emergence of a certain impact is a consequence of the relation that the participants build with the delivery staff and the opportunities offered. This relationship is based on properties such as trust, commitment, positive attitude, gained authority, quality of communication, reciprocity, systematic work and the extent to which the activities are motivating and engaging. Table 1 summarizes the key mechanisms of the project and examples of their activation.

Table 1. Key mechanisms and their activation

Proposed activity	Leading pedagogue	Frequency of delivery (Actual)	Number of participants & type of access	Degree of created relation with teacher/coach (Likert scale 0-5)	Additional observations
Football	PE teacher from the school	5 times per week	Not fixed (open access)	5	Activities continued during the vacation for available students.
Basketball	Deputy principal from the school	5 times per week	Not fixed (open access)	5	
Badminton	External coach	Irregularly	Not fixed (open access)	3	The contract with the coach was terminated two months before the end of the project due to poor quality of service provided.
Table tennis	External coach	2-3 times per week	Not fixed (open access)	5	A differentiation approach was applied - a group for beginners and for advanced.
Fitness	External coach	3 times per week	Not fixed (open access)	4	A differentiation approach was applied - a group for beginners and for advanced.
Folklore dances	External teacher	3 times per week	Not fixed (open access)	5	
Painting	- Deputy principal from another school (8 months)	Very irregularly	Not fixed (open access)	2	A differentiation approach was applied.
	- Social worker from the school (4 months)	2 times per week		5	

The selection of activities was made on the basis of available qualified teachers and/or hiring external coaches from nearby settlements. In addition, the project activities were well combined in terms of time with the study process at school and students' leisure time. Of a critical importance was the fact

that the teachers involved in delivering some of sport activities (e.g., football, basketball) and painting classes (e.g., social worker) had already gained authority and respect among the children and were highly valued for their positive and supportive attitude. More specifically, the school principal, the deputy principal, one of the physical education teachers, and the social worker were the main sources of information, support and motivators. The same was also valid for the external coaches in table tennis and fitness as well as the teacher who delivered folklore dances classes. The challenge for them was to demonstrate the right approach and skills of gaining trust and authority among youths. In the opposite case, the lack of a professional attitude in certain periods on the part of the badminton coach or the externally hired teacher in painting who conducted classes very irregularly, impacted negatively the relation with the students and their perceptions. Special attention in this regard should be paid to the indicator for assessing the strength of the relation created with a coach/teacher on the part of the participants. To this end, a Likert scale varying from 0 to 5 was applied where 5 is associated with the strongest degree of relation.

Another key mechanism is the recruitment of the participants. The delivery of activities was premised on completely open access to participation as there were no selection criteria or any pre-set number of participants per group and where students from grades 5 to 12 practically could 'self-invite' in what to get involved in and for how long. Another point that deserves attention is the application of a differentiation approach in structuring the groups in table tennis, fitness and painting taking into consideration variables such as skills, interests or age, which allowed for more targeted work. Of utmost importance also was the delegation of roles and responsibilities by the trainers to older boys with authority among the others when conducting sport activities, which appeared a particularly successful mechanism in the specific context of the participants. In terms of material resources, the delivery team was relying only on already available resources.

Outcomes of the project: identifying effects and attributing causality

As discussed, the effects result from a well-planned, resourced and practically implemented combination of activities. The spectrum of social interactions and relationships encompasses emotional, cognitive, behavioral and social dimensions. The most strongly motivated youths were engaged in all four planes where the concept of satisfaction is directly related to the nature of the impacts that occurred. In this way, participation is always selective, that is, the project essentially selects the determinants of behavior that it wants to influence (Pawson, 2013). Any impact for the individual participant will vary over time depending on the situation and the individual's assessments, perceptions and experiences. In terms of consuming leisure it was found that the most preferred choice was doing sports (mentioned in 75% of cases). Among the important motives for choosing to participate in a particular activity was the presence of a previous interest and certain skills in the specific sport. Only 26%, however, had practiced a given sport at a sport club or school, that is, have had a prior relation with sport. Different ratios were observed in each period as well as in terms of interest, with the highest levels being established in football, table tennis, fitness and painting. A closer scrutiny over the data reveal interesting nuances and parallels. An important aspect in terms of sustainability of participation is the number of students who attended the chosen activities throughout the project. Football (19 participants) and table tennis (16 participants) enjoyed the highest number of youths who attended from the very beginning and continued to the very end of the project. In contrast, badminton and folklore dancing experienced the lowest level of interest, with 6 and 7 children, respectively, remained engaged during the entire period.

Regarding preferences for attending activities by type, 38% of the youths took part in sporting activities only (the project did not have an explicit requirement for combining sport with other proposed activities), while the majority (62%) combined sports with folklore dances or painting classes. Only one student attended all types of activities all the time, while three chose to participate in only one pursuit. The results demonstrate that the different types of activities have different potential to generate specific impacts related to the processes of socialization. For example, participating in sports like basketball and football generated perceptions that are different from those of table tennis, badminton or fitness. On a different plane are the benefits experienced by attending folklore dances and/or drawing classes.

Besides entertainment, learning basic technical skills, improving their own discipline, stress relief, channeling attention and positive thinking as well as getting pleasurable experience appeared key

benefits perceived. Special attention deserves the attribution of causality between participation in sporting activities and the creation of a particular social impact with implications to both the reputation of the school and the sport system. Evidence of a multiplier effect in this regard is that: School students continue to practice some of the sports through self-organisation after the formal end of the project; and

20 of the boys continue to be part of the representative school teams and have prestigious rankings in various competitions in sports like basketball, football, badminton, table tennis and athletics.

Conclusions

As this research showed, the identified outcomes and impacts resulted from the activation of some of the projects' key mechanisms in a controlled context of adolescents displaying undesired social behaviors. The embedded resources provoked a series of social interactions between the participants themselves as well as between them and providers and represent a combination of mutually reinforcing social, behavioral, psychological and resource interplays. One of the key practical implications is that the act of participation in sport and/or other activities per se is not sufficient for creating any significant impacts, rather they are produced by the interpretations and judgements of the individual beholder as to what is valuable for him at a given point in time. In this way, the focus shifts from the generally accepted abstract claims that sports-based interventions are by default able to change the life of at-risk youths to the strictly subjective perceptions, experiences and assessments by the participants. Future research is needed to test the relevance of the theories of change of sports-based prevention programmes by examining which specific mechanisms have been activated to produce reported outcomes in particular circumstances.

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PARENTS' OPINIONS OF PHYSICAL AND HEALTH EDUCATION FOR CHILDREN WITH DISABILITIES IN SERBIA

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Abstract

The inclusion of students in the process of physical and health education (PHE) represents a new experience for every student; however, when it comes to students with disabilities, access to this area may be more challenging. Particularly in the field of PHE, family support plays a significant role in overcoming barriers and encouraging the participation of children with disabilities in physical activities (Opoku et al., 2020).

The study was conducted in September 2025 on a sample of 48 parents of children with disabilities from the “Anton Skala” Special Education School and the Home for Children and Youth with Hearing Impairment in Belgrade. Data were collected through an anonymous questionnaire consisting of demographic characteristics, child-related variables, and 13 Likert-scale items examining parents' opinions on physical education classes, community support, and the adequacy of facilities and equipment. Descriptive statistics (minimum, maximum, mean, and standard deviation) were calculated. Differences between parents with higher and lower educational levels were examined using the Mann–Whitney U test.

Descriptive statistics indicate highly positive opinions regarding physical education classes ($M = 4.27\text{--}4.94$), with the highest scores assigned to the statement that physical education is beneficial for the child's health ($M = 4.94$). In contrast, community support was rated considerably lower ($M = 2.23\text{--}2.60$). A statistically significant difference was found only for the item concerning the positive impact of physical education on health and social skills ($p = 0.03$), with parents of higher educational levels expressing more favorable opinions. No significant differences were observed for other variables.

Parents generally support inclusive physical education and believe in its benefits for their children's health and social development. However, there is clear dissatisfaction with the level of community support and the availability of adapted programs outside of school. The findings suggest a need for better parental information and increased investment in infrastructure beyond the formal education system.

Keywords: person with disability, physical and health education, parents, inclusion

Introduction

Physical and health education (PHE) is essential for developing motor skills, physical health, communication, and emotional well-being, serving as a vital link between education and broader social inclusion (Leyser & Kirk, 2004; Wilhelmsen et al., 2019). However, children with disabilities frequently encounter systemic challenges, including inaccessible sports facilities, lack of adapted equipment, and persistent social barriers (Opoku & Peprah, 2020). Without proper supervision and tailored instruction, students may also engage in compensatory behaviors to match their peers, leading to overexertion or frustration (Wilhelmsen et al., 2019).

As primary stakeholders, parents play a fundamental role in shaping their children's educational trajectory and school engagement (Pomerantz et al., 2007). Parents of children with disabilities possess unique insights regarding their child's functional needs, which are critical for assisting educators in developing individualized programs (Hilbert, 2014). Consequently, parents generally support inclusive models that enhance socialization and quality of life, particularly when they perceive strong support from school staff (De Boer et al., 2010; Leyser & Kirk, 2004; Lui et al., 2015). Conversely, negative parental experiences often stem from concerns regarding teacher training, peer acceptance, and insufficient school infrastructure for physical activities (Stevens & Wurf, 2018).

The relationship between parental educational attainment and attitudes toward inclusion remains debated in the literature. Some evidence suggests that higher educational levels foster more positive attitudes through greater policy awareness and recognition of developmental benefits (Lohmann et al., 2018; Torgbenu et al., 2021), whereas other findings indicate that educational background is not a decisive factor and that personal experience may exert a stronger influence (Al-Dababneh, 2018; Gupta & Buwade, 2013). Despite these insights globally, research specifically addressing parental perspectives on inclusive PHE in Serbia remains scarce. To address this gap, this study analyzes the opinions of parents of children with disabilities regarding PHE in Serbia, examines the impact of parental education levels, and provides actionable recommendations to improve inclusive physical education practices.

Materials and methods

Participants

The study was conducted among 48 parents of children with disabilities attending the *Anton Skala* Special Education School and the Home for Children and Youth with Hearing Impairment in Belgrade, Serbia. The participants were parents or legal guardians of children with various types of disabilities enrolled in these educational institutions. Participation in the study was voluntary, and all respondents agreed to participate anonymously.

Instrument

Data were collected using an anonymous questionnaire specifically designed for the purposes of this study. The questionnaire consisted of three sections: (1) demographic characteristics of parents, (2) child-related variables, and (3) 13 statements assessing parents' opinions regarding PHE, community support, inclusion, and the adequacy of school facilities and equipment for children with disabilities. Responses to the statements were recorded using a five-point Likert scale, where higher scores indicated more positive attitudes toward inclusive physical and health education.

Procedure

Data collection was conducted during 2025 in cooperation with the participating institutions. Prior to participation, respondents were informed about the aim and purpose of the study, the voluntary nature of participation, and the confidentiality and anonymity of the collected data. After providing informed consent, parents completed the questionnaire individually. The study was conducted in accordance with ethical principles for research involving human participants.

Data Analysis

Descriptive statistics, including minimum values, maximum values, arithmetic means, and standard deviations, were calculated for all study variables. The internal consistency of the questionnaire was evaluated using Cronbach's Alpha coefficient. Since the data did not meet the assumptions for parametric testing and the sample size was relatively small, differences in parents' opinions according to educational level were examined using the nonparametric Mann-Whitney U test. Statistical significance was set at $p < 0.05$.

Results and discussion

All applied scales demonstrated high internal consistency and proved suitable for further statistical analysis. Specifically, the scale measuring parents' opinions regarding physical and health education (PHE) classes showed excellent internal consistency ($\alpha = .906$), while the social support and inclusion scale ($\alpha = .816$) and the equipment and facilities scale ($\alpha = .885$) both demonstrated good reliability. Regarding sample demographics, 35.4% of parent participants were men and 64.6% were women, aligning with previous research indicating that mothers are more frequently involved in school-related studies concerning children with disabilities (Pomerantz et al., 2007). Average parental age placed most respondents in middle adulthood. In terms of educational background, 4.2% of parents had completed primary education, 37.5% completed secondary education, and 58.3% held a higher education or advanced degree. For statistical comparisons, these were recategorized into two groups: a lower level of education (primary and secondary) and a higher level of education (higher education degree, Master's, or PhD).

Regarding socioeconomic status, the largest proportion of families reported average status (43.8%), while 10.4% reported low status. The children ranged in age from 7 to 31 years ($M = 13.5$, $SD =$

5.51), and 81.3% were male. Participants represented diverse disability categories, with every respondent who selected the "Other" category specifying Down syndrome as their child's condition. Descriptive analysis revealed generally positive parental attitudes toward PHE, with item means ranging from 4.27 to 4.94. The highest mean was observed for the statement that PHE contributes to children's health ($M = 4.94$), followed by social skills development ($M = 4.79$), teachers' understanding of children's needs ($M = 4.56$), inclusion in PHE classes ($M = 4.40$), and parent-teacher communication ($M = 4.31$). These findings support earlier research emphasizing physical activity's role in improving communication, peer interaction, and quality of life (Wilhelmsen et al., 2019; Opoku & Peprah, 2020), as well as general positive recognition of inclusive education (De Boer et al., 2010; Leyser & Kirk, 2004) and the importance of parental trust in school staff (Hilbert, 2014; Lui et al., 2015). Additionally, parents evaluated school equipment and facilities favorably, with mean values ranging from 4.06 to 4.23, indicating relative satisfaction with school safety and resource adaptability.

In stark contrast to high scores for school-based support ($M = 4.6$), parents expressed low satisfaction with community support and physical activity opportunities outside the school environment ($M = 2.4$, item range 2.23 to 2.60). This pronounced gap reflects limited accessibility of adapted sports programs and insufficient external investment (Stevens & Wurf, 2018; Al-Dababneh, 2018), pointing to a critical need for policy interventions that build inclusive bridges extending from schools into local communities. Comparative analyses revealed that parental educational level was not substantially associated with most attitudes. A statistically significant difference emerged for only one variable regarding perceived PHE benefits ($p = .03$), with higher-educated parents expressing slightly more positive views. While some studies suggest educated parents hold more favorable inclusion attitudes due to greater policy awareness (Torgbenu et al., 2021; Lohmann et al., 2018), these results also align with literature showing education is not always a decisive factor and that direct personal experience may exert a stronger influence (Gupta & Buwade, 2013; Al-Dababneh, 2018).

Several limitations should be acknowledged. The small sample size and inclusion of participants from only two institutions limit generalizability, while exclusive reliance on self-reported data introduces potential subjective bias. Furthermore, research specifically addressing parental opinions on inclusive PHE in Serbia remains scarce, limiting national contextual comparisons. Future studies should include larger, more diverse samples alongside perspectives from teachers and healthcare professionals to establish a more comprehensive understanding of inclusive PHE in Serbia.

Top of Form

Conclusion

This research has provided valuable insight into the perceptions of parents of children with disabilities regarding inclusive PHE in Serbia. The results indicate a clear discrepancy between a high level of trust in educational institutions and marked dissatisfaction with the support provided by the wider local community.

The main findings of the study confirm that parents recognise PHE as a key factor in improving their children's health and social skills. The very high ratings for teacher performance and mutual communication suggest that the schools have become "safe zones" where inclusion, despite infrastructural challenges, is implemented with a high degree of empathy and commitment.

However, the critical point identified by this paper is the "inclusion gap" which arises the moment a child leaves the school environment. The extremely low scores for support from the local community and the availability of adapted sports programmes outside of school indicate that families of children with disabilities in Serbia are often left to fend for themselves in their attempts to provide their child with an active lifestyle.

The fact that parents' level of education did not significantly influence their attitudes (except in the perception of general benefits) suggests that the need for quality physical upbringing is a universal value that parents recognise intuitively and through direct experience, and not just through awareness. Recommendations for future practice and research:

Systemic integration: It is necessary to establish institutional cooperation protocols between schools and local sports clubs to ensure continuity of physical activity for children with disabilities.

Education beyond the school system: Inclusive training must not be reserved solely for educators; it is essential to educate coaches and sports professionals within the local community to mitigate the barriers perceived by parents.

Infrastructural investment: The results suggest that while parents value the existing equipment, further adaptation of facilities to meet the specific needs of various types of disabilities is required for deeper inclusion.

Overall, the results highlight the need for a comprehensive approach that extends beyond the classroom to foster long-term well-being and social participation, while contributing valuable empirical data to guide future research and policy improvements.

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EXPERT ASSESSMENT OF THE MANAGEMENT OF TAEKWONDO (WT) IN BULGARIA

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Abstract

Introduction: The governance of national sport federations operating within hierarchical international frameworks represents a growing area of inquiry in sport management research. As an Olympic and

Paralympic sport in Bulgaria, Taekwondo (World Taekwondo format) operates within a multi-level governance structure that extends from the International Olympic Committee and World Taekwondo to the Bulgarian Taekwondo Federation (BTF-WT) and affiliated sports clubs. Despite the sport's established organizational presence, the management system faces persistent structural deficits in financial dependency, geographic concentration, human resource mono-profiling, and the national federation's limited strategic role. This study examines expert evaluations of the management of Taekwondo (WT) in Bulgaria to identify the key factors influencing the system's effectiveness and future development.

Methods: The study applied a mixed-methods approach grounded in sport management and institutional theory. The primary instrument was a structured expert survey comprising 26 indicators organized across four thematic dimensions: expert profiling, organizational and management assessment, stakeholder interaction, and strategic development. A targeted sample of 34 experts was selected based on a minimum of five years of active involvement in the governance and development of Taekwondo (WT) in Bulgaria, encompassing BTF-WT governing body members, sports club chairmen, council members, and coaches. Data were collected via a structured digital questionnaire and processed using descriptive statistical procedures. The analysis was complemented by a content review of key strategic documents, including the World Taekwondo MNA Ranking Bylaws, the WT Sustainability Strategy and Sustainability Report 2022-2024, and the ASOIF Fifth Review of International Federation Governance.

Results: The findings reveal a system characterized by significant structural deficits. Experts ranked the Ministry of Youth and Sports as the most influential actor in Taekwondo's development (91.2%), while the BTF-WT was perceived as an administrative intermediary rather than a strategic leader. Financial sustainability is severely constrained, with 97.1% of clubs relying on membership fees and 61.8% on state subsidies as primary income sources, and with near-zero commercial revenue. Human resource provision was identified as a major challenge, with 78.8% of clubs lacking qualified psychologists, 63.6% reporting insufficient coaching staff, and 60.6% having no medical personnel. The geographic distribution of clubs is highly imbalanced, with 51.5% of all registered clubs (17 of 33) concentrated in Sofia City, while 17 of 28 Bulgarian administrative regions have no Taekwondo (WT) club presence. The legal and regulatory framework was assessed as acceptable but with notable gaps (70.6%), and internet-based communication was the sole information channel identified by all respondents.

Discussion: The findings are interpreted through institutional theory and resource dependence frameworks, demonstrating that the BTF-WT's heavy reliance on state funding reflects coercive isomorphic pressures that constrain its strategic autonomy. The identified deficits are directly misaligned with the governance criteria applied by World Taekwondo to its MNAs and with the standards benchmarked by the ASOIF Fifth Governance Review. The study proposes introducing a decentralized regional governance model, implementing systematic personnel policy reform, and diversifying revenue sources as foundational strategic priorities. The findings contribute empirical evidence to the under-researched governance of national Olympic combat sport federations in Central and Eastern Europe and offer a transferable analytical framework for comparable national sport systems.

Keywords: sport management, expert evaluation, taekwondo, sport governance

Introduction:

National sport federations operate in multi-level institutional environments and must reconcile government requirements, club needs, international standards and limited resources. DiMaggio and Powell (1983) identified three mechanisms through which such institutional isomorphic change occurs – coercive, mimetic, and normative – each functioning to modify the organizations toward structural homogeneity. In the context of national sport federations heavily dependent on state funding, coercive isomorphism is particularly relevant: organizations adapt their structures and priorities to comply with the requirements of dominant resource providers rather than developing autonomous strategic capacity (DiMaggio & Powell, 1983; Edwards, Mason, & Washington, 2009). Within this institutional context, the management of national sport federations must respond to the interests of multiple actors. Applied to national sport federations, this framework offers a systematic

basis for assessing how different actors (governments, municipalities, sports clubs, athletes, coaches) exert influence on the system's governance and with what consequences.

Taekwondo (WT) operates within one of the most structured governance frameworks in international sport. World Taekwondo, as an International Sports Federation responsible for the development of the sport, has significantly raised its requirements to the Member National Associations (MNAs), introducing and applying a formal MNA Ranking System that evaluates the Federations annually on five key criteria: governance, participation, performance, events, and sustainability (World Taekwondo, 2025). World Taekwondo's governance standing within the international Olympic sport system is formally documented through the ASOIF review process. In the fifth and most recent review (2023-24), World Taekwondo was placed in Group A2, achieving a score between 185 and 209 out of 240, positioning it among the better-governed Olympic International Federations globally (ASOIF, 2024). This institutional standing is not incidental to the present study: it means that the BTF-WT, as one of WT's 215 MNAs, operates within a governance hierarchy whose standards are independently benchmarked and publicly reported. In 2022, World Taekwondo formalized its understanding of sustainability as an organizational obligation applicable to its entire global membership. The federation defines sustainability as "the way to address our impact as an international sports federation to ensure that the current and future generations of Taekwondo may continue to enjoy the sport of Taekwondo and, through it, contribute to an inclusive and peaceful society" (World Taekwondo, 2022). This definition is operationalized through three strategic focus areas – Diversity, Equity and Inclusion (DEI) and Community; Environmental Sustainability, and Health and Well-being – each with specific objectives, activities, and key performance indicators monitored on a four-year cycle. For MNAs, alignment with these focus areas is not aspirational – it is a measurable component of the WT annual ranking system against which national federations are formally assessed. The Bulgarian Taekwondo Federation – WT (BTF-WT) exists within this framework, and any assessment of its management must be considered partly in relation to these international benchmarks, not only in national terms. Taekwondo in Bulgaria is currently governed by an organizational structure that includes BTF-WT, sports clubs and their members, as well as cooperation with international and other national institutions. The successful functioning of the Taekwondo (WT) system in Bulgaria presupposes coordinated management actions and a strategic approach.

Despite growing interest to Taekwondo (WT) in Bulgaria there are issues related to the uneven territorial allocation of Taekwondo (WT) clubs in Bulgaria, difficulties in inter-institutional communication, limitations in the development of management and coaching staff in the clubs, inefficient use of available resources, etc. The differences between national practices and international trends also stand out as a fundamental obstacle, raising the question of whether management models should be adapted to modern requirements. That is why applying scientifically based approaches to the analysis and assessment of the management of sports organizations is of crucial importance. The expert assessment appears as one of the effective methods for identifying key problems of the researched system, analyzing the existing good management practices and composing guidelines for improving efficiency.

The research is based on the perception that the governance of Taekwondo (WT) in Bulgaria should be viewed not only as an organizational process, but also as an institutional system in which multiple stakeholders with different roles and interests interact constantly.

The main objective of this research is to conduct an Expert assessment of the management of Taekwondo (WT) in Bulgaria and to identify the main factors affecting the effectiveness of the management processes in the studied system. To achieve this goal, the following objectives were set: structuring a profile of the experts in the system; researching the main management and organizational aspects at the National Taekwondo Federation and Clubs level; identifying main system's issues; analyzing the interactions between the stakeholders and drawing conclusions and recommendations for optimizing the management of Taekwondo (WT) in Bulgaria.

Materials and Methods

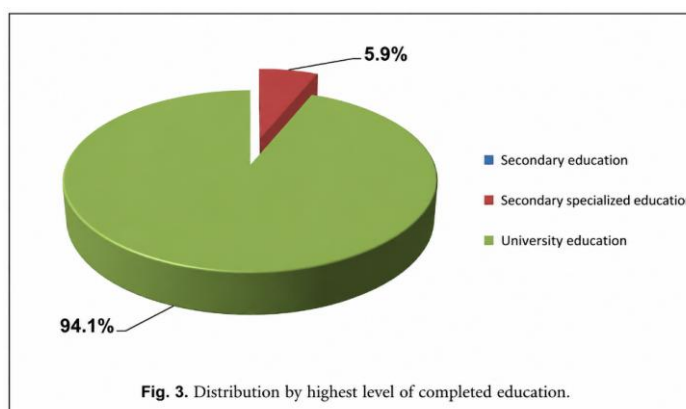
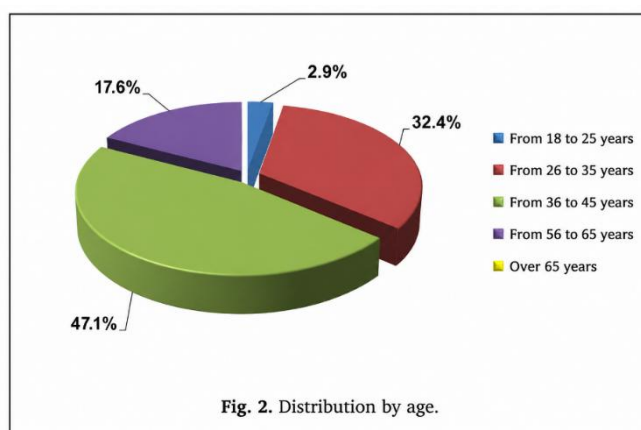
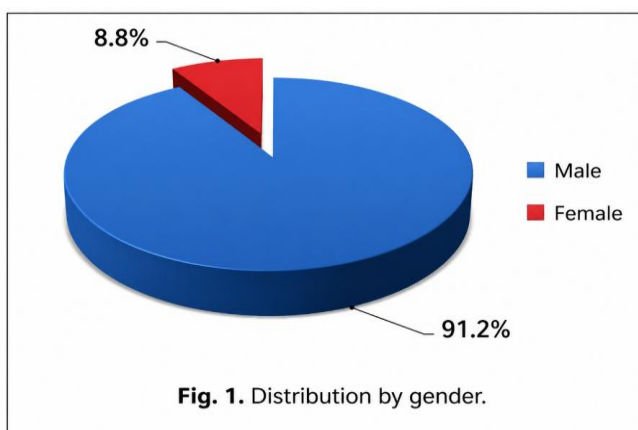
The research tool used in this study is a questionnaire comprising 26 queries, structured around four thematic dimensions corresponding to the stated research objectives. The expert survey was developed by the author based on established sport management frameworks and reviewed by two academic experts prior to administration. The experts' opinions gathered through the survey would

identify key management processes in the Taekwondo (WT) system in Bulgaria, on the basis of which an in-depth analysis of the expert assessment results would be conducted.

A targeted selection of participants was made, with the main selection criteria being practical experience and at least 5 years of engagement in the management and development of Taekwondo (WT) processes in Bulgaria. This led to the involvement of 34 experts having key management roles in the Taekwondo (WT) system – members of the governing bodies of the Bulgarian Taekwondo Federation, Chairmen and Council members of Sports clubs and coaches. Winand and colleagues (2010) state that experts who are part of the system they are evaluating may underestimate structural deficits or reduce criticism in their assessments to preserve collegial relationships and avoid eventual negative outcomes. The survey data collection was conducted through Google Forms. The responses were processed using frequency distribution analysis and percentage calculations relative to the total number of respondents (n=34), enabling a systematic quantification of expert perceptions across all 26 survey indicators. In addition to the expert survey, a systematic content analysis of key international governance documents was conducted, including the World Taekwondo MNA Ranking Bylaws, the World Taekwondo Sustainability Strategy, and the ASOIF Fifth Review of International Federation Governance, in order to benchmark the findings against established international standards.

Results and discussion:

The social profile of the involved experts is characterized by the following indicators: mostly male representatives (Fig. 1), between 36 and 45 years old (Fig. 2), with university education and professional qualifications as coaches or teachers (Fig. 3), and employed (Fig. 4). The experts have experience ranging from 11 to over 20 years in the Taekwondo (WT) system in Bulgaria (Fig. 5), permanently engaged in activities at Taekwondo clubs (Fig. 6). The responders hold the position of Council Chairman or coach at their respective organizations (Fig.7).

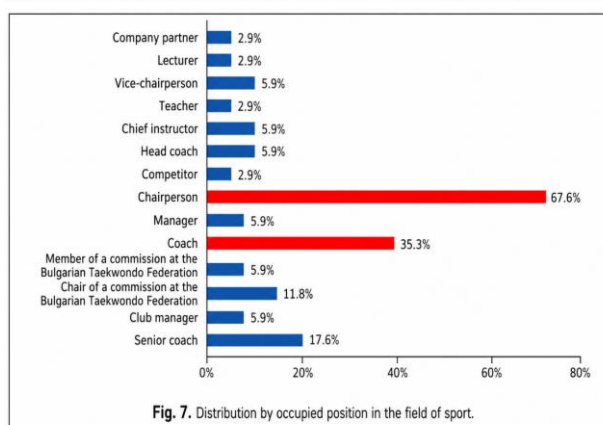
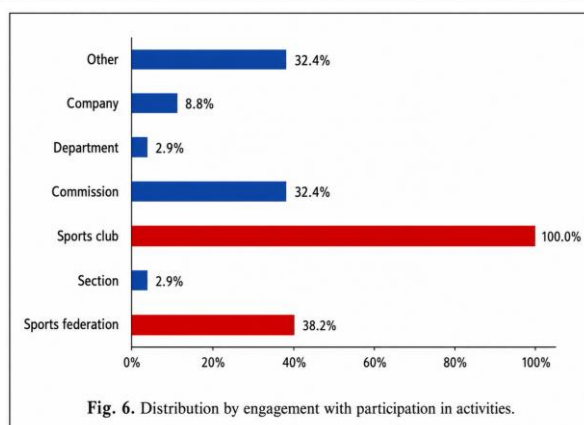
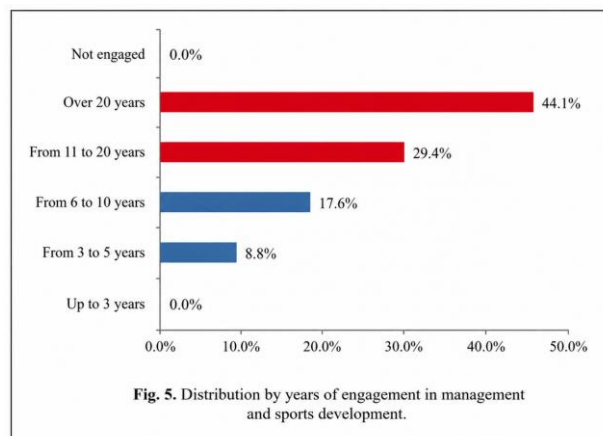
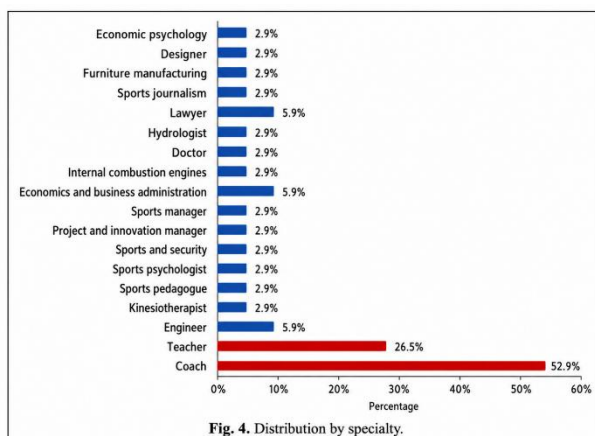


Based on the profile of the experts, we can conclude that the gender-educational profile reveals a dominance of men with higher education and long experience in the Taekwondo (WT) system in

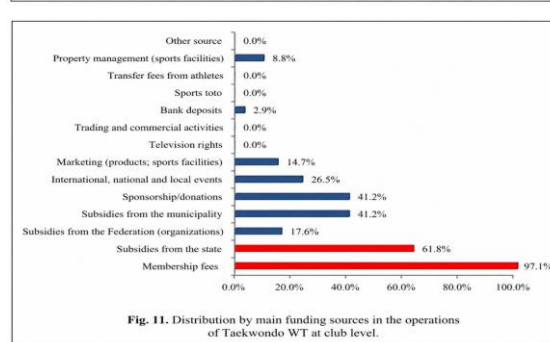
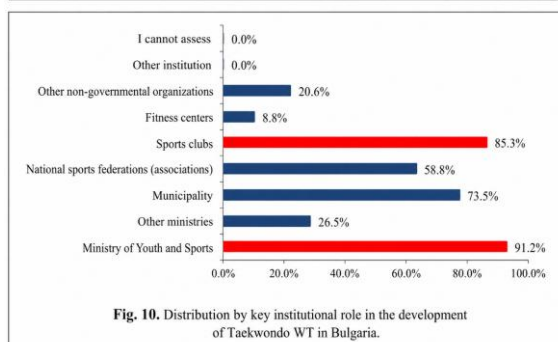
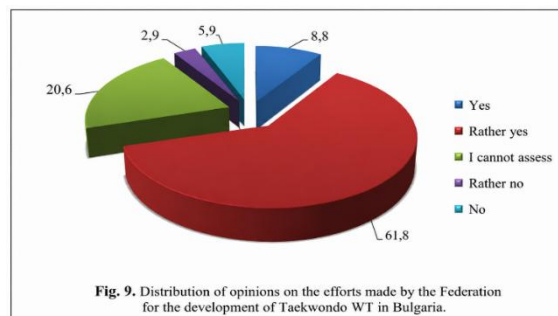
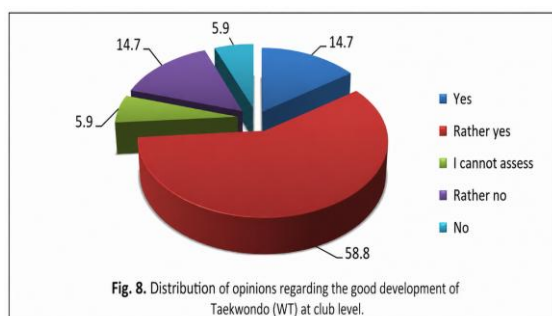
Bulgaria. The middle and young age groups (47.1% 36-45 years; 32.4% 26-35 years) indicate good personnel potential for implementing modern approaches in organizational and management aspects. The gender imbalance in the Bulgarian context is not an isolated phenomenon. The heavily presented male gender profile is consistent with the broader governance landscape documented at MNA level by World Taekwondo.

The experts participating in the survey assess the development of the Taekwondo clubs as successful (73.5%) (Fig. 8), and the efforts made by the Bulgarian Taekwondo Federation for the progress and growth of sport at the national level are perceived as sufficient (70.6%) (Fig. 9). Despite the positive indicators, it is necessary to conduct an in-depth analysis to better understand the respondents' negative perceptions.

(Insert Fig. 8 and Fig. 9 here)



Experts consistently identify the key institutions that have played a significant role in the development of Taekwondo (WT) in Bulgaria. The respondents assessed the Ministry of Youth and Sports (91.2%) (Fig. 10) in first place and respectively the most significant role. This finding is consistent with the research made by DiMaggio and Powell (1983), which terms coercive isomorphism. Another key finding is that 61.8% of clubs, members of the Bulgarian Taekwondo Federation – WT, rely on state funding as a primary financial source (Fig. 11), this dependence on Ministry subsidies appears to have repositioned the federation from a strategic governance body to an administrative intermediary – compliance mechanism rather than a leadership institution.



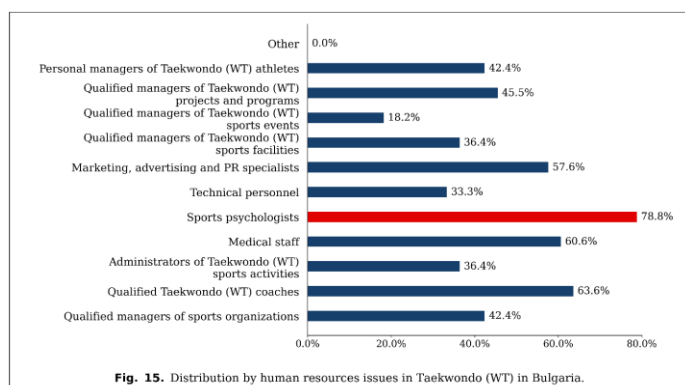
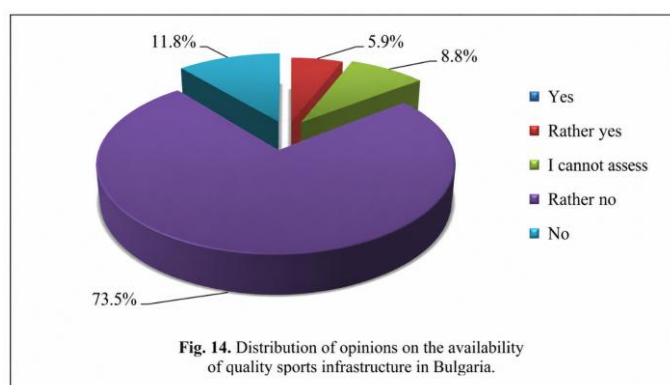
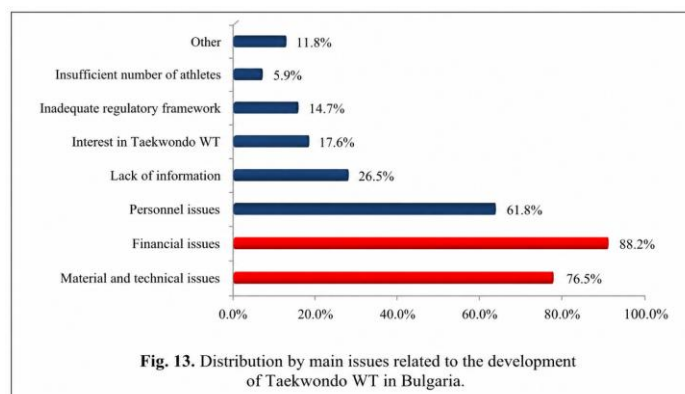
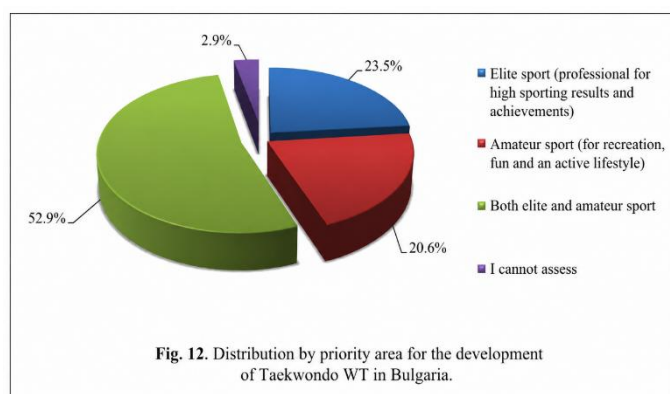
According to the respondents and the data from Fig. 11, the system relies almost entirely on membership fees (97.1%) and state and government subsidies (61.8%). Alternative financial sources such as sponsorship (41.2%) and marketing (14.7%) are poorly represented, and income from television rights, transfers, and shares is practically zero. The financial structure identified in the Bulgarian Taekwondo system is not unique but reflects a broader pattern characteristic of non-profit sport organizations operating in public-sector. Bayle and Robinson (2007) identified financial autonomy and the diversification of revenue sources as key determinants of national governing body performance, arguing that federations capable of generating commercial income alongside public subsidies are better positioned to pursue independent strategic planning and invest in organizational development. Furthermore, sport organizations depending mostly on government finances are, according to resource dependence theory revealed by Pfeffer and Salancik (1978), structurally limited in their decision-making autonomy.

The respondents identify that the key role in Taekwondo's development in the country is played by the Sports clubs (85.3%) and the local municipality (73.5%). This allows us to reveal the direct dependence of the development of Taekwondo (WT) in Bulgaria on the legal and regulatory framework, financial opportunities, and local and national conditions provided to sports clubs by the Ministry of Youth and Sports and the regional municipality. The findings firmly identify the Bulgarian Taekwondo Federation's role and contribution to the development of the sport at the national level as limited and can be interpreted as the organization being perceived as a liaison and mediator rather than a strategic leader.

The experts are revealing that the focus of Taekwondo (WT) in the country is aimed at the priority development of high-performance and amateur sports (52.9%) (Fig. 12). Fundamental issues marked are the system's financial provision (88.2%) and the provision of necessary equipment and facilities for its functioning (76.5%) (Fig. 13). The level of the system's human resource provision (61.8%) is also presented as a negative indicator for the development of Taekwondo (WT) in Bulgaria. The data can be interpreted both in terms of the insufficient number of personnel involved in sports club activities and of the quality and capabilities of those staff. Besides the sports pedagogy personnel, which is most often defined to a limited number of coaches in the clubs, it is necessary to engage medical, psychological, managerial and marketing expertise, who can directly influence the

development of the taekwondo club and improve the physical and psychological condition of the organization's members.

Over 85% of the respondents believes that there is a lack of quality sports facilities for Taekwondo (WT) in Bulgaria (Fig. 14). The experts' opinion regarding the deficits in the human resources provision highlights the lack of qualified psychologists engaged (78.8%), sufficient coaching staff (63.6%), medical staff (60.6%) and marketing specialists (57.6%) (Fig. 15).



The personnel mono-profile identified in the Bulgarian Taekwondo (WT) system reflects what the literature on national sport organizations describes as a structural deficit of professionalization. Thibault, Slack, and Hinings (1991) state that the hiring of professional staff with specialized competencies (beyond coaching) fundamentally transforms the structural and systemic arrangements of non-government sport organizations, enabling greater strategic planning capacity, improved service quality, and enhanced stakeholder management. The Taekwondo (WT) system in Bulgaria appears to be activity delivery dependent, almost exclusively on coaching personnel, while managerial, medical, psychological, and marketing competencies remain systematically absent. These findings point to a structural need for specialized professionals for the progressive development of the Taekwondo (WT) system in Bulgaria.

Regarding the legal and regulatory framework governing Taekwondo (WT) processes at the national level, 8.8% of experts consider it good without reservations, and 70.6% consider it good with certain gaps (Fig. 16). These indicators allow us to assess the analyzed system in Bulgaria as having an acceptable legal and regulatory framework, with relative gaps that serve as a basis for developing sport in the country. A key indicator of a system's evolution, including in the field of sports, in addition to the indicators listed above, is its information provision. That is why the expert survey included questions on approaches to information distribution and collection. On both key processes, the experts are firm – 100% indicate the internet as a source for providing and obtaining information (Fig. 17 and Fig. 18). Along with the well-accepted legal and regulatory framework, information provision is another positive characteristic of the Taekwondo (WT) system in Bulgaria. Notably, no expert identified conducting surveys as a source of information. Today, it is essential for sports organizations to research their target audiences, as well as to manage their administrative, operational and marketing

activities not only through e-mail, but also through specialized platforms, social networks and channels, applications for optimizing activities and artificial intelligence.

The in-depth analysis of Taekwondo (WT) in Bulgaria at the time of the study reveals serious issues with the sport's spread and popularization in the country. The statistical data shown on Fig. 19 derived from the Register of Licensed Sports Federations and Sports Clubs, maintained by the Ministry of Youth and Sports, clearly outlines the regions in which there are registered Taekwondo (WT) clubs and their number.

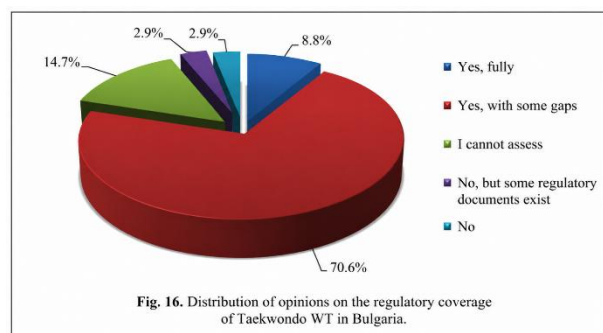


Fig. 16. Distribution of opinions on the regulatory coverage of Taekwondo WT in Bulgaria.

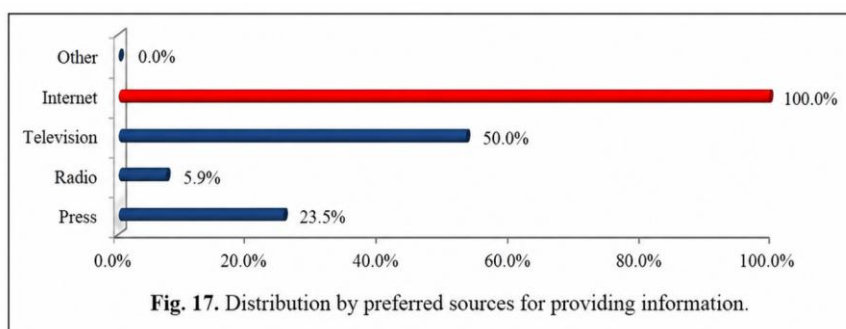


Fig. 17. Distribution by preferred sources for providing information.

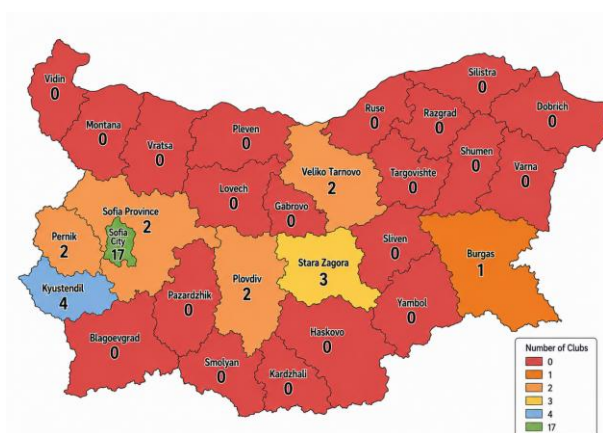


Fig. 19. Number of Taekwondo (WT) clubs by Province in Bulgaria

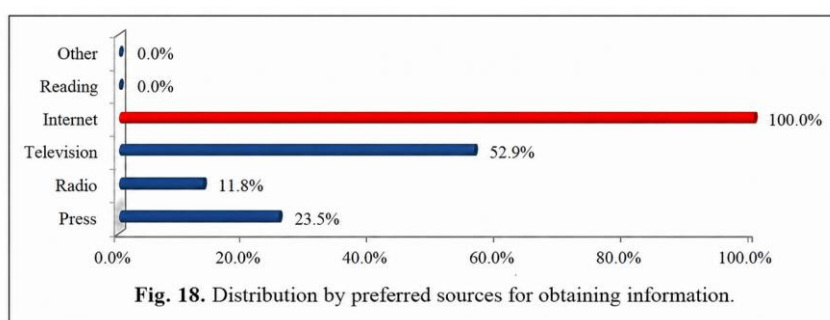


Fig. 18. Distribution by preferred sources for obtaining information.

The extreme geographic concentration of Taekwondo clubs within the Sofia City region (51.5% of all registered clubs) demands serious attention. A national sport system, like the Bulgarian Taekwondo Federation – WT, in which more than half of all organized activity is concentrated in the capital city, suffers from a lack of territorial reach necessary to build a sustainable national talent pipeline, develop regional coaching capacity, or engage local institutional stakeholders such as municipalities and regional sports and non-sport authorities. Stamenkov's (2022) research on regionalization in the Bulgarian Sports Federations clearly states that there are drastic differences in how each sports federation partitions regions. Based on the information above and the uneven territorial distribution of Taekwondo (WT) clubs in Bulgaria, it is necessary for BTF-WT to establish regions, each reflecting its own socio-economic, cultural and sports characteristics. That is an essential prerequisite for structuring and implementing strategic approaches to promoting and developing Taekwondo (WT) in the country.

The findings portray the Bulgarian Taekwondo (WT) system as a complex structure managed by experienced specialists but constrained by interrelated structural deficits. Its strong dependence on public funding limits the strategic autonomy of the BTF-WT and restricts its capacity to generate commercial revenue, improve facilities, and invest in specialized personnel. The resulting personnel mono-profile and the concentration of clubs in Sofia further hinder regional development and reinforce the system's dependence on state resources.

These deficits also have direct implications for the World Taekwondo MNA Ranking criteria. Limited institutional autonomy affects governance, geographic imbalance restricts participation, financial

dependence weakens sustainability, and insufficient professional staff reduces the federation's capacity to organize and deliver events. Addressing these problems separately would therefore have limited impact. A coordinated reform is required, integrating governance, revenue diversification, human resource development, infrastructure provision, and territorial expansion within a unified strategic framework.

Conclusions

The findings indicate that the system of Taekwondo (WT) in Bulgaria remains highly dependent on the policies and funding of the Ministry of Youth and Sports, while regional municipalities also play an important role in resource provision. The Bulgarian Taekwondo Federation – WT is perceived as less influential than its affiliated clubs, suggesting that it functions primarily as an administrative intermediary rather than as a strategic leader. This institutional weakness is accompanied by an uneven geographic distribution of clubs, which limits the national development and accessibility of the sport.

A decentralized regional governance model could address these structural deficiencies by establishing formal regional units with defined development strategies, responsibilities, resources, and performance indicators. While remaining subordinate to the BTF-WT, these units could exercise operational autonomy and adapt their activities to the specific conditions and level of Taekwondo development in each region. Such an approach would strengthen national coordination, improve territorial coverage, and reinforce the federation's governance legitimacy.

The study provides empirical evidence of the principal governance deficits in the management of Taekwondo (WT) in Bulgaria and offers a framework that may also be applicable to comparable sport organizations. However, the reliance on anonymous respondents holding active positions within the system creates a risk of insider bias and limits the external validity of the findings. Future research should therefore include the perspectives of additional stakeholder groups, particularly athletes, participants, and parents, to provide a more comprehensive assessment of the system.

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PHYSICAL EDUCATION PRESESERVICE TEACHER TRAINING AND PERCEIVED AND MEASURED HEART RATE IN PHYSICAL ACTIVITY INVESTIGATION AS BRIDGE WITH THE HEALTHY AND ACTIVE LIFESTYLE PROGRAM IN PRIMARY SCHOOL

Do Future Teachers Accurately Perceive Their Effort? Exploring the Gap Between Perceived and Measured Heart Rate

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Abstract

Physical activity promotion in schools depends not only on curricular structures but also on teachers' physical literacy and bodily awareness. The ability to recognise and interpret physiological signals, such as heart rate (HR), represents a foundational competence for effectively modelling and teaching healthy behaviours. This study aimed to examine the level of bodily awareness among preservice teachers by comparing analogue and digital HR measurements following two standardised physical tasks. A cross-sectional design was employed involving 202 preservice teachers enrolled in a physical education training program. Participants completed a 6-minute walk test and an agility test. Immediately after each task, HR was assessed using carotid artery palpation (analogue method) and a digital method using smartphone Apps. Paired-sample t-tests were conducted to compare HR values obtained through the two measurement approaches. Results revealed a consistent and statistically significant underestimation of HR when measured manually compared with digital monitoring in both the 6-minute walk test ($p < .001$) and the agility T-test ($p = .008$). These findings indicate limited interoceptive accuracy among preservice teachers and highlight discrepancies between perceived and actual physiological exertion. The study underscores the importance of integrating bodily awareness training and physiological self-monitoring into preservice teacher education. Combining analogue techniques with real-time digital biofeedback may enhance interoceptive competence, strengthen physical literacy, and better prepare future educators to promote safe and effective physical activity in school settings.

Introduction

Physical activity (PA) is universally recognised as a fundamental pillar of public health, significantly preventing non-communicable diseases such as cardiovascular conditions, diabetes, and obesity (Lee et al., 2012). Regular PA has also been linked to improved mental health outcomes, including reduced symptoms of anxiety and depression (Rebar et al., 2015), enhanced cognitive function (Hillman, Erickson, & Kramer, 2008), and an overall better quality of life. Importantly, the benefits of an active lifestyle begin in early childhood and continue throughout life, making schools a critical setting for instilling lifelong habits (Janssen & LeBlanc, 2010). Despite these benefits, global trends indicate a concerning decline in physical activity levels among youth, particularly in high-income countries where sedentary lifestyles are becoming increasingly common (Guthold et al., 2020). This decline seriously threatens individual and societal health, contributing to rising healthcare costs and decreased productivity (Ding et al., 2016). Addressing this issue requires a multi-level strategy, where educational institutions and teachers play a pivotal role in shaping attitudes and behaviours related to movement and health (Telama, 2009). Teachers serve as providers of knowledge and role models, whose physical literacy and enthusiasm can significantly influence students' engagement in physical activity. Schools are among the most important environments for promoting healthy behaviours among children and adolescents. As students spend a substantial portion of their daily lives in school, this setting offers structured opportunities to incorporate physical activity into daily routines (Centres for Disease Control and Prevention [CDC], 2013). School-based physical activity programs have improved physical health, academic performance, classroom behaviour, and student well-being (Rasberry et al., 2011). Teachers have a crucial dual role in this context: they are both implementers of physical education and powerful role models. Their attitudes and competencies regarding physical activity can strongly influence student engagement (Webster et al., 2013). When teachers demonstrate enthusiasm, self-efficacy, and bodily awareness, they are more likely to create a classroom climate

that encourages movement and health-promoting behaviours. Conversely, teachers who lack confidence in their physical abilities or do not understand how to monitor physiological cues may be less effective in delivering meaningful physical activity experiences (Zhu, Ennis, & Chen, 2011). Preservice teacher education shapes future educators' beliefs and competencies regarding PA promotion. A deeper understanding of one's body, including recognising and interpreting physiological responses during exercise, is essential for translating knowledge into effective teaching practices. However, this bodily awareness is not always prioritised in teacher training programs, potentially limiting future teachers' ability to engage students in health-enhancing PA activities. Despite growing evidence on the benefits of school-based physical activity, many preservice teachers enter the profession with a limited ability to recognise and manage their physiological responses during exercise (Sun, Li, & Shen, 2017). This lack of bodily awareness can affect their confidence and reduce the quality of physical activity sessions they deliver in schools (Durden-Myers, Green, & Whitehead, 2018). Physical literacy involves moving skillfully and confidently across a range of physical activities. Individuals need to understand how their bodies feel and react during exercise to develop this literacy. However, many teacher training programs do not emphasise this self-awareness (Whitehead, 2010). Without recognising basic signs such as changes in heart rate or perceived exertion, preservice teachers may face challenges teaching healthy habits and encouraging active participation in the classroom (Kwon, Welk, & Chen, 2019). Physically literate teachers are more likely to promote an active lifestyle among their students (Sallis et al., 2003). To enhance future teachers' confidence and ability to teach physical activity effectively, it is essential to equip them with analogue and digital tools for tracking physiological responses. Despite the widespread availability of heart rate monitors and other digital tools for tracking physiological data, their educational potential is often underutilised in preservice teacher training programs. Most programs focus on general teaching skills but provide limited practical experience in self-monitoring and interpreting physiological signals, such as heart rate, during physical activity. Consequently, many future teachers lack the confidence and competence to use these tools effectively or explain their significance to children. Additionally, there is a shortage of research on how well preservice teachers can assess their heart rates using analogue methods, such as carotid palpation, compared to digital monitors. This raises important questions about their bodily awareness and preparedness to integrate physiological literacy into their teaching practices. This study compares analogue and digital heart rate measurements after two physical activity tasks to identify potential gaps in self-assessment skills and bodily awareness among preservice teachers. Understanding these gaps could inform the development of more effective training approaches that help preservice teachers become confident, reflective educators capable of promoting physical activity in meaningful ways. This study aims to explore the level of bodily awareness among preservice teachers by engaging them in two physical tests and comparing their heart rate values obtained through analogue (carotid palpation) and digital (heart rate monitor) methods. By assessing their self-assessment accuracy and ability to reflect on physiological signals, this study seeks to enhance understanding of their preparedness to promote physical activity in school contexts. The expected results will likely reveal gaps in self-monitoring skills and underscore the need for integrating physiological education into preservice teacher training programs.

Methods

This study employed a cross-sectional design to assess bodily awareness during physical activity among preservice teachers by comparing analogue and digital heart rate (HR) measurements. The investigation took place in an academic setting, integrated within the regular coursework of a physical education teacher training program, ensuring high ecological validity. Two hundred thirty-eight preservice teachers at the University of Turin voluntarily participated in the study. The participants had a mean age of 24.7 ± 5.4 years, a mean body weight of 60.3 ± 11.4 kg, a mean height of 164.2 ± 17.5 cm, and an average BMI of 21.8 ± 3.3 . All participants were physically able to perform moderate-intensity activities and provided written informed consent before inclusion. Participation was voluntary, and no financial compensation was offered. Each participant completed two physical tasks in a controlled gymnasium setting: a 6-minute walk test (6MWT) and an agility T-test. Before beginning the tasks, participants were instructed to manually measure their heart rate at the carotid artery. They were also given a brief familiarisation session with the digital HR monitor. A five-minute standardised warm-up preceded the first test. Upon completing each test, participants were

immediately instructed to assess their HR using analogue and digital methods. Heart rate was measured using an analogue method via carotid pulse palpation and a digital method with a commercial device. For the analogic method, participants were instructed to count their carotid pulse for 15 seconds and multiply the result by four to estimate beats per minute. The digital method measurement using a smartphone app is intended for both Android and iOS devices. This setup allowed each subject to collect and view their HR data directly, promoting personal engagement with the monitoring process. Two physical tests were used to elicit cardiovascular responses: the 6-minute walk test (6MWT) and the agility T-test. The 6MWT was administered to estimate aerobic capacity through sustained moderate-intensity walking. The T-test evaluated agility by requiring participants to perform directional changes through lateral and backwards sprinting movements. Heart rate was assessed immediately after each test using analogue and digital methods to capture peak post-exertion responses. Paired-sample t-tests were conducted to compare heart rate values obtained through analogue and digital methods for each physical test. Statistical analyses were performed using the open source software JASP version 0.16.4 (University of Amsterdam, Amsterdam, the Netherlands). Statistical significance was set at $p < 0.05$. The study was conducted in accordance with the ethical standards of the Helsinki Declaration, and each participant provided informed consent. Participants were informed of the study's purpose, their right to withdraw at any time, and the confidentiality of their data.

Results

A total of 238 preservice teachers were initially enrolled in the study. However, 36 participants were excluded from analysis due to incomplete data. Reasons for exclusion included failure to meet inclusion criteria, failure to complete one or both physical tests, or difficulty properly recording heart rate values. The final sample consisted of 202 participants (190 females and 12 males) with complete and valid data sets. The mean height was 167.4 cm (SD = 110.8) for females and 175.5 cm (SD = 6.3) for males. Mean BMI was 26.96 kg/m² (SD = 65.06) for females and 23.93 kg/m² (SD = 3.87) for males. In the 6-minute walk test, female participants covered a mean distance of 580.5 meters (SD = 182.2), while males averaged 629.0 meters (SD = 200.2). Mean heart rate measured immediately after the test using analogic palpation at the carotid artery was 94.4 bpm (SD = 55.9) for females and 97.3 bpm (SD = 51.2) for males. The corresponding heart rate values recorded via the Polar H10 chest strap were 110.9 bpm (SD = 31.1) and 115.3 bpm (SD = 22.5) for females and males, respectively. During the T-Test of Agility, females completed the task in an average of 13.5 seconds (SD = 2.20), while males averaged 12.2 seconds (SD = 1.47). Heart rate values recorded after the T-test using carotid palpation were 88.9 bpm (SD = 46.0) for females and 86.8 bpm (SD = 43.4) for males. Heart rate measured with the Polar H10 was higher for both groups, with females averaging 108.0 bpm (SD = 89.9) and males 102.1 bpm (SD = 19.4). Paired-sample t-tests compared heart rate values measured through analogic (carotid artery palpation) and digital (Polar H10) methods. This analysis aimed to assess participants' ability to self-monitor their physiological responses following physical exertion, a key aspect of bodily awareness and physical literacy. In the 6-minute walk test, the mean heart rate measured via analogic palpation was 94.6 bpm (SD = 55.5), while the digital heart rate recorded with the Polar H10 was significantly higher at 111.1 bpm (SD = 30.6). The difference was statistically significant, $t(186) = -4.419$, $p < .001$, indicating that participants significantly underestimated their heart rate using the manual method. A similar trend was observed in the T-Test of Agility. The analogic heart rate measurement averaged 88.7 bpm (SD = 45.8), whereas the digital measurement reached 107.6 bpm (SD = 87.3). This difference was also statistically significant, $t(195) = -2.679$, $p = .008$, again suggesting that participants underestimated their exertion levels.

	Weight	Height	BMI (Kg/m ²)	6 minutes walking test	T-Test of Agility	6 minutes walking test heart rate analogic recording (Carotid artery)	6 minutes walking test heart rate digital recording (smartphone app)	T-Test of heart rate analogic recording (Carotid artery)	T-Test of heart rate digital recording (Smartphone app)
Valid	202	202	202	202	202	202	187	198	199
Missing	0	0	0	0	0	0	15	4	3
Mean	59.98	165.72	21.868	631.03	13.43	94.614	111.144	88.737	107.608
Std. Deviation	10.507	6.827	3.306	68.167	2.177	55.518	30.551	45.769	87.275
Minimum	40.00	145.00	15.000	280.00	9.800	18.000	38.000	20.000	50.000
Maximum	99.00	188.00	35.100	779.00	20.10	454.000	208.000	234.000	1278.000

Table 1. Descriptive statistics of participants' anthropometric characteristics and performance outcomes (N = 202). The table reports valid and missing cases, mean, standard

deviation, minimum, and maximum values for weight, height, body mass index (BMI), distance covered in the 6-minute walk test, time in the T-Test of Agility, and heart rate measured after each test using analogue (carotid artery palpation) and digital (smartphone apps) recording methods.

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
6 minutes walking test heart rate analogic recording (Carotid artery)	6 minutes walking test heart rate digital recording (smartphone app)	-4.419	186	< .001

Note. Student's t-test.

Table 2. Paired-sample t-test comparing heart rate values obtained through analogue (carotid artery palpation) and digital (smartphone app-based monitor) methods following the 6-minute walk test. Results indicate a statistically significant difference between measurement methods, with analogue recordings showing lower heart rate values than digital recordings ($t(186) = -4.419$, $p < .001$). Student's paired t-test was applied.

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
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T-Test of Agiliity hearth rate analogic recording (Carotid artery)	-	T-Test of Agiliity hearth rate digital recording (Smartphone app)	2.679	195	0.008
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Note. Student's t-test.

Table 3. Paired-sample t-test comparing heart rate values obtained through analogue (carotid artery palpation) and digital (smartphone app–based monitor) methods following the T-Test of Agility. A statistically significant difference emerged between the two measurement approaches ($t(195) = 2.679$, $p = .008$), indicating a discrepancy between analogue and digital heart rate recordings. Student’s paired t-test was applied.

Discussion

This study investigated preservice teachers' ability to self-monitor their physiological responses during two physical fitness tasks using analogue (carotid artery palpation) and digital (smartphone apps) methods. A total of 202 participants with complete data were included in the analysis, while 36 were excluded due to incomplete tests, measurement difficulties, or failure to meet inclusion criteria. Descriptive results showed that males generally performed better in the 6-minute walk test and the T-Test of Agility, covering greater distances and completing the agility task in less time, even though the gender distribution was markedly imbalanced (94.1% females and 5.9% males, reflecting typical demographics in teacher education programs)(Drudy, 2008). Across both tests, heart rate values obtained through digital monitoring were consistently higher than those measured manually. The inferential analysis confirmed this discrepancy: paired-sample t-tests revealed statistically significant differences between analogic and digital heart rate recordings in both the 6-minute walk test ($p < .001$) and the T-Test of Agility ($p = .008$). In both cases, analogic measurements underestimated heart rate compared to digital values. These results indicate a consistent pattern of underestimation in participants' physiological self-assessment, regardless of test intensity. These findings align with prior research demonstrating the limited reliability of manual pulse palpation techniques under exercise conditions. For example, studies have shown that manual carotid palpation underestimates heart rate, particularly after physical exertion, and performs poorly in accuracy and response time compared to digital monitoring tools (Suzuki et al., 2023). Wearable heart rate monitors using photoplethysmography (PPG) or chest straps have shown higher accuracy and consistency, especially in dynamic settings (Wallen et al., 2016). The consistent underestimation of the heart rate observed in this study suggests a limited interoceptive accuracy, the ability to perceive internal bodily states, among the preservice teachers. Interoception plays a crucial role in physical literacy, bodily awareness, and the regulation of physical effort (Herbert et al., 2012). It is well established that individuals inexperienced in physical monitoring, particularly under exertional stress, may have difficulty accurately perceiving physiological signals such as heart rate (Schandry, 1981; Ring & Brener, 2018). Incorporating real-time biofeedback via wearable technology has improved self-monitoring and motivation in physical activity contexts. For instance, heart rate monitoring in physical education or sport science programs helps learners adjust effort, engage more deeply in activity, and better understand physiological thresholds (Byun et al., 2017). When integrated into educational settings, such tools support interoceptive learning by helping participants align subjective perceptions with objective physiological feedback (Hargest et al., 2022). From a pedagogical perspective, these findings underscore the need to include analogic and digital monitoring strategies in preservice teacher training. Bodily awareness, particularly the recognition and interpretation of physiological cues such as heart rate, is a foundational skill for engaging in and promoting physical activity. Individuals with low interoceptive awareness may fail to regulate exercise intensity appropriately, experience reduced confidence during physical exertion, or misjudge effort levels, which can hinder long-term engagement in active lifestyles (Herbert et al., 2012; Ring & Brener, 2018). This awareness becomes doubly important for teachers: it is essential for their health and critical in shaping how physical activity is framed, taught, and encouraged in school contexts. For this reason, developing

competence in self-assessing physical effort enhances individual health literacy and equips future educators to model and teach accurate exercise monitoring to students. Preservice teachers who learn to monitor and reflect on their physiological responses during activity are better positioned to foster positive, competent, and safe physical activity experiences for children. In this sense, investing in bodily awareness training is not just a matter of personal competence but a pedagogical responsibility essential to the school's health-promoting role. This is particularly important given the increasing emphasis on health promotion and physical activity within school curricula. Therefore, findings from this study support the inclusion of specific education on the importance of physical activity and bodily awareness in preservice teacher training programs. In this way, bodily awareness is framed as a personal health skill and a professional teaching competence central to the school's educational mission of promoting lifelong engagement in physical activity.

Finally, this study presents some strengths and limitations. One of the main strengths of this study lies in its ecological validity. Data were collected in real-world educational settings during regular coursework, enhancing the relevance and applicability of the findings to actual preservice teacher training contexts. Furthermore, the study directly compared analogic and digital heart rate measurements, offering a pragmatic approach to assessing bodily awareness and highlighting the potential pedagogical benefits of integrating self-monitoring tools in teacher education. Another notable strength is the relatively large sample size ($n = 202$ with complete data), which enhances the analyses' statistical power and allows for more robust conclusions. The use of standardised physical tests (the 6 minutes walking test and the T-Test of Agility) also contributes to the study's methodological rigour. However, several limitations must be acknowledged. First, the sample showed a significant gender imbalance, with 94.1% of participants female. While this reflects the typical demographics of teacher education programs (Drudy, 2008), it limits the generalizability of findings, particularly concerning male preservice teachers. Second, the analogic heart rate measurements were self-reported and may have been influenced by participants' inexperience in pulse palpation techniques. Variability in manual counting accuracy could introduce measurement error, especially immediately post-exercise, when heart rate is elevated and difficult to assess without training. Third, the study relied solely on heart rate as an indicator of bodily awareness. While heart rate is a valid and widely used measure, bodily awareness (or interoception) encompasses a broader range of physiological and perceptual cues, including breathing rate, muscle fatigue, and perceived exertion. Future studies might consider including multimodal indicators or validated interoceptive accuracy tasks for a more comprehensive understanding. Lastly, the cross-sectional design limits the ability to assess changes over time or draw conclusions about long-term learning effects. Longitudinal or intervention-based designs would be needed to evaluate whether bodily awareness improves with targeted training in analogic and digital self-monitoring methods.

Conclusion

This study examined preservice teachers' ability to self-monitor their physiological responses during two standardised physical fitness tasks using both analogue (carotidartery palpation) and digital (smartphone apps) heart rate monitoring methods. The findings revealed a consistent underestimation of heart rate when participants relied on analogic techniques, regardless of exercise intensity. These results suggest limited interoceptive accuracy among preservice teachers and highlight the discrepancy between perceived and actual physiological effort. The observed differences between manual and digital heart rate values underscore the importance of fostering bodily awareness in teacher education as part of professional preparation. Given teachers' essential role in promoting physical activity and health literacy in school settings, the ability to recognise and interpret physiological cues such as heart rate should be considered a core competence. This study supports the inclusion of targeted educational interventions within teacher training programs to improve bodily awareness and self-monitoring skills. Combining traditional palpation techniques with real-time biofeedback tools can help preservice teachers calibrate their perceptions, develop interoceptive insight, and ultimately become more effective role models in guiding children toward lifelong engagement in physical activity.

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CURRICULAR PHYSICAL EDUCATION: CONTRIBUTION OF MOVEMENT SCIENCES TO THE DEVELOPMENT OF PREREQUISITES FOR SCHOOL SKILLS AND READING AND WRITING IN PRIMARY SCHOOL FROM AN EVIDENCE-BASED PERSPECTIVE

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Abstract

This study investigates the prerequisites for reading and writing in the academic curriculum for preservice teachers (primary and primary in national Italy school system), given the decline in written text comprehension performance among students attending Italian schools, as measured by national and international tests, estimated at between 25% and 35% (MIM, INVALSI, OECD, 2024). Reading and writing is a fundamental academic skill and an initial literacy process acquired primarily during primary school, not spontaneously. It is a complex skill that requires the development of prerequisites (visual, motor, and phonological) and the passage through stages. Guided Process: Unlike oral language, writing is not innate and requires systematic teaching, usually guided by an adult. Key Components: Includes cognitive skills such as phonological awareness, phonetics, motor fluency derived from functional grasp, and sign decoding (spatial orientation) to lead to text comprehension. Learning Stages: Develops through a hierarchical model, often starting from the logographic stage (visual-spatial recognition and production of logos - fine motor skills expressed through the functional grasp of the pencil-pen tool) up to full literacy. Prerequisites: Acquisition is prepared by skills that develop around 4-5 years of age (visual analysis and spatial orientation - graphic production through functional means) to convert phonemes into graphemes and viceversa. The aim of the research is to qualitatively investigate the prerequisites for reading and writing (grip) in a sample of approximately 300 subjects, preschool and primary school teachers in pre-service training in an academic setting. Results: 52.9% of the sample has a functional grip; On average, 19% of children in each category reported having received instruction from preschool and primary school teachers, or parents, and 38% did not know; 55.5% predominantly wrote in cursive, while the remaining 45.5% wrote in capital letters. Conclusions: Physical education and movement science are a core curriculum subject and active contributors to the development of prerequisite academic skills: reading and writing skills (grip and visual-spatial orientation) and executive functions, in accordance with the educational needs of children of digital natives in the third millennium. Physical education is based on evidence in sedentary lifestyles and reduced motor skills, due to cultural contexts (motor play has become digital sedentary play since early childhood) and lifestyle habits (use of devices and reduced functional motor skills for the cognitive and psycho-affective development of childhood).

Key words Physical Education – school based - teacher primary school– writing reading - grip

Introduction

In the contemporary educational context, reading comprehension is a key skill for academic success, access to subject knowledge, and active participation in social and cultural life. Despite its centrality, numerous pieces of evidence indicate that this skill is progressively weakening, with significant impacts on students' entire educational journey.

Reading comprehension cannot be considered a single skill; rather, it is a complex process that integrates linguistic, cognitive, and attentive components. Recent studies conducted on Italian school populations show that reading comprehension difficulties emerge already at school age and are attributable to differentiated skill profiles, in which decoding, basic linguistic skills, working memory, and executive control interact (Pasqualotto et al., 2024). These findings confirm that text

comprehension weaknesses are not solely due to linguistic deficiencies, but involve a broader system of cognitive and functional prerequisites.

From this perspective, international literature has highlighted the central role of reading fluency as a significant predictor of comprehension skills and overall academic performance. The ability to read accurately and automatically frees up cognitive resources for the processes of interpreting and integrating text semantics (Bigozzi et al., 2017). When this automation is not adequately consolidated, comprehension is more vulnerable, especially in the presence of complex texts or high cognitive demands.

Further scientific contributions emphasize how working memory is a key factor in the development of text comprehension, as it allows students to retain relevant information, establish connections between text parts, and construct a coherent representation of the overall meaning (Orsolini et al., 2023).

Recent research indicates that limitations in working memory are associated with lower comprehension performance, both in monolingual and bilingual contexts (Lam et al., 2024).

In addition to cognitive aspects, several studies highlight the influence of motivational and educational factors. The frequency and quality of reading experiences, as well as the educational practices adopted in school contexts, significantly impact the development of comprehension skills. In particular, teaching approaches that promote active student engagement and the conscious use of metacognitive strategies are associated with better learning outcomes (Guasconi & Vannini, 2025).

Within this framework, the progressive decline in reading comprehension skills represents a systemic issue, requiring targeted training interventions starting in initial teacher training. It is therefore essential to promote teaching models capable of integrating theoretical knowledge, scientific evidence, and reflective educational practices.

This paper fits into this context and proposes a RBL experience aimed at students in preservice academic training for teaching in the first cycle of education, with particular attention to the role of the motor and cognitive prerequisites of writing as functional components in the development of reading and comprehension skills.

This study investigates the prerequisites for reading and writing in the preservice academic curriculum for first cycle teachers (Italian preschool and primary school), in a situation where written text comprehension performance among students attending Italian schools has declined by an estimated 25% to 35%, as measured by national and international tests (MIM, INVALSI, OECD, 2024). The aim of the research is to qualitatively investigate the prerequisites for reading and writing (handling).

Methodology

1. Sample

The sample consisted of 230 participants ($N = 230$), who were administered a structured questionnaire designed to identify their demographic, educational, and professional characteristics, as well as their learning styles and use of handwriting.

All participants are enrolled in the degree program in Primary Education Sciences; most began their academic career by enrolling in the first year of the degree program qualifying for teaching in preschool and primary school (LM85s Primary Education Sciences) in the 2021/2022 academic year. The respondents' birth years ranged between 1965 and 2003, with a majority of those born in 2002.

Regarding gender, 95.65% of the sample were women and 3.91% were men; a residual portion did not provide a response.

Regarding their secondary education, 33.91% of participants reported having attended a high school specializing in humanities, 19.13% a high school specializing in science, and 13.04% a high school specializing in languages. The year in which they graduated ranged from 1984 to 2021, with a higher concentration in 2021.

From a professional perspective, the sample consisted primarily of individuals working in the school environment. 25.65% stated that they were not currently working and were participating in the survey as undergraduate students. Among the participants who teach, 22.17% work in preschool, 50.87% in primary school, and 1.30% in lower or upper secondary school.

Seniority was distributed as follows: 18.26% reported less than one year of experience, 25.65% between one and three years, and 36.96% more than three years. 18.26% stated they had no professional teaching experience.

The questionnaire surveyed participants' physical activity habits both during childhood and adulthood.

Regarding childhood, 22.61% stated they mainly practiced dance or aerobics, 22.17% swimming, and 14.35% team sports. 6.96% reported they either did not remember or had not participated in any structured physical activity.

Regarding current physical activity, 30.87% reported light walking, 18.70% gym training, and 8.70% reported no regular physical activity.

In terms of weekly frequency, 41.74% engage in physical activity two or three times a week, 30.87% once a week, and 12.61% more than three times a week.

The questionnaire investigated the key figures involved in learning to hold a graphic object and the methods used to acquire this skill. To the question "Who taught you to hold a graphic object?", 19.57% cited preschool teachers, 18.26% primary school teachers, and 19.57% parents. 38.26% stated they did not know or could not remember, while 2.61% cited grandparents.

Regarding learning methods, 60.00% reported direct practice with graphic tools (coloring, hatching, writing), 36.96% reported indirect learning through object manipulation, and 3.04% did not respond.

Regarding perceived self-efficacy in learning to write, 47.85% rated it high or very high (scores 7–8), 48.22% rated it medium (scores 4–6), and 3.94% rated it low or very low (scores 1–3).

Regarding perceived difficulty, 23.37% reported little or no difficulty (scores 0–2), 52.13% reported moderate difficulty (scores 3–5), and 24.51% reported high difficulty (scores 6–8).

Writing habits and tools used

The questionnaire analyzed writing habits in relation to digital and manual tools.

When using a smartphone, 89.57% of participants reported writing primarily with their thumb. When writing on a touch keyboard, 66.52% used two fingers on both hands, while 32.17% used only one finger. Regarding the personal computer keyboard, 88.26% typed using both hands, while 11.30% predominantly used their dominant hand. Regarding handwriting, 94.76% wrote with the right hand. 55.22% used cursive, 33.48% lowercase, and 10.87% uppercase.

Pen grip was measured by uploading a photograph of the user writing and comparing it with models from the literature. 51.30% of the sample had a functional grip with three dynamic fingers on the palm. The other types were distributed as follows:

Grip Types	Comparison between our grip and the proposed one
Dynamic three-finger in palmar saddle (functional)	51,30%
Praying mantis grip	0,87%
Bite grip	3,48%
Thumb forward grip	32,61%
Thumb forward fork grip	7,39%
Inner thumb grip	1,30%
ND	3,04%
Total	100,00%

The majority of the sample therefore had a functional grip, despite learning methods that often lacked explicit teaching. The prevalence of cursive writing indicates a still widespread and stable use of handwriting in the sample.

Based on the collected data, a program was developed to support the development of fine motor control, which is essential for the development of a functional grip. This is one of the prerequisites for writing, as set out in the National Guidelines for the Curriculum of the First Cycle of the Italian National Education System (MIUR, 2021-2018, MIM 2025) and as required by the professional profile of generalist teachers in preschool and primary school, within the teaching laboratories of the SSD MEDF01 Methodology and Teaching of Physical Education, First Cycle.

Starting from a guided selection of scientific articles on the topic of the prerequisites for reading and writing—with specific reference to the pen grip—using the Google Scholar and PubMed, ScienceDirect, and ResearchGate platforms. Some articles were selected, a photographic selection of 6 images of grips was collected (1 functional and 5 dysfunctional). This was followed by a laboratory activity: the group of students was divided into pairs. Each pair was given the task of writing a

sentence on a sheet of paper with a pen and their partner with a cell phone took a photo. Roles were exchanged and the pairs discussed how to classify their respective grips according to the 6 images under the supervision of the teacher. A questionnaire was prepared using Google Forms, which each student answered to record: a. the type of grip used among the 6 examined through the images taken and uploaded; b. remember who had taught them how to hold a pen for writing; c. which type of writing font used (cursive, capital letters, lowercase) as per teaching methodological practice in teaching reading and writing in the first cycle.

The following is a proposal for three simple activities that can be used daily to teach children aged 3 to 6 years old functional grip skills:

- Massage and sensitization of the depression between the thumb and index finger where the pen rests
- Thumb-index-middle finger pinch (mimicking a lion's roar with the fingers and the sound)
- Holding a small ball of paper between the ring and pinky fingers

Based on the evidence gathered from scientific articles, practicing these three activities transforms dysfunctional grips into functional ones through research data, evidence-based practices, and active and critical learning, also supported by data collected through questionnaires using Google Forms during the laboratory activity in real time while the training activities were taking place

Conclusion

Based on the collected data, a program was developed to support the development of fine motor control, which is essential for developing a functional grip. Writing is one of the prerequisites for writing, as required by the National Guidelines for the First Cycle Curriculum of the Italian National Education System (MIUR, 2021-2018, MIM 2025) and as required by the professional profile of generalist teachers in preschool and primary school, within the teaching laboratories of the SSD MEDF01 Methodology and Teaching of First Cycle Physical Education.

From this perspective, this contribution stands out for its innovative value in integrating movement sciences with the prerequisites for reading and writing, transcending a sectoral view of learning and recognizing the body and movement as an active role in cognitive and symbolic processes. The focus on preservice teachers represents a further element of originality, as it allows for intervention at a crucial stage in the construction of professional identity, with specific reference to disciplinary knowledge of teaching in the primary school system, and to scholastic skills from a multidisciplinary and transversal perspective, involving and placing the student at the center of the teaching and learning processes in secondary and secondary childhood, and seeking to meet contemporary educational needs. The approach followed has also allowed us to outline a curriculum of teaching practices based on scientific evidence as a model that can accompany teachers' career development throughout their personal and professional lives, in accordance with lifelong learning. This approach seeks to build a bridge between the preservice academic training period and become a model and an attitude that can be replicated and applied in in-service training

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ENJOYMENT AND PHYSICAL EDUCATION: EXPERIMENTAL STUDY FOR ENHANCING QUALITY PERFORMANCE IN PRIMARY PHYSICAL EDUCATION

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Abstract

Introduction: Enjoyment, defined as a positive and effective response to physical experience, is a recurring focus in the scientific literature, and it's a key aspect of promoting learning and motivation in physical activity (Scanlan & Simons, 1992). The content of this research concerns the analysis of the relationship between enjoyment and qualitative performance in school based physical education (PE) in childhood. Methods: Experimental research, sample 39 children (8–9 years old) in a northwest Italian primary school. The experimental group (EG) and a control group (CG). The EG was involved in an 8-week PE project, designed with the aim of increasing the quality of Physical Education (QPE) through deliberate evidence-based programs. The CG continued with a traditional design PE project based on the free game. The instruments were the TGMD (Test Gross Motor Development—quality skills assessment) (Ulrich, 1985) and the Physical Activity Enjoyment Scale (PACES) (assessment enjoyment level) (Carraro et al., 2008). The validated tests were administered at the EG and CG pre-post (after 8-week intervention) and follow-up (after 8-week post) according to the Physical Education Evidence-Based (Cazzoli, 2014). Results: The results showed a significant increase in the experimental group's scores (TGMD: +30%; PACES: +29%); in the control group, the changes scores were

less significant (TGMD: +2%; PACES: +5%). Moreover, a positive correlation was found between the changes in the mean scores of the two variables in the three survey times (CG $r = 0.966939$ - EG $r = 0.947469$). In contrast, when examining individual scores, analysed at only one survey time, no correlation was found (first survey, $r = 0.073386$). Discussion: First, the improvement in qualitative performance was shown to be associated with the increase in PACES scores within the context of the intervention. Therefore, increased feelings of enjoyment appear to have contributed to the improvement of TGMD scores in the experimental group within a broader contextual effect of the physical education program, rather than acting as a direct causal factor at the individual level. Second,

the single PACES test score is not predictive of qualitative performance in physical education. That is, having a high score on the PACES does not directly equate to being more proficient than those with lower scores. The results of the research suggest the need for further investigation of the relationship between physical education and evidence-based programs in order to design effective and efficient PE curricula, ensure educational quality for primary school students, and address motor development needs alongside opportunities for enhancing executive functions and cognitive skills.

Keywords: enjoyment, quality physical education, primary school, performance, motivation.

Introduction

The nature of experiences and the conditions under which learning occurs are of critical importance in contemporary research and teacher education. Consequently, numerous studies focus on basic emotions and their role in the learning process.

Due to its ambiguous nature, the term *enjoyment* is often used interchangeably with *fun*. This approach is problematic, as there are significant and distinct differences in meaning between the two (Podilchak, 1991). In fact, fun is a social construct activated through face-to-face interaction, where the individual participates externally or engages in the creation of a social-human relationship with another. Enjoyment, on the other hand, shares some similarities with the latter, but its activation process is more intrinsic or self-reflective, indicating a detachment from the emotions of others. Early studies on happiness and enjoyment are rooted in the classical era. In particular, Aristotle distinguished between two forms of happiness: *hedonia* and *eudaimonia*. Hedonia refers to the satisfaction of needs and desires, whereas eudaimonia pertains to the pursuit of self-actualization and a meaningful life (Deci & Ryan, 2008; Waterman, 1993).

In his research, Waterman examined the convergences and divergences between these two constructs. The results provided empirical evidence supporting the claim that self-actualization is a core component of optimal psychological functioning. Such experiences typically occur under specific conditions, characterized by:

- an unusually intense involvement in an undertaking;
- a sense of special fit or integration with a non-routine activity;
- a feeling of being intensely alive;
- a sense of completeness or fulfillment while engaged in the task;
- the impression of doing exactly what one ought to be doing; and
- the realization of one's true identity.

These experiences, defined in the article as "personal expressiveness," are closely linked to feelings associated with intrinsic motivation (Deci & Ryan, 1985) and flow (Csikszentmihalyi, 1988). Through activities that elicit personal expressiveness, individuals can achieve self-actualization by realizing their full potential and talents.

In recent years, there has been a growing interest in enjoyment within sport psychology literature. Scanlan and Simons (1992) define sport enjoyment as "a positive affective response to the sport experience that reflects generalized feelings such as pleasure, liking, and enjoyment" (p. 202). Within the context of physical education, the concept of enjoyment is also closely linked to self-determination and motivation. Indeed, research has shown that a task-involving motivational climate during physical education lessons is directly associated with feelings of enjoyment toward the subject. Enjoyment in physical education can be explained by the task-oriented environment, perceived physical competence, and intrinsic motivation in both girls and boys (Gråstén et al., 2012).

Furthermore, enjoyment can be considered a key element as it serves as a significant predictor of physical activity. Specifically, it predicts both the intention to initiate regular physical or sporting activity and the commitment to maintain it over time. This interest increases student participation in lessons, where enjoyment provides immediate rewards for physical activity (Vallerand et al., 1997). Additionally, research has shown that when students experience enjoyment during these sessions, their opinions and attitudes toward the subject improve as a result (MacPhail et al., 2008).

In a different line of research, analyzing enjoyment across various physical activities, it was found that games were more appreciated than dance or gymnastics; moreover, enjoyment in every activity was positively correlated with perceived success (Baron & Downey, 2007). Similarly, research focusing on children and adolescents in team sports has examined the role of enjoyment and motivational climate in relation to personal development. Results demonstrated that positive

sporting experiences were predicted by peer affiliation, self-referenced competence, effort, and a task-oriented climate. Conversely, negative experiences were predicted by an ego-involved climate and other-referenced competence (MacDonald et al., 2011).

Indeed, even in other contexts, it has been found that in team sports, the primary sources of enjoyment include greater effort and mastery, positive team interactions and support, supportive coaching, and satisfaction with seasonal performance (Scanlan et al., 1993).

As outlined in this section, the scientific literature provides a broad range of evidence demonstrating the benefits of enjoyment and motivation in physical education, as well as the most effective ways to foster these feelings and attitudes. The present research investigates the relationship between enjoyment in physical education and qualitative performance, defined here as the proficiency of gross motor development. Furthermore, it aims to emphasize the importance of designing evidence-based programs intended to enhance both enjoyment and the overall quality of physical education.

Specifically, the focus will be on the school-age population, involving primary school children in Northern Italy.

The rationale for this investigation stems from the necessity to identify effective strategies for enhancing motor competence in primary school. It is essential to develop approaches that increase student participation by optimizing physical education programs. This study aims to provide evidence to refine the educational framework, ensuring a genuine improvement in motor proficiency as a fundamental step toward promoting an active lifestyle.

Materials and Methods

To address the primary research question—specifically, whether a relationship exists between enjoyment levels in physical education and gross motor development—a quasi-experimental two-group design was employed. The sample consisted of a total of 39 children (20 males and 19 females), aged between 8 and 9 years, from primary schools in Northern Italy. Due to the impossibility of selecting a specific sampling method, a convenience sampling approach was adopted.

The experimental group participated in a structured physical education intervention consisting of two weekly one-hour sessions over an eight-week period, totaling 16 lessons. The protocol was designed to manipulate enjoyment levels as a key variable to observe its impact on motor competence. To achieve this, the intervention specifically leveraged the Quality Physical Education (QPE) framework, optimizing the pedagogical environment to foster higher enjoyment. To ensure internal validity, the intervention was grounded in these evidence-based guidelines. Conversely, the parallel class served as a control group, following a traditional teaching approach based on free play.

Regarding data collection, two standardized tests were administered concurrently to both groups: The Test of Gross Motor Development - TGMD (Ulrich, 1985) → detected through the compilation of assessment grids, qualitative performance in physical education, specifically focusing on six items: three skills from Subtest 1: Locomotion (run, gallop, and hop) and three skills from Subtest 2: Object Control (stationary bounce, catch, and overhand throw).

The Physical Activity Enjoyment Scale – PACES (Kendzierski & DeCarlo, 1991), specifically the Italian version (PACES-it) validated by Carraro, Young, and Robazza (2008), which assessed individual enjoyment levels through a questionnaire.

Different scoring strategies were applied to the data analysis for each assessment tool. Regarding the TGMD, for each of the three assessment periods, an individual total score was first calculated for every participant by summing the points obtained across all six items. These individual totals were then used to calculate the overall group mean for each specific measurement.

For the PACES, the final score was determined by summing the scores of the 9 positive items and subsequently subtracting the total of the 7 negative items. The theoretical range of this test was established by calculating the extreme potential scores: the maximum score (+38) is achieved when all positive items are rated at the highest value and all negative items at the lowest. Conversely, the minimum score (-26) results from the opposite combination. These scoring methods were applied consistently across all assessment periods to provide a standardized framework for interpreting the results.

Data collection was carried out at eight-week intervals and occurred concurrently for both groups. Specifically, the research design was structured into three assessment phases:

Initial Phase: Administration of Test 0 (pre-test) to both groups to establish the baseline and verify the initial status of participants before the intervention.

Intervention Period: Over eight weeks, the Experimental Group (EG) participated in the evidence-based PE program, while the Control Group (CG) followed traditional PE lessons.

Post-test Phase: Immediately after the eight-week intervention, Test 1 (post-test) was performed by both groups to compare the effects of the two different programs.

Follow-up Phase: After an additional eight-week period without intervention, Test 2 (follow-up) was administered to both groups to monitor the stability of the results and determine if any observed variations were maintained over time.

Data were processed according to the following protocol. In the first phase, results were organized into tables and graphs to allow for a preliminary description of the trends in both groups, analyzing their average progress. Subsequently, a statistical analysis was conducted by calculating the main indices of central tendency (mean, mode, median) and dispersion (range, standard deviation), as well as percentage changes between the different assessments.

To compare the groups, inferential statistical analyses were performed using paired-sample t-tests to evaluate within-group differences between the different testing points (Test 0, Test 1, and Test 2) for both TGMD and PACES-it scores.

Furthermore, the relationship between enjoyment and motor performance was investigated using Pearson's correlation coefficient at different levels of analysis. Specifically, correlations were calculated at the group level using mean scores across the three assessment periods, as well as at the individual level using change scores between Test 0 and Test 2 (Δ values), in order to examine whether variations in enjoyment were associated with variations in motor performance over time.

Results and Discussion

The results obtained from the analysis of the data collected during experimentation are reported below. These were analyzed individually and in combination across the various tests.

TGMD

Regarding the TGMD, an initial general overview is presented to highlight the main differences between the two sample groups.

First, the variations in the mean scores for each item across the three assessments are analyzed. For the experimental group (Figure 1.A), a constant increase can be observed from the initial test through to the final one, with a percentage change ranging between 17% and 51% across the various items (Run: +17%, Overhand Throw: +30%, Gallop: +22%, Hop: +22%, Catch: +51%, Stationary Dribble: +48%).

In fact, although with varying degrees of intensity, all item scores showed clear growth over the course of the assessments. In contrast, for control group, the observed differences were minimal (Figure 1.B), with percentage changes ranging between -10% and +6% (Run: +6%, Overhand Throw: +4%, Gallop: +6%, Hop: +5%, Catch: -10%, Stationary Dribble: -3%).

The total mean variations for both groups are reported below, confirming the analysis above: EG +30%, CG +2%.

To conclude the TGMD test analysis, descriptive statistics for the three assessment periods are provided (Table 1). These indices reflect the total scores obtained by each participant across all six items. Furthermore, the analysis includes measures of central tendency—specifically the mean, median, and mode—along with key dispersion indices to describe the distribution of the results. It is important to note that the mean offers a different perspective in the data analysis: while individual total scores highlight personal performance, the mean allows for a collective evaluation of group trends and a direct comparison between the experimental and control groups over time.

For the experimental group, a gradual decrease in data dispersion was observed. This is evidenced by the reduction in both the range (from 11 to 8) and the standard deviation (from SD: 3.13 at Test 0 to SD: 2.29 at Test 2). This reduction in dispersion, coupled with the increase in the mean, suggests generalized improvement across the group. In the final two assessments, the mode and median were higher than the mean, indicating a negatively skewed distribution where the majority of participants achieved scores above the average.

In contrast, the control group showed fluctuating dispersion. The range shifted from 12 to 8, before rising again to 9, while the standard deviation followed a similar pattern (from 2.95 to 2.02, then

2.55). Despite these fluctuations, the final dispersion values remained lower than the baseline. The mean for the control group showed only a slight increase between the first and final tests, with the distribution characterized by a majority of scores above the mean.

These data suggest that the intervention program led to a positive trend in gross motor development within the experimental group, as evidenced by the consistent improvements observed across the different test items compared to the control group.

PACES-it

Regarding the PACES-it, a general overview of the trends observed in both groups across the three assessment periods is presented.

Analysis of the mean scores (Table 1) reveals that the control group initially maintained a higher mean compared to the experimental group. However, this mean remained relatively stable throughout the study, showing no significant modifications between assessments, aside from a slight increase.

In contrast, while the experimental group started with a considerably lower baseline score than the control group, a substantial increase was observed between the first and second tests. Following this initial surge, the mean remained nearly constant, showing only a minor additional growth at the follow-up.

To better analyze the collected data and their changes across the three assessment periods, descriptive statistics (Table 1) are provided, including indices of central tendency and dispersion for the PACES-it scores recorded at each stage.

Regarding the experimental group, a notable decrease in the range was observed between the first and second tests (dropping from 38 to 27), a trend that subsequently stabilized in the third assessment.

Similarly, the standard deviation showed a consistent reduction between the first two tests, despite a slight increase recorded in the third (moving from SD: 12.4 to 7.8, and finally 8.3). Overall, these results indicate a general reduction in data dispersion throughout the three assessments.

Analyzing the indices of central tendency, the median was consistently higher than the mean across all tests. This highlights a negatively skewed distribution, with the tail extending toward the lower scores. Furthermore, particularly in the first test where the discrepancy between the mean and median was most pronounced, the majority of the data points lie above the mean. This suggests the presence of a few extreme outliers—specifically, very low scores—that significantly pulled the average down, despite the overall positive trend of the group." Referring specifically to the control group, a slight overall decrease in data dispersion can be observed. Regarding the indices of central tendency, the median is higher than the mean in all three tests. This comparison denotes a negatively skewed distribution; in fact, the majority of the values are positioned above the mean.

Comparisons

This section focuses on the comparison between the two primary variables examined in this study.

First, an overview of the changes in the mean scores across the different testing periods is presented.

The data regarding the percentage changes recorded between Test 0 and Test 2 provide an initial comparison between the two sample groups (Table 1). As shown, the experimental group experienced very similar percentage increases in both TGMD and PACES scores—specifically, an improvement of 30% and 29%, respectively. A similar trend was observed in the control group, which showed much smaller increases of 2% and 5%, respectively.

The similarities found within each group's results, combined with the significant difference in the magnitude of change between the two groups, provide initial evidence supporting a possible association between the two variables.

Furthermore, it is important to note that, in this research, the enjoyment variable plays a dual role: it serves as a dependent variable in relation to the physical education program, and as an independent variable regarding the improvement of qualitative performance. In this initial analysis, enjoyment is examined specifically as an independent variable.

To extract further insights from these findings, inferential statistical analyses were conducted. Paired-sample t-tests showed that in the control group, no statistically significant differences were found between Test 0 and subsequent measurements for either TGMD ($p = 0.78$) or PACES-it ($p = 0.39$). In contrast, the experimental group showed a statistically significant improvement in TGMD scores ($p = 0.0004$) and a significant increase in PACES-it scores ($p = 0.04$) between Test 0 and Test 1.

By observing the two scatter plots in the appendix (Figure 2 A-B), it is evident that a positive correlation exists between the two variables at the group level. In fact, despite the differences in the data, a direct proportionality between the mean scores of the PACES and TGMD tests is observable in both groups.

The data pairs used to generate these graphs consist of the means from both groups across the three assessment periods. Based on these elements, the correlation coefficients were calculated as follows:

CG $r = 0.966939$

EG $r = 0.947469$

As the results show, both correlation coefficients are above 0.9, indicating a strong positive correlation at the group level.

However, to better understand the nature of this relationship, individual change scores between Test 0 and Test 2 were also analysed. Pearson correlation analysis revealed no meaningful linear association between changes in enjoyment and motor performance at the individual level, with $r = -0.06$ for the control group and $r = -0.02$ for the experimental group.

Furthermore, to accurately interpret these results, it is essential to consider the number of data pairs examined, which in this case is three for the group-level analysis. It should also be noted that relying exclusively on the correlation coefficient can be misleading, as it specifically detects only linear relationships.

Given these premises, the two variables are analyzed from different perspectives. In this first section, the relationship was evaluated from a diachronic perspective, taking into account their respective changes over time. Subsequently, the existence of a potential relationship was examined in a static situation, considering only the data collected at a single assessment point and for each individual separately.

Regarding the first assessment (Test 0) and referring to the entire sample—including data from both groups—the resulting correlation coefficient was 0.073386 (Figure 3), indicating no association between the variables at baseline.

Conclusions

In conclusion, the ultimate aim of the present study was to investigate a possible relationship between enjoyment and qualitative performance in physical education within primary schools. The general hypothesis suggested that an increase in enjoyment—understood as “a positive and effective response to physical experience, reflecting a general feeling of pleasure and enjoyment” (Scanlan & Simons, 1992, pp. 203–204)—would be associated with improvements in motor performance.

Firstly, regarding enjoyment as a dependent variable, the results demonstrate the effectiveness of the evidence-based physical education intervention, which was designed to enhance both student engagement and motor competence. Data analysis revealed a significant increase in PACES scores within the experimental group, compared to the control group, where changes were minimal. This improvement was maintained over time, suggesting a stable effect of the intervention.

Similarly, TGMD results indicated a significant improvement in the experimental group, whereas the control group showed only marginal variations. These findings support the effectiveness of the intervention in promoting both enjoyment and gross motor development. In this regard, the increase in enjoyment should not be interpreted as a direct predictor of motor performance at the individual level.

Rather, it appears to have contributed to improving the overall learning environment, enhancing students' engagement, motivation, and quality of participation during physical education activities.

This contextual improvement may have facilitated better conditions for learning and skill acquisition, which in turn is reflected in the observed improvements in motor competence at the group level.

However, when examining the relationship between the two variables, different patterns emerged depending on the level of analysis. At a group level, both variables showed parallel increases over time. In contrast, individual-level correlation analysis between change scores from Test 0 to Test 2 did not reveal a meaningful linear association between enjoyment and motor performance.

Therefore, while enjoyment and motor competence appear to improve simultaneously within the context of an effective physical education program, the present findings do not support a direct linear relationship between the two variables at the individual level. Rather, their development may be influenced by shared contextual factors related to the quality of the intervention.

Despite the limited sample size, the results suggest that evidence-based physical education programs can positively influence both enjoyment and motor development in primary school students. These findings underline the importance of designing structured and engaging physical education environments that support both affective and motor outcomes.

In conclusion, the observations from this study suggest that enjoyment and qualitative performance do not operate as strictly dependent variables at the individual level; instead, they appear to be jointly enhanced within a well-designed educational context. Further research with larger samples is needed to clarify the nature of this relationship and to explore its long-term implications for motor development and student engagement.

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Figure 1
TGMD item mean scores for Experimental Group (A) and Control Group (B) at Test 0, Test 1, and Test 2.

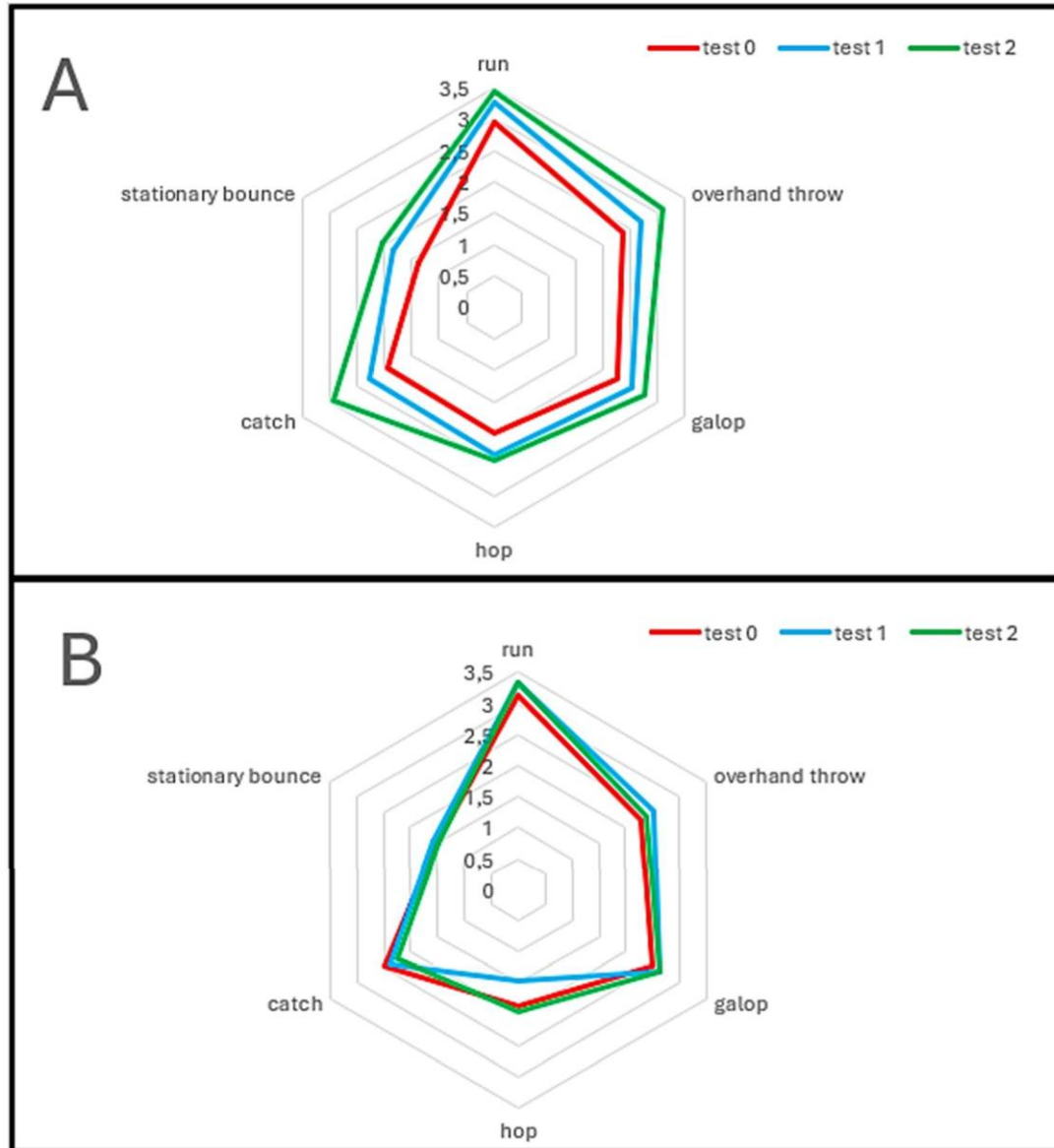


Table 1

Descriptive statistics and percentage changes for TGMD and PACES-IT scores: A comparison between Experimental and Control groups across the three assessment phases.

TGMD										
	EXPERIMENTAL GROUP					CONTROL GROUP				
	Range	Standard Deviation	Mean	Median	Mode	Range	Standard Deviation	Mean	Median	Mode
Test 0	11	3,13	12,94	12,5	12	12	2,95	13.76	14	14
Test 1	9	2,78	15,06	15,5	16	8	2,02	13.9	15	15
Test 2	8	2,29	16,78	17	18	9	2,55	14	14	14
Percentage Change*			+30%					+2%		
PACES-IT										
	EXPERIMENTAL GROUP					CONTROL GROUP				
	Range	Standard Deviation	Mean	Median	Mode	Range	Standard Deviation	Mean	Median	Mode
Test 0	38	12,395	23,111	28,5	33	19	6,402	32,095	34	38
Test 1	27	7,826	28,778	30,5	N.d.	18	6,159	33,333	36	38
Test 2	27	8,328	29,778	31,5	38	17	5,144	33,571	36	38
Percentage Change*			+29%					+5%		

*Between Test 0 and Test 2

Figure 2

Correlation Between Mean Enjoyment and Mean TGMD Scores Across Three Time Periods for Experimental (A) and Control (B) Groups.

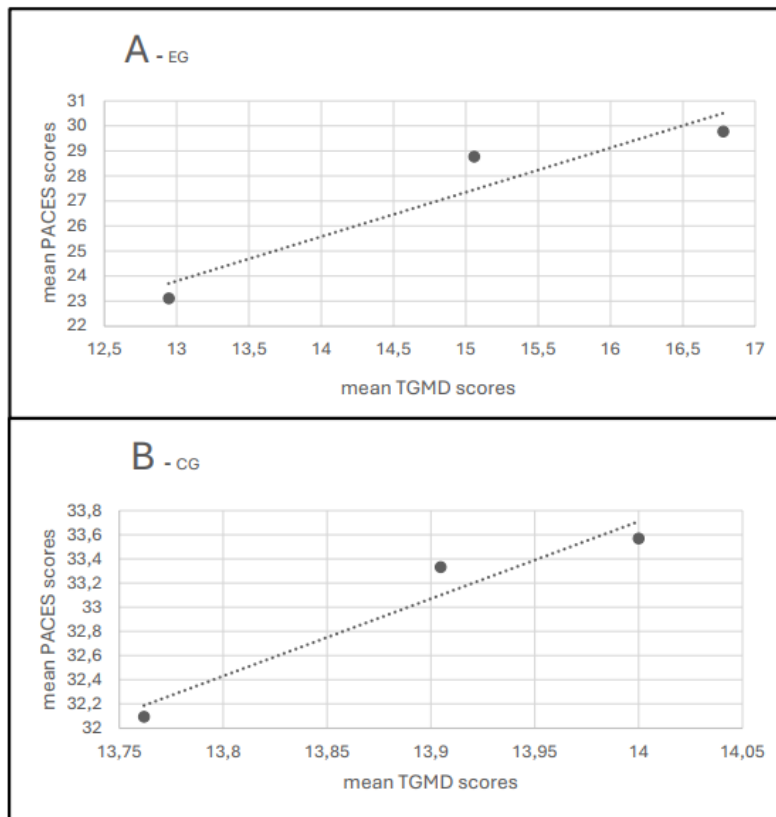
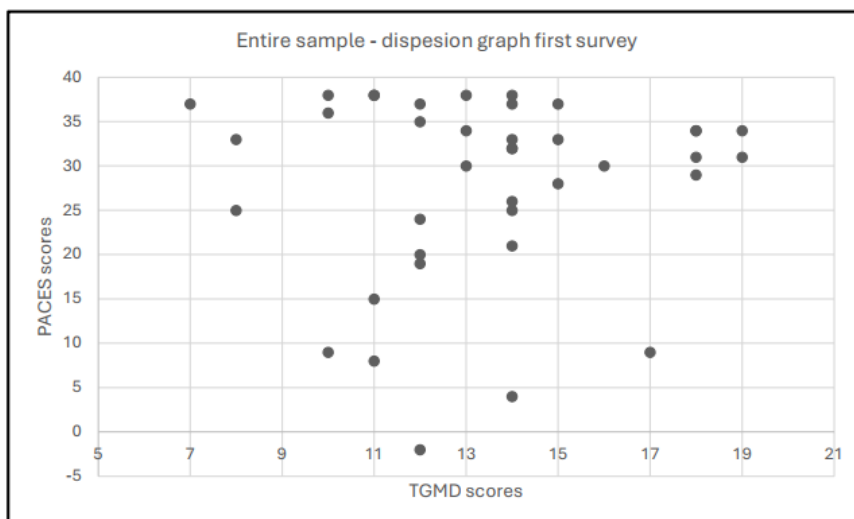


Figure 3

Correlation Between Individual Enjoyment and TGMD Scores for the Entire Sample at Test 0



PERFORMANCE DYNAMICS IN STRENGTH SPORTS: A COMPARATIVE AGE-RELATED ANALYSIS OF ELITE MALE MEDALISTS

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Abstract

This study compared age-related patterns of elite male performance in Olympic weightlifting and powerlifting. A retrospective descriptive analysis was conducted using official competition protocols and results books from major international championships. The database comprised 564 medal performances by 300 unique weightlifting medalists and 431 medal performances by 241 unique powerlifting medalists. Mean age was calculated by sport and medal position, and each athlete's earliest recorded podium result was used to analyze age at first medal. Differences between gold, silver, and bronze medalists within each sport were small: mean ages were 24.87, 25.35, and 24.61 years in weightlifting and 29.55, 29.60, and 29.89 years in powerlifting, respectively. The overall mean age was 24.94 years in weightlifting and 29.68 years in powerlifting, a difference of 4.74 years. First-medal age also differed clearly: the peak was 21 years in weightlifting and 26 years in powerlifting. By age 26, 80.67% of weightlifting medalists had achieved their first recorded medal, whereas 53.53% of powerlifting medalists achieved it after age 26. The findings indicate an earlier and more concentrated elite-realization profile in weightlifting and a later, broader developmental profile in powerlifting.

Keywords: strength sports; weightlifting; powerlifting; elite performance; age dynamics

Introduction

Strength sports are well suited to retrospective performance analysis because competitive success is expressed through objective outcomes: the total lifted and the final ranking. Research on peak competitive age has shown that the timing of elite performance varies across sports and should be interpreted in relation to each discipline's physiological and technical demands (Allen & Hopkins, 2015). Previous analyses have also demonstrated sport-specific performance development in Olympic weightlifting and powerlifting (Huebner & Perperoglou, 2019; Solberg et al., 2019).

Although both disciplines depend on high levels of strength, their performance structures differ. Olympic weightlifting requires the snatch and the clean and jerk, combining maximal force with speed, coordination, mobility, and technical precision. Powerlifting evaluates maximal strength in the squat, bench press, and deadlift, and performance may continue to improve through accumulated training experience, muscular development, and technical refinement. These differences suggest that the age at which athletes reach and maintain international medal level may not be identical.

Most descriptions of elite achievement emphasize the final result or medal position. Age at medal and age at first medal add a developmental perspective. The former describes the typical age of podium performance, whereas the latter indicates when an athlete first enters the medal-winning level within the analyzed competition set. Comparison of medal positions can additionally show whether champions have a distinct age profile from other podium athletes.

The aim of this study was therefore to identify sport-specific age patterns among elite male medalists in Olympic weightlifting and powerlifting. The analysis addressed three questions: (1) whether mean age differs between gold, silver, and bronze medalists; (2) how the overall age profile differs between the two sports; and (3) how age at first recorded medal is distributed among unique athletes.

Materials and Methods

The study used a retrospective comparative design based on publicly available official results. Male athletes who placed first, second, or third in selected major international competitions were included. The weightlifting dataset covered medalists from the Olympic Games, World Championships, and European Championships; the powerlifting dataset covered medalists from World and European Classic Championships. Powerlifting results were limited to Classic/Raw competition, excluding equipped events. Junior, youth, sub-junior, masters, disqualified, incomplete, and non-medal results were excluded.

Official protocols, results books, and federation result systems were the primary sources (European Powerlifting Federation, n.d.; European Weightlifting Federation, n.d.; International Powerlifting Federation, n.d.; International Weightlifting Federation, n.d.). They were prioritized for competition, category, ranking, athlete identity, country, and total result. Athlete profiles and other reliable public records were used only when additional verification of date of birth or identity was required.

For each medal performance, the database recorded sport, competition, date or year, weight category, medal position, athlete, country, date of birth, age at event, total result, and individual lifts when available. Age at event was calculated in decimal years from date of birth and competition date. When only the birth year was available, 1 July of that year was used as a consistent mid-year estimate and the case was flagged in the dataset. Names, duplicate records, missing values, and age calculations were reviewed before analysis.

Two analytical units were applied. For mean age by medal type, every medal performance was counted separately because each podium result represented a distinct elite performance. For age at first medal, each athlete was counted once, using the earliest medal-winning performance recorded within the dataset. First-medal age was summarized by exact age and by six groups: ≤ 20 , 21–23, 24–26, 27–29, 30–32, and ≥ 33 years. The analysis was descriptive: means, frequencies, percentages, and selected cumulative percentages were calculated. No inferential statistical tests were applied in this stage.

The study used only information already published in official records and involved no intervention or direct contact with athletes. Results were analyzed and reported in aggregated form.

Results and Discussion

The final database included 564 weightlifting medal performances by 300 unique athletes and 431 powerlifting medal performances by 241 unique athletes. Weightlifting comprised 188 gold, 188 silver, and 188 bronze performances; powerlifting comprised 144 gold, 144 silver, and 143 bronze performances (Table 1). The difference in sample size reflects the different competition structures included for the two sports.

Table 1. Dataset structure and mean age of medalists

Sport	Podium results (n)	Athletes (n)	Gold mean age (n)	Silver mean age (n)	Bronze mean age (n)	Overall mean age
Weightlifting	564	300	24.87 (188)	25.35 (188)	24.61 (188)	24.94
Powerlifting	431	241	29.55 (144)	29.60 (144)	29.89 (143)	29.68

Note. Values are mean age at the medal-winning performance; n is the number of medal performances.

Within each sport, differences between medal positions were minor. In weightlifting, the largest contrast was 0.74 years between silver and bronze medalists; in powerlifting, the full range between the three medal means was only 0.34 years. Gold medalists were therefore not systematically younger or older than other podium athletes. Medal contention in each discipline occurred within a relatively narrow sport-specific age range.

The between-sport contrast was considerably larger. The overall mean age was 24.94 years in weightlifting and 29.68 years in powerlifting, a difference of 4.74 years. Across individual medal types, powerlifting medalists were approximately four to five years older. This pattern is consistent with previous evidence that world-class weightlifting tends to reach peak performance earlier than powerlifting (Solberg et al., 2019).

A plausible interpretation is that the highly explosive and technically constrained movements of weightlifting favor earlier specialization and a younger elite profile. Powerlifting depends more directly on maximal strength across three lifts, and gains in muscle mass, technical efficiency, and accumulated training exposure may support continued improvement at later ages. These explanations are compatible with the observed data but should not be interpreted as direct causal findings, because training history and physiological characteristics were not measured.

Age at first recorded medal showed an even clearer distinction. The most frequent exact age was 21 years in weightlifting and 26 years in powerlifting. In weightlifting, 15.00% of unique athletes achieved their first recorded medal by age 20 and 65.67% did so between ages 21 and 26. Altogether, 80.67% had achieved a first medal by age 26. In powerlifting, only 46.47% had done so by that age; 53.53% achieved their first recorded medal after age 26 (Table 2).

Table 2. Distribution of age at first recorded medal among unique athletes

Age group	Weightlifting (%)	Powerlifting (%)
≤20 years	15.00	0.83
21–23 years	36.67	17.01
24–26 years	29.00	28.63
27–29 years	13.00	20.33
30–32 years	5.67	13.69
≥33 years	0.67	19.50

Note. Each athlete was counted once, at the earliest medal-winning performance recorded in the dataset.

The grouped distribution emphasizes the contrast. In weightlifting, the largest group was 21–23 years (36.67%), followed by 24–26 years (29.00%), while first medals after age 32 were exceptional (0.67%). Powerlifting displayed a broader and later distribution: 20.33% first medaled at 27–29 years, 13.69% at 30–32 years, and 19.50% at ≥33 years. Thus, late entry to international medal level was relatively common in powerlifting but rare in weightlifting.

The practical implication is not that fixed age limits determine success. Rather, the observed distributions can inform realistic long-term development. Weightlifting pathways may require earlier identification, systematic technical development, and timely transition to senior international competition. Powerlifting appears to offer a longer developmental window, meaning that athletes who have not reached medal level in early adulthood may still progress to elite performance later. Several limitations should guide interpretation. Only male medalists were included, so the findings do not describe the full competitive field or female performance. The competition sets were not identical because weightlifting is an Olympic sport and powerlifting is not. Age at first medal refers to the first medal within the analyzed dataset and may not equal the athlete's first major career medal if an earlier competition was outside the study scope. Some birth dates were estimated from year-only information, and the analysis was descriptive rather than inferential. Nevertheless, the large structured dataset provides a clear initial comparison of age-related elite-performance profiles.

Conclusions

Elite male medalists in Olympic weightlifting and powerlifting showed distinctly different age profiles. Medal position itself was associated with little variation in mean age within either sport, but powerlifting medalists were, on average, 4.74 years older than weightlifting medalists. The first-medal analysis reinforced this difference: weightlifting was concentrated in early adulthood, with a peak at 21 years and 80.67% of athletes reaching their first recorded medal by age 26, whereas powerlifting peaked at 26 years and more than half of athletes first medaled after that threshold.

The results support two sport-specific models of elite realization: an earlier and more concentrated model in weightlifting and a later, extended model in powerlifting. Coaches and sport scientists should therefore avoid treating strength sports as a single developmental category. Age should be considered together with competitive results when evaluating athlete progression, planning long-term preparation, and setting realistic expectations for entry into international medal-level performance. Future research should extend the analysis to female athletes and non-medal finalists, apply inferential and longitudinal methods, and examine how individual lift structure, category changes, repeated medal success, and career duration interact with age.

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ADAPTIVE PHYSICAL THERAPY STRATEGIES FOR MAINTAINING QUALITY OF LIFE UNDER CHANGING HEALTH CONDITIONS

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Abstract

Introduction: Every individual has an optimal physical activity regimen that supports a satisfactory quality of life. However, substantial changes in baseline health parameters due to injury or illness often result in a decline in quality of life. In such cases, implementing specialized physical therapy and rehabilitation programs is essential to help individuals adapt to the altered functional state of their bodies. These programs—including individualized exercise regimens and modifications to daily living conditions—play a crucial role in maintaining quality of life following health changes. The aim of this literature review is to synthesize current evidence on physical therapy and rehabilitation strategies for this population and to evaluate their effectiveness in preserving or enhancing quality of life under changing health conditions.

Methods: A systematic review of peer-reviewed publications was conducted using PubMed, Scopus, Web of Science, and Ukrainian scientific journals. Keywords included: "adaptive physical therapy," "rehabilitation," "quality of life," "functional adaptation," and "health status change." Selected studies focused on physiotherapeutic and rehabilitation interventions for individuals with functional impairments arising from injury or illness. The primary approaches to these interventions were analysed with the objective of improving participants' quality of life to a level that meets their individual needs.

Results: The literature review indicates that specialized physical therapy and rehabilitation programs that integrate targeted physical exercises, functional tasks, and real-life adaptations are effective in maintaining satisfactory quality of life for affected individuals. Evidence demonstrates improvements in mobility, functional independence, self-efficacy, and engagement in regular physical activity. Basic physiological parameters, such as blood pressure and heart rate, also show positive trends among

participants. Recent research conducted in Ukraine further highlights the value of individualized rehabilitation programs in restoring functional status and sustaining an adequate quality of life in individuals experiencing health changes.

Discussion: The evidence supports the implementation of modern physical therapy and rehabilitation programs for individuals whose functional status has been altered by injury or illness. Individualized programs contribute to enhanced functional adaptation, sustained physical activity, and maintenance of a stable quality of life. Moreover, integrating adaptive physical therapy into long-term healthcare and rehabilitation frameworks may reduce disability rates, enhance resilience in specific populations, and improve overall well-being.

Keywords: physical therapy, rehabilitation, quality of life, literature review

Introduction

The preservation and improvement of quality of life (QoL) represent fundamental goals of modern healthcare systems, rehabilitation sciences, and public health policy. Advances in medicine have significantly increased survival rates following traumatic injuries, neurological disorders, cardiovascular diseases, cancer, and chronic musculoskeletal conditions. However, prolonged survival is frequently accompanied by persistent physical limitations, psychosocial difficulties, and reduced participation in everyday activities. Consequently, contemporary rehabilitation no longer focuses exclusively on survival or symptom management but increasingly emphasizes long-term adaptation, independence, social participation, and maintenance of satisfactory quality of life (World Health Organization [WHO], 2023).

Health-related quality of life is a multidimensional construct that includes physical functioning, emotional well-being, social participation, cognitive functioning, and subjective perceptions of health status. According to the WHO (2023), QoL reflects an individual's perception of their position in life within the context of their cultural environment, personal goals, expectations, and social relationships. Significant changes in health status—whether caused by trauma, chronic disease, neurological impairment, or age-related decline—can profoundly disrupt all dimensions of human functioning. These changes often reduce mobility, independence, occupational capacity, social engagement, and psychological stability, thereby creating long-term rehabilitation needs.

In recent decades, rehabilitation sciences have undergone a substantial conceptual transformation. Traditional biomedical models primarily concentrated on correcting physical impairments, whereas modern rehabilitation increasingly adopts a biopsychosocial perspective that recognizes the interaction between biological, psychological, environmental, and social determinants of health (Zanatta et al., 2023). This paradigm shift has promoted the development of adaptive rehabilitation strategies aimed not only at restoring physical function but also at facilitating successful adaptation to altered health conditions and improving overall life satisfaction.

Adaptive physical therapy refers to individualized rehabilitation interventions specifically designed to accommodate changes in functional capacity while maximizing independence, participation, and well-being. Such interventions may include therapeutic exercise programs, neuromuscular re-education, gait and balance training, adaptive physical activity, environmental modification, assistive technologies, virtual rehabilitation systems, and psychosocial support strategies (WHO, 2023). Unlike standardized rehabilitation approaches, adaptive rehabilitation programs are continuously modified according to patient progress, functional limitations, personal goals, and psychosocial needs.

The growing importance of adaptive physical therapy is strongly associated with demographic and epidemiological trends observed worldwide. Population aging, increasing prevalence of chronic diseases, and rising numbers of individuals living with disability have created substantial demands for long-term rehabilitation services. According to global rehabilitation estimates, approximately 2.4 billion people currently live with conditions that could benefit from rehabilitation interventions (WHO, 2023). Neurological disorders, musculoskeletal diseases, cardiovascular conditions, cancer survivorship, and post-traumatic impairments remain among the leading contributors to long-term disability and reduced QoL globally.

Neurological rehabilitation represents one of the most rapidly developing areas of adaptive physical therapy. Conditions such as stroke, Parkinson's disease, multiple sclerosis, traumatic brain injury, and spinal cord injury often result in persistent impairments requiring prolonged and individualized rehabilitation management. Recent evidence suggests that adaptive interventions integrating robot-

assisted therapy, virtual reality (VR), computer-mediated exercise, and neuroplasticity-based approaches can significantly improve motor recovery, functional independence, and quality of life among neurological populations (Olana et al., 2025; Zanatta et al., 2023).

Stroke rehabilitation is particularly important due to the high prevalence of post-stroke disability worldwide. Many stroke survivors experience chronic impairments affecting mobility, upper limb function, speech, cognition, and social participation. VR-based rehabilitation systems have demonstrated promising results in improving activities of daily living, upper extremity motor recovery, and patient motivation during rehabilitation (Olana et al., 2025). Similarly, robot-assisted rehabilitation technologies appear effective in enhancing repetitive task-oriented training and supporting motor relearning processes through intensive, individualized interventions (Zanatta et al., 2023).

Another important area of adaptive rehabilitation involves the use of digital health technologies and tele-rehabilitation systems. The rapid expansion of digital healthcare has transformed rehabilitation delivery models by increasing access to therapy outside traditional clinical settings. Home-based rehabilitation programs utilizing wearable devices, mobile applications, exergames, and telemonitoring systems allow patients to continue therapeutic activities independently while maintaining communication with healthcare professionals. These approaches became particularly relevant following the COVID-19 pandemic, which highlighted the importance of remote rehabilitation services and continuity of care (Rüth et al., 2023).

Research indicates that home-based and technology-assisted rehabilitation may improve treatment adherence, physical functioning, and patient autonomy while reducing healthcare costs and transportation barriers (Rüth et al., 2023). Furthermore, artificial intelligence (AI)-enhanced rehabilitation systems are increasingly capable of adapting exercise intensity and feedback according to real-time patient performance. Such technologies may improve personalization, engagement, and therapeutic efficiency, especially in patients requiring long-term rehabilitation support (Niculescu et al., 2026).

Adaptive physical activity and sports participation also represent critical components of modern rehabilitation frameworks. Physical inactivity is strongly associated with secondary health complications, reduced cardiovascular fitness, depression, and social isolation among individuals with disability or chronic disease. Participation in adaptive sports has been linked to improvements in physical endurance, muscular strength, emotional resilience, self-esteem, and social inclusion (Chen et al., 2024; Isidoro-Cabañas et al., 2023). Importantly, adaptive sports contribute not only to physiological rehabilitation but also to identity reconstruction and community integration following major health changes.

Recent systematic reviews demonstrate that adaptive physical activity interventions positively affect both physical and psychological dimensions of quality of life among individuals with physical disabilities (Chen et al., 2024). Moreover, participation in structured physical activity programs may reduce symptoms of anxiety and depression while enhancing self-efficacy and long-term adherence to healthy lifestyle behaviors (Isidoro-Cabañas et al., 2023).

Psychosocial adaptation represents another essential dimension of rehabilitation. Individuals experiencing major changes in health status frequently encounter emotional distress, reduced self-confidence, altered social roles, and difficulties adjusting to new functional realities. Consequently, successful rehabilitation requires not only physical restoration but also psychological support, motivational interventions, and social reintegration strategies. Studies involving patients with spinal cord injury and other disabling conditions emphasize the importance of personalized rehabilitation approaches that foster emotional resilience, self-management, and participation in meaningful life activities (Singh et al., 2018).

The importance of adaptive rehabilitation has become especially pronounced in Ukraine due to the growing number of individuals requiring long-term rehabilitation following war-related injuries, trauma, neurological complications, and psychological stress. Ukrainian healthcare institutions increasingly recognize the necessity of individualized rehabilitation programs that integrate physiotherapy, occupational therapy, psychosocial support, and community-based rehabilitation services. Current rehabilitation reforms in Ukraine emphasize patient-centered care models aligned with international standards and WHO rehabilitation recommendations.

Despite substantial progress in rehabilitation sciences, several challenges continue to limit the effectiveness and accessibility of adaptive rehabilitation interventions. Rehabilitation outcomes often vary depending on patient age, severity of impairment, comorbidities, socioeconomic conditions, healthcare infrastructure, and availability of qualified rehabilitation professionals. In many countries, rehabilitation services remain underfunded and inaccessible to large segments of the population. Furthermore, the heterogeneity of rehabilitation protocols and outcome measures complicates the development of universal evidence-based clinical guidelines.

Another important challenge concerns the long-term sustainability of rehabilitation outcomes. Many patients experience reductions in physical activity and functional independence after completing formal rehabilitation programs. Consequently, there is increasing interest in rehabilitation models that promote lifelong adaptation, self-management, and community participation rather than short-term clinical recovery alone.

In addition, researchers increasingly emphasize the need for culturally sensitive and individualized rehabilitation technologies capable of addressing diverse linguistic, social, and environmental contexts. Emerging AI-assisted rehabilitation systems and digital therapeutic platforms may provide new opportunities for scalable and personalized rehabilitation delivery; however, further research is needed to evaluate their long-term effectiveness, accessibility, and ethical implications (Niculescu et al., 2026).

Given these considerations, adaptive physical therapy should be viewed not only as a medical intervention but also as a multidimensional strategy supporting human functioning, resilience, and participation throughout the lifespan. Understanding the effectiveness of various adaptive rehabilitation approaches is therefore essential for improving healthcare quality and optimizing long-term patient outcomes.

The purpose of this literature review is to synthesize contemporary scientific evidence regarding adaptive physical therapy and rehabilitation strategies for individuals experiencing changing health conditions and to evaluate their effectiveness in maintaining or improving quality of life. Particular attention is devoted to individualized rehabilitation models, neurological rehabilitation, adaptive physical activity, digital rehabilitation technologies, psychosocial adaptation, and community-based rehabilitation approaches.

Materials and Methods

This study was performed as a comprehensive narrative literature review designed to identify, analyze, and synthesize current scientific evidence on adaptive physical therapy and rehabilitation strategies aimed at maintaining or improving quality of life in conditions of changing health status. The methodological approach was chosen to ensure an integrative understanding of modern rehabilitation practices, emerging technologies, and individualized therapeutic interventions applied in patients with functional impairments resulting from injury, chronic disease, neurological disorders, or other significant health-related conditions.

The review process was guided by the principles of evidence-based medicine and the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Although the present study does not represent a full meta-analysis, PRISMA-based procedures were applied to ensure transparency, consistency, and methodological rigor during the selection and evaluation of scientific sources.

A systematic search of scientific literature was performed using several international electronic databases recognized for indexing high-quality biomedical and rehabilitation research. The primary databases included PubMed, Scopus, Web of Science, Google Scholar, and the Cochrane Library. In addition, Ukrainian academic repositories and professional rehabilitation journals were examined to include regional studies and recent developments in Ukrainian rehabilitation science. The inclusion of both international and Ukrainian sources allowed for a broader understanding of adaptive rehabilitation practices across different healthcare systems and sociocultural contexts.

The literature search primarily included publications from 2015 to 2026, a period marked by significant advances in rehabilitation sciences, particularly in digital rehabilitation technologies, virtual reality interventions, robot-assisted therapy, telemedicine, and AI-supported systems. Earlier foundational studies were also included when they provided essential contributions to the theoretical understanding of functional adaptation and quality of life maintenance.

To identify relevant publications, a combination of controlled vocabulary terms and free-text keywords was applied. The primary search terms included “adaptive physical therapy,” “physical rehabilitation,” “functional adaptation,” “quality of life,” “health status change,” “adaptive exercise,” “neurological rehabilitation,” “virtual reality rehabilitation,” “robot-assisted therapy,” “community-based rehabilitation,” “adaptive sports,” and “home-based rehabilitation.” Boolean operators such as AND and OR were used to combine keywords and refine the search strategy. Additional manual searches were conducted by reviewing the reference lists of selected articles to identify potentially relevant studies that may not have appeared during the initial database search.

The selection process involved several consecutive stages. Initially, titles and abstracts identified through the database search were screened to assess their relevance to the objectives of the review. Publications that clearly focused on unrelated topics, pharmacological interventions without rehabilitation components, or purely surgical approaches were excluded at this stage. Full-text articles were then retrieved and evaluated according to predefined inclusion and exclusion criteria. Studies were included in the review if they met several important conditions. First, the publication had to be written in English or Ukrainian to ensure accurate interpretation and analysis. Second, the study needed to investigate adaptive physical therapy, physiotherapy, rehabilitation interventions, or related supportive strategies aimed at improving functional adaptation or quality of life. Third, the study population had to include individuals experiencing changes in functional status due to injury, chronic illness, neurological disorders, musculoskeletal impairments, disability, or age-related decline. Finally, the selected studies were required to report outcomes associated with physical functioning, mobility, independence, participation in activities of daily living, psychosocial adaptation, or quality of life indicators.

A wide range of study designs was considered eligible for inclusion. These included randomized controlled trials, cohort studies, longitudinal observational studies, systematic reviews, meta-analyses, and qualitative investigations focusing on patient experiences and rehabilitation outcomes. Including diverse methodological approaches allowed for a multidimensional understanding of adaptive rehabilitation processes and their impact on both physiological and psychosocial aspects of health. At the same time, several exclusion criteria were applied to maintain the scientific relevance and quality of the review. Conference abstracts without accessible full texts, opinion papers lacking empirical evidence, duplicate publications, and studies with insufficient methodological transparency were excluded. Studies exclusively addressing pharmaceutical treatment without rehabilitation-related interventions were also omitted. Additionally, highly specialized pediatric studies unrelated to adaptive rehabilitation principles were not included unless they provided important insights into functional adaptation and quality-of-life improvement.

Following study selection, data extraction was performed systematically. Information from each study was organized into analytical categories, including study design, participant characteristics, sample size, health conditions, rehabilitation interventions, duration and intensity of therapy, assessment tools, and outcomes related to quality of life and functional adaptation.

Special attention was devoted to identifying rehabilitation approaches that emphasized personalization and adaptation to individual patient needs. Consequently, the analysis focused not only on traditional physiotherapeutic methods but also on innovative interventions such as virtual reality rehabilitation, adaptive sports programs, tele-rehabilitation, wearable technologies, robot-assisted movement training, and AI-supported rehabilitation systems. Psychosocial rehabilitation strategies and community-based support models were likewise considered due to their growing importance in modern rehabilitation frameworks.

The collected data were analyzed using thematic synthesis, allowing identification of recurring concepts, therapeutic trends, and outcome patterns across heterogeneous studies. Key thematic domains included individualized exercise interventions, neurological rehabilitation, adaptive sports, home-based rehabilitation, digital rehabilitation technologies, and psychosocial adaptation, which formed the basis for the Results and Discussion section.

Overall, the selected methodological approach allowed for a comprehensive synthesis of contemporary evidence regarding adaptive physical therapy and rehabilitation strategies. The integration of multidisciplinary research findings provided a broad perspective on the role of adaptive rehabilitation in supporting quality of life among individuals experiencing changing health conditions.

Results and Discussion

Adaptive Physical Therapy and Functional Adaptation

The analysis of contemporary scientific literature demonstrates that adaptive physical therapy plays a central role in maintaining and improving quality of life among individuals experiencing significant changes in health status. Across diverse clinical populations, adaptive rehabilitation interventions have been associated with improvements in mobility, muscular strength, postural control, cardiovascular endurance, balance, self-efficacy, and participation in activities of daily living (World Health Organization [WHO], 2023). Importantly, rehabilitation outcomes are increasingly evaluated not only through physiological indicators but also through broader dimensions of health-related quality of life, social participation, and psychological well-being.

One of the most consistently reported findings in rehabilitation research is the importance of individualized therapeutic planning. Patients with similar diagnoses often demonstrate substantial differences in functional impairments, adaptive capacity, cognitive status, emotional resilience, and social support systems. Consequently, rehabilitation programs tailored to individual patient needs appear significantly more effective than generalized therapeutic protocols (Levack et al., 2016). Personalized rehabilitation strategies allow clinicians to modify intervention intensity, exercise complexity, environmental conditions, and psychosocial support according to patient progress and long-term goals.

Recent multidisciplinary rehabilitation models emphasize the integration of physical therapy, occupational therapy, psychosocial support, and patient education into coordinated treatment frameworks. Studies focusing on outpatient and community-based rehabilitation indicate that integrated interventions contribute to improvements in physical functioning, independence, emotional adaptation, and social reintegration among individuals with acquired brain injury, chronic pain, neurodegenerative disorders, and oncological diseases (Zanatta et al., 2023; Cieza et al., 2021). These findings support the growing recognition that rehabilitation should address the full spectrum of human functioning rather than isolated physical impairments alone.

Adaptive rehabilitation additionally contributes to the prevention of secondary complications frequently associated with chronic disability and reduced mobility. Long-term physical inactivity may increase the risk of cardiovascular disease, obesity, osteoporosis, metabolic dysfunction, and depression. Accordingly, sustained participation in adaptive physical activity and rehabilitation programs appears essential for preserving long-term health and functional independence (Bull et al., 2020).

Another important aspect identified in the reviewed literature concerns patient engagement and adherence to rehabilitation. Studies demonstrate that rehabilitation programs emphasizing goal-setting, autonomy, and meaningful activities produce higher levels of patient motivation and long-term participation (Maclean et al., 2002). Patient-centered rehabilitation approaches therefore represent a critical component of successful adaptive therapy.

Neurological Rehabilitation

Neurological rehabilitation remains one of the most extensively investigated domains within adaptive physical therapy research. Neurological disorders such as stroke, traumatic brain injury, Parkinson's disease, multiple sclerosis, spinal cord injury, and cerebral palsy often produce long-term or progressive impairments requiring continuous therapeutic adaptation.

Stroke rehabilitation constitutes a major area of contemporary rehabilitation science because stroke remains one of the leading causes of disability worldwide. Stroke survivors commonly experience motor impairments, spasticity, cognitive dysfunction, speech disturbances, and reduced participation in everyday activities. Evidence from systematic reviews and meta-analyses suggests that adaptive rehabilitation interventions significantly improve mobility, upper limb function, gait performance, and activities of daily living among stroke patients (Olana et al., 2025; Winstein et al., 2016).

Virtual reality (VR)-based rehabilitation has emerged as a particularly promising intervention in neurorehabilitation. VR environments provide immersive, repetitive, and task-oriented training that may stimulate neuroplasticity and improve motor relearning processes. Studies indicate that VR-assisted rehabilitation enhances patient motivation and engagement while producing positive effects on upper extremity function, balance, and gait performance after stroke (Laver et al., 2017; Olana et al., 2025).

Similarly, robot-assisted rehabilitation technologies have gained increasing attention due to their ability to deliver highly repetitive and precisely controlled movement training. Robot-assisted gait and upper limb therapies may facilitate intensive rehabilitation while reducing therapist burden. According to Zanatta et al. (2023), combining robotic rehabilitation with virtual reality interventions may further improve health-related quality of life and functional recovery among neurological populations.

Research involving patients with Parkinson's disease also demonstrates the effectiveness of adaptive exercise programs. Balance training, gait retraining, resistance exercise, dance-based rehabilitation, and dual-task interventions have shown positive effects on mobility, fall prevention, and psychosocial functioning in Parkinsonian populations (Allen et al., 2013). In patients with multiple sclerosis, individualized physical activity programs improve fatigue management, muscular endurance, and emotional well-being (Motl et al., 2017).

Adaptive rehabilitation additionally plays an important role in spinal cord injury recovery and long-term adjustment. Qualitative studies indicate that personalized locomotor training and adaptive exercise contribute not only to physical improvement but also to identity reconstruction, self-confidence, and emotional resilience (Singh et al., 2018). Many patients describe rehabilitation as a process of redefining functional independence and restoring social participation following life-altering injuries.

Participation-oriented rehabilitation approaches are increasingly emphasized in neurological rehabilitation frameworks. Beyond improving motor function, modern rehabilitation aims to enhance community integration, occupational participation, communication abilities, and quality of life. Egan et al. (2025) reported that adaptive interventions designed to increase participation after stroke significantly improved social reintegration and functional autonomy.

Adaptive Sports and Physical Activity

Adaptive sports and structured physical activity programs have become essential components of modern rehabilitation practice. Participation in adaptive physical activity contributes not only to physiological recovery but also to psychological adaptation, social inclusion, and long-term health maintenance.

Systematic reviews consistently demonstrate that adaptive sports improve cardiovascular fitness, muscular strength, flexibility, endurance, balance, and motor coordination among individuals with physical disabilities (Chen et al., 2024; Isidoro-Cabañas et al., 2023). Moreover, adaptive sports participation has been associated with reductions in anxiety, depressive symptoms, social isolation, and perceived disability.

An important benefit of adaptive sports concerns their influence on self-efficacy and social identity. Individuals participating in wheelchair basketball, adaptive swimming, para-athletics, and other inclusive sports frequently report enhanced confidence, autonomy, and emotional well-being (Groff et al., 2009). Rehabilitation researchers increasingly recognize adaptive sports as valuable tools for facilitating psychosocial recovery and community participation.

Long-term adherence to physical activity remains a major challenge among individuals living with chronic disease or disability. Adaptive sports programs appear particularly effective in promoting sustained participation because they combine therapeutic exercise with enjoyment, competition, and social interaction. Chen et al. (2024) found that wheelchair users participating in adaptive sports consistently demonstrated higher quality-of-life scores and greater social engagement compared to inactive individuals.

Adaptive physical activity interventions are also beneficial among pediatric populations. Children with neuromotor disorders who participate in individualized physical activity programs demonstrate improvements in gross motor performance, participation, emotional regulation, and social functioning (Faccioli et al., 2025). Early adaptive intervention may therefore contribute to improved long-term developmental outcomes and social inclusion.

Furthermore, evidence suggests that adaptive physical activity may positively affect neurocognitive functioning. Exercise interventions have been associated with improvements in executive functioning, attention, mood regulation, and neuroplasticity among individuals with neurological disorders and age-related cognitive decline (Erickson et al., 2019).

Home-based rehabilitation and digital therapeutic technologies represent rapidly expanding areas of rehabilitation science. Growing healthcare demands, aging populations, limited rehabilitation workforce capacity, and geographical barriers have increased interest in remote and technology-assisted rehabilitation models.

Commercial exergames, wearable sensors, mobile rehabilitation applications, and telehealth systems have demonstrated positive outcomes in improving physical functioning and quality of life among individuals requiring long-term rehabilitation (Rüth et al., 2023). These interventions allow patients to continue therapeutic exercise outside clinical settings while maintaining rehabilitation continuity. Home-based rehabilitation offers several important advantages, including increased accessibility, reduced transportation barriers, lower treatment costs, and greater flexibility for patients and caregivers. Studies indicate that remote rehabilitation may achieve outcomes comparable to clinic-based therapy when interventions are appropriately individualized and monitored (Cramer et al., 2019).

Digital rehabilitation technologies additionally promote patient autonomy and self-management. Real-time biofeedback systems, wearable motion sensors, and AI-driven adaptive platforms can dynamically adjust exercise intensity and therapeutic recommendations according to patient performance. Emerging AI-supported rehabilitation systems may therefore enhance personalization and treatment precision (Niculescu et al., 2026).

Virtual reality technologies have become particularly influential in digital rehabilitation. VR systems create interactive therapeutic environments capable of simulating functional tasks and real-world activities. Such systems may improve patient motivation, adherence, and motor learning through immersive and engaging rehabilitation experiences (Laver et al., 2017).

Tele-rehabilitation also gained significant importance following the COVID-19 pandemic. During periods of restricted healthcare access, remote rehabilitation services became essential for maintaining continuity of care among vulnerable populations. Current evidence suggests that tele-rehabilitation may remain an important component of future rehabilitation systems due to its scalability and accessibility (Prvu Bettger et al., 2020).

Nevertheless, digital rehabilitation technologies also present several challenges. Technological literacy, internet accessibility, financial barriers, and limited clinician training may reduce the effectiveness of remote rehabilitation in some populations. Ethical considerations related to data privacy and equitable access additionally require further attention.

Community-Based Rehabilitation and Equity

Community-based rehabilitation (CBR) represents an important strategy for promoting long-term adaptation, social inclusion, and equitable access to rehabilitation services. CBR programs emphasize locally accessible interventions that integrate healthcare, education, vocational support, and social participation into community environments.

Exercise-based community rehabilitation programs positively influence mobility, physical functioning, and quality of life among individuals with amputations, neurological disorders, and chronic musculoskeletal conditions (Müller et al., 2023). Community rehabilitation may also reduce institutional dependence and support independent living.

Despite growing recognition of rehabilitation as a human right, substantial inequities in rehabilitation access persist globally. The WHO (2023) estimates that many individuals requiring rehabilitation services do not receive adequate care due to shortages of rehabilitation professionals, inadequate healthcare infrastructure, and financial barriers.

These challenges are particularly relevant in low-resource and conflict-affected regions, including Ukraine. The ongoing consequences of war-related trauma, neurological injuries, amputations, and psychological stress have substantially increased rehabilitation demands within the Ukrainian healthcare system. Consequently, scalable community-based and home-based rehabilitation models are becoming increasingly important.

Socioeconomic factors also strongly influence rehabilitation outcomes. Lower income, reduced education, and limited social support are associated with poorer rehabilitation participation and reduced quality-of-life outcomes (Cieza et al., 2021). Addressing rehabilitation inequities therefore requires not only medical interventions but also broader policy initiatives aimed at improving healthcare accessibility and social inclusion.

Psychosocial Adaptation and Quality of Life

An important theme emerging from the reviewed literature is the close relationship between physical rehabilitation and psychosocial adaptation. Rehabilitation outcomes extend far beyond physiological recovery and include emotional well-being, identity reconstruction, social integration, and perceived autonomy.

Individuals experiencing major health changes frequently encounter anxiety, depression, social withdrawal, reduced self-esteem, and difficulties adapting to altered life circumstances. Consequently, rehabilitation programs that incorporate psychological support and social participation strategies demonstrate superior long-term outcomes (Singh et al., 2018).

Adaptive rehabilitation contributes to resilience by helping patients redefine personal goals and reconstruct meaningful life roles following illness or injury. Goal-oriented rehabilitation approaches emphasizing self-management and participation are associated with improved motivation and psychological adaptation (Levack et al., 2016).

The biopsychosocial rehabilitation model provides an effective framework for understanding these multidimensional recovery processes. Interdisciplinary rehabilitation teams involving physiotherapists, occupational therapists, psychologists, physicians, speech therapists, and social workers are particularly effective in addressing complex rehabilitation needs.

Importantly, social support represents a critical determinant of rehabilitation success. Family involvement, peer support, community participation, and therapeutic relationships significantly influence adherence, emotional adaptation, and quality-of-life outcomes (Maclean et al., 2002).

Overall, the reviewed evidence demonstrates that adaptive physical therapy represents a comprehensive and multidimensional process aimed not only at restoring physical function but also at promoting long-term adaptation, resilience, participation, and quality of life among individuals living with changing health conditions.

Conclusions

The findings of this literature review confirm that adaptive physical therapy and rehabilitation strategies represent essential components of contemporary healthcare systems aimed at preserving and improving quality of life among individuals experiencing changing health conditions due to injury, chronic disease, neurological disorders, disability, or age-related functional decline. Modern rehabilitation is no longer limited to the restoration of isolated physical functions but increasingly focuses on comprehensive human functioning, long-term adaptation, psychosocial well-being, and social participation.

The reviewed evidence demonstrates that individualized and patient-centered rehabilitation approaches produce the most favorable outcomes across diverse clinical populations. Adaptive interventions tailored to individual functional capacities, personal goals, psychological characteristics, and environmental conditions contribute significantly to improvements in mobility, muscular strength, balance, cardiovascular endurance, independence in activities of daily living, and overall health-related quality of life. Importantly, successful rehabilitation depends not only on physiological recovery but also on the patient's ability to adapt psychologically and socially to altered health conditions.

The analysis additionally highlights the growing importance of multidisciplinary rehabilitation models integrating physiotherapy, occupational therapy, speech therapy, psychological support, social services, and patient education. Such integrated approaches address the multidimensional nature of disability and recovery, thereby supporting sustainable functional adaptation and long-term participation in meaningful life activities. The biopsychosocial rehabilitation framework appears particularly effective for understanding and managing the complex interactions among physical impairments, emotional adaptation, environmental barriers, and social participation.

Neurological rehabilitation emerged as one of the most significant areas of adaptive physical therapy research. Contemporary evidence indicates that adaptive interventions for stroke survivors, individuals with spinal cord injuries, Parkinson's disease, multiple sclerosis, and traumatic brain injuries can substantially improve motor recovery, balance, functional independence, and participation outcomes. In particular, virtual reality-based rehabilitation, robot-assisted therapy, and task-oriented

neurorehabilitation programs demonstrate strong potential for enhancing neuroplasticity, patient engagement, and rehabilitation efficiency.

The review also confirms the important role of adaptive sports and individualized physical activity in promoting both physical and psychological well-being. Participation in adaptive physical activity programs contributes to improved cardiovascular fitness, muscular endurance, self-efficacy, emotional resilience, and social integration. Moreover, adaptive sports may facilitate identity reconstruction and long-term adherence to physically active lifestyles, which are critical for sustaining rehabilitation outcomes and preventing secondary health complications.

Technological innovations represent another major trend identified in the reviewed literature. Home-based rehabilitation systems, tele-rehabilitation platforms, wearable technologies, exergames, and AI-supported rehabilitation tools significantly expand opportunities for accessible and personalized care. Digital rehabilitation interventions are particularly valuable for individuals with limited access to healthcare facilities or those requiring long-term therapy. Furthermore, emerging AI-driven systems capable of adapting rehabilitation tasks according to real-time patient performance may enhance therapeutic precision, motivation, and continuity of care.

At the same time, the review identifies several persistent challenges affecting rehabilitation effectiveness worldwide. Significant disparities in access to rehabilitation services remain associated with socioeconomic inequalities, geographical barriers, shortages of rehabilitation professionals, insufficient healthcare infrastructure, and financial limitations. These issues are especially relevant in low-resource settings and regions affected by military conflict or humanitarian crises, including Ukraine. Consequently, the development of scalable community-based and home-based rehabilitation models should become a strategic priority for healthcare systems.

Another important conclusion concerns the need for culturally sensitive and context-specific rehabilitation approaches. Rehabilitation interventions should account for linguistic, social, environmental, and cultural factors influencing patient engagement and adaptation. Personalized rehabilitation technologies and community-oriented programs may therefore play an increasingly important role in future rehabilitation systems.

The review additionally demonstrates that psychosocial adaptation constitutes a fundamental component of rehabilitation success. Emotional resilience, motivation, family support, self-management skills, and community participation substantially influence long-term rehabilitation outcomes. Accordingly, future rehabilitation models should further integrate psychological support and participation-oriented strategies into routine clinical practice.

Several limitations within the current body of research should also be acknowledged. Existing studies demonstrate considerable heterogeneity regarding intervention protocols, outcome measures, rehabilitation duration, and patient populations. Furthermore, long-term follow-up data remain limited in many rehabilitation studies, making it difficult to evaluate the sustainability of therapeutic outcomes over time. Additional high-quality longitudinal and comparative studies are therefore necessary to strengthen the evidence base for adaptive rehabilitation interventions.

Future research should focus on several priority directions, including:

- evaluation of long-term rehabilitation outcomes;
- comparative effectiveness of adaptive rehabilitation technologies;
- integration of artificial intelligence into individualized rehabilitation planning;
- optimization of tele-rehabilitation systems;
- development of culturally adapted rehabilitation models;
- expansion of community-based rehabilitation services;
- investigation of psychosocial determinants of rehabilitation adherence and quality of life.

Overall, adaptive physical therapy is a dynamic, multidimensional, and lifelong process aimed at promoting functional independence, resilience, participation, and sustainable quality of life.

Continued development of evidence-based and personalized rehabilitation systems remains a key priority of modern healthcare.

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A STUDY OF PHYSICAL ACTIVITY HABITS OUTSIDE PHYSICAL EDUCATION CLASSES AMONG HIGH SCHOOL STUDENTS

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Abstract

The modern lifestyles pose a serious threat to the physical activity levels of adolescents. This global trend leads to a significant increase in sedentary behavior and various health-related complications among the youth. The aim of this study is to investigate and analyze physical activity habits outside of mandatory Physical Education and Sports classes among high school students (grades 8–12). The research focuses on identifying existing attitudes, motivations, and barriers to physical activity in order to outline the current situation and propose directions for its improvement. Furthermore, the study seeks to highlight the importance of extracurricular sports for the overall development of the personality. To achieve this objective, a survey was conducted among 351 students, along with interviews with Physical Education and Sports teachers from several regional cities in Bulgaria. Specialized literature was reviewed, and mathematical-statistical methods were applied. These methods allowed for a deep empirical understanding of the gathered data and a professional interpretation of the findings. The analysis of the results shows that a significant proportion of students engage in physical activity several times per week, demonstrating a positive attitude toward an active and healthy lifestyle. At the same time, a considerable percentage of students belong to risk groups, remaining insufficiently engaged or completely inactive. Statistical data confirm that family and peer environments are important factors in the development of sports habits. Social circles play a crucial role in shaping the long-term athletic interests of young people. The findings indicate that motivation is closely linked to personal satisfaction and social interaction, while lack of time and financial resources represent major barriers. The practical implications of the results highlight the need for stronger interaction between school initiatives and family support in order to optimize physical activity patterns and prevent sedentary lifestyles among adolescents. Such cooperation is vital for fostering a healthier future generation.

Keywords: physical activity, high school, students, habits, physical education

Introduction

Physical activity is a primary foundation for human health and a vital prerequisite for the overall development of the individual (Marinov, 2020). In modern society, technological advancement and

sedentary lifestyle limit physical activity, making it an essential tool to counteract hypodynamia among young people (Dimitrova, 2014).

Adolescents are particularly vulnerable to global lifestyle changes. Engagement in physical activity outside of regular Physical Education and Sports classes plays a vital role in strengthening physical and mental health, developing social skills, and fostering discipline (Cavill et al., 2001; Herbert, 2022; Rudik, 1976). High school represents a critical developmental stage where lasting habits are formed (Arnett, 2000; Zhelyazkova-Koynova, 2002). However, extracurricular physical activity is often insufficient due to modern sedentary trends (WHO, 2024).

Understanding the factors shaping student habits – such as personal interests, social circles and motivation – is necessary to address this issue (European Commission, 2007; Hardman, 2004). The aim of this study is to analyze physical activity habits outside of mandatory Physical Education and Sports classes among high school students, exploring their attitudes, motivations, and barriers to provide actionable directions for improving school sport culture.

Materials and methods

In order to achieve the aim and objectives of this scientific research, a complex methodology was applied. The methodology is structured to ensure objectivity in establishing students' physical activity habits outside the educational process.

Participants and object of the study

The object of the study is the physical activity habits of high school students. The subject of the study is the specific prerequisites regarding the manifestation of these habits. The scientific study covered a total of 351 students from the high school stage of secondary education from several regional cities in the Republic of Bulgaria: Sofia, Varna, Veliko Tarnovo, Vratsa, and Vidin. These participants represent a broad demographic scope, allowing for an analysis of trends in various urban environments.

Instruments and procedures

The primary research instrument is the survey method. A questionnaire was developed to establish physical activity habits outside mandatory Physical Education and Sports classes. In parallel, the method of professional discussion (interview) with Physical Education and Sports teachers in secondary education was applied. During the pedagogical research, discussions were held with teachers leading the classes of some of the participants. The impact of extracurricular sports activities on students' physical skills, responsibility, and discipline, as well as the role of active students in the learning process, were explored.

Research organization

The process went through three main stages. The first stage included a theoretical analysis of literary, documentary, and internet sources, as well as the preparation of the instruments. The second stage covered the conduct of the survey and discussions with teachers, followed by processing of empirical data. The third stage focused on the final analysis of the results and the formatting of the scientific work.

Data analysis

Mathematical and statistical methods were applied for the quantitative processing and analysis of the experimental data. Frequency analysis and two-dimensional (multidimensional) distribution of the relative share of the analyzed results from the survey were used (Kostov, 2013; Gigova, 2019). This approach allowed for the identification of dependencies and correlations between various factors influencing student habits. All data were processed using MS Excel software, ensuring the accuracy of calculations and the possibility of graphical representation of the results.

Results and discussion

The analysis of the results is based on quantitative frequency analysis and bivariate distribution, which allowed for the identification of main trends, gender- and age-related differences, and the impact of the social and school environment on the physical activity of high school students.

The demographic distribution of the sample reveals that a significantly higher percentage of the study participants were girls (62.7%), compared to boys (37.3%). As presented in Table 1, the largest percentage of participants in the survey were students from the 11th grade (26.2%), followed by the

8th grade (24.2%) and the 9th grade (19.9%). The analysis by grade allows us to reveal age-related differences in attitudes towards physical activity among students from this stage of education.

Regardless of the grade, girls outnumber boys in all age groups (Table 1).

The motivational components of students for exercising outside of school indicated that the desire for health, fun, and improving appearance are the leading factors (Table 2). The analysis reveals that boys are primarily driven by health and social motives, while girls are motivated by aesthetic factors and factors related to fun and personal satisfaction. Specifically, 30.8% of respondents are motivated by the desire to improve their appearance, while 28.8% indicate fun and enjoyment, and 28.5% of respondents indicated health as a factor (Table 2). This suggests that modern young people often lack appropriate hygiene habits for health-enhancing physical activity, possibly due to a lack of conviction that "Sport is Health" (Dimitrova, 2015; WHO, 2010; Foster, 2000).

Regarding the barriers to regular participation in extracurricular physical activity, the main factor identified is the lack of time (50.7%), likely related to the busy school schedule and additional commitments (Table 3). Additionally, limited financial resources for paid sports activities emerged as a social barrier. Girls more frequently report a lack of interest, support or motivation, while boys indicate a lack of suitable conditions for doing sports in their free time (Table 3). These findings highlight the importance of socio-economic factors in equal access to opportunities (European Union, 2008).

Socio-environmental support plays a pivotal role in maintaining sports habits. Table 4 shows that over 63% of students receive regular support from their family or friends. In contrast, only 28.8% report receiving active support from their school, and 31.3% not feel any institutional support at all (higher among boys – 39.7% than girls – 26.4%, as seen in Table 5). Furthermore, participation in school-organized extracurricular sports activities remains low: only 21.4% participate regularly, while 59.8% do not participate at all (Table 6). Boys show higher engagement in school sports (29.0%) than girls – only 16.8%.

Regarding preferences for physical activities, students show a marked preference for individual sports (Table 7). Girls predominantly prefer individual disciplines (49.1%), while boys show more interest in team sports (43.5%). The preference for individual sports (such as fitness, athletics, swimming and gymnastics) is often driven by the need for schedule flexibility, though team sports (football, basketball and volleyball) remain vital for social motivation.

In terms of technology, 37.3% of students regularly use fitness apps or smart devices, while 40.5% do not use digital monitoring tools. Self-assessment data reveal that 59.8% of them define themselves as "moderately active", and 29.1% as "very active", and 11.1% as "inactive". Importantly, 54.7% of the students express a positive attitude toward the idea of the school organizing more physical activity initiatives outside of regular hours, while 11.7% were not interested and 33.6% cannot decide.

Analyzing weekly physical activity duration and frequency shows that the largest group consists of individuals who exercise several times a week for more than 60 minutes per day. While this indicates high health commitment, approximately 10% of students do not perform any physical activity, presenting a health risk factor that requires targeted intervention.

Conclusions

The analysis of the study results and the conducted survey allowed for drawing conclusions regarding the physical activity of high school students.

It was established that a significant portion of students at this stage of education practice physical activity several times a week, indicating a positive attitude toward an active and healthy lifestyle. Nevertheless, there remains a considerable percentage of students in risk groups who stay poorly engaged or entirely inactive.

The primary motivational factors for participating in extracurricular physical activity are the desire for fun, improvement of physical appearance, and the pursuit of maintaining good health, with personal motivation outweighing social influences from friends and family.

The contribution of this research lies in identifying specific barriers to regular physical activity, namely a lack of time, unsuitable conditions, and limited financial opportunities for participating in paid sports activities. A significant indicator is the discrepancy between the sources of support. A large majority of students perceive their family and friends as the primary source of moral and practical support, while the school is rated lower in terms of encouraging physical activity outside of regular

class hours. The data also reveal an increased preference for individual sports, which highlights the need for diverse, flexible, and more attractive forms of extracurricular activities.

The discussion held with teachers confirms that participation in such activities leads to better discipline, responsibility, and motivation during regular classes, as physically active students stand out with a higher level of preparation.

Based on the obtained results, future directions should focus on strengthening the school's role as an active mediator in the process of promoting physical activity (Mileva, 2020). It is necessary to organize more extracurricular sports activities tailored to students' interests and to develop mechanisms for sustainable interaction between the school and parents for the joint promotion of a healthy lifestyle.

A key step toward increasing engagement is the integration of modern technological tools, such as applications, smart devices, etc., as an element of motivational strategies to enhance students' interest and commitment to systematic physical activity.

Optimizing the school sports environment through greater accessibility and innovative approaches will allow for attracting students from risk groups and consolidating motor habits as a lasting part of the daily routine of adolescents.

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Tables and figures

Table 1. Distribution of respondents by gender and current grade

Gender	What grade are you currently in?										General	
	8th grade		9th grade		10th grade		11th grade		12th grade			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	55	64.7%	49	70%	35	61.4%	51	55.4%	30	63.8%	220	62.7%
Boy	30	35.3%	21	30%	22	38.6%	41	44.6%	17	36.2%	131	37.3%
General	85		70		57		92		47		351	
	24.2%		19.9%		16.2%		26.2%		13.4%		100%	

Table 2. Distribution of respondents by gender and motivation for playing sports outside of school

Gender	What motivates you to play sports outside of school?										General	
	The desire to be healthy		Fun and enjoyment		Improving appearance		Example from friends/family		Other			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	53	24.1	73	33.2	71	32.3	19	8.6	4	1.8	220	62.7%
Boy	47	35.9	28	21.4	37	28.2	14	10.7	5	3.8	131	37.3%
General	100		101		108		33		9		351	
	28.5		28.8		30.8		9.4		2.6		100%	

Table 3. Distribution of respondents by gender and reasons for insufficient physical activity

Gender	What are the main reasons for NOT doing sports regularly outside of school?												General	
	Lack of time		Lack of interest		Lack of need		Lack of suitable conditions		Lack of support or motivation		Other			
	n	%	n	%	n	%	n	%	n	%	n	%		
Girl	104	58.4	24	64.9	7	53.8	31	79.5	27	77.1	27	55.1	220	62.7%
Boy	74	41.6	13	35.1	6	46.2	8	20.5	8	22.9	22	44.9	131	37.3%
General	178		37		13		39		35		49		351	
	50.7		10.5		3.7		11.1		10.0		14.0		100%	

Table 4. Distribution of respondents by gender and support from family or friends

Gender	Do you receive support from your family or friends for your physical activity?								General	
	Yes, often		Sometimes		Rarely		Never			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	140	63,6	52	23,6	15	6,8	13	5,9	220	62,7%
Boy	84	64,1	34	26	6	4,6	7	5,3	131	37,3%
General	224		86		21		20		351	
	63,8		24,5		6		5,7		100%	

Table 5. Distribution of respondents by gender and role of the school for physical activity

Gender	Do you think the school sufficiently encourages physical activity outside of school hours?						General	
	Yes		Partly		No			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	62	28,2	100	45,5	58	26,4	220	62,7%
Boy	39	29,8	40	30,5	52	39,7	131	37,3%
General	101		140		110		351	
	28,8		39,9		31,3		100%	

Table 6. Distribution of respondents by gender and participation in extracurricular sports activities

Gender	Do you participate in extracurricular sports activities organized by the school?						General	
	Yes		Partly		No			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	37	16,8	45	20,5	138	62,7	220	62.7%
Boy	38	29	21	16	72	55	131	37.3%
General	75		66		210		351	
	21,4		18,8		59,8		100%	

Table 7. Distribution of respondents by gender and preferences for type of physical activity

Gender	If you had the opportunity, what kind of physical activity would you practice outside of school?								General	
	Individual Sports		Team Sports		Adventure or Extreme Sports		Other			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Girl	108	49,1	63	28,6	41	18,6	8	3,6	220	62,7%
Boy	49	37,4	57	43,5	19	14,5	6	4,6	131	37,3%
General	157		120		60		14		351	
	44,7		34,2		17,1		4		100%	

STATE OF MOTOR ABILITIES IN PRESCHOOL CHILDREN

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Abstract

The age period between 3 and 7 years, defined by numerous authors as preschool age, is crucial for the overall development of children and their health status. In early childhood, the fundamental motor skills and habits are formed, which exert a long-term influence on children's motor activity as well as their physical and cognitive development; the foundations of personality development are also established during this stage. Numerous authors report that the level of motor development exerts a complex influence on the formation of the different aspects of the child's personality. In this context, the present study aimed to determine the level of development of the basic motor abilities in preschool children.

A total of 571 children were examined, including 287 aged 6 years and 284 aged 3 years. The participants were tested through nine motor tasks, by means of which the state of the different manifestations of their motor abilities was assessed. The nine motor tasks were selected and subsequently validated as part of our authorial research aimed at diagnosing motor abilities in preschool children (Naydenova et al., 2023). Testing was conducted once in six kindergartens located in the city of Sofia.

The obtained results were subjected to mathematical–statistical processing using the software product IBM SPSS v.23. The data were analysed through variation and comparative analyses.

The findings indicate an uneven development of the individual motor abilities, with a proportion of children demonstrating significantly lower performance levels. A substantial imbalance between the different components of motor abilities in preschool children was identified.

In conclusion, the need for targeted pedagogical approaches and programs to optimise motor development in preschool age is emphasised. The results may be used to improve physical education practices and to develop effective strategies for increasing children's motor activity.

Key words: preschool, children, motor abilities, physical activity, motor development

Introduction

The period between 3 and 7 years of age, considered in an educational context as preschool age, is fundamental with regard to the formation and subsequent development of the child. This period is characterized by intensive cognitive, motor, and physical development in children. Studies aimed at clarifying the development of children's motor abilities have been conducted by authors such as Barnett et al. (2008), Diamond (2015), Alesi et al. (2016), Pasichnyk et al. (2018), Battaglia et al. (2019), Martinez-Merino & Rico-González (2024), Piotrowski et al. (2025), and Tekin & Outayanik (2025). These authors, along with many others, investigate the relationships between motor development during this period and other aspects of child development.

In this regard, Martinez-Merino & Rico-González (2024), based on an in-depth analysis of the literature, identify the positive effects of physical education activities during the preschool period in three main directions. The first is the improvement of children's motor competence. The second direction is related to cognitive competence, more specifically the enhancement of creativity, attention, and mental abilities, as well as the reduction of symptoms of hyperactivity and attention deficit. The third direction of positive impact concerns children's social competence, with group activities carried out during physical education classes serving as a basis for its improvement.

Piotrowski et al. (2025) state that “fundamental motor skills (FMS) represent basic movement patterns that support physical, cognitive, and social development.” Tekin & Outayanik (2025) point out that physical activity influences children's cognitive functions and academic skills. They further emphasize that, within contemporary educational structures, physical education is a prerequisite for addressing lifelong problems in child development.

Zheng et al. (2017) found a positive effect of organized physical activity on memory, perception, and learning outcomes in preschool children. In support of the above, Carson et al. (2015), in an independent study, revealed that increasing the

frequency and duration of physical activity has a significant positive effect on executive functions and language literacy in children within the examined age period.

According to Piotrowski et al. (2025), the motor development of children between 2 and 8 years of age is based on the formation and intensive development of the so-called fundamental or naturally applied movements. In turn, authors such as Logan et al. (2018) and Newell (2020) consider these movements to be a fundamental building block and, at the same time, a prerequisite for mastering more complex movements at a later stage of child development. An example of such movements may be sport-specific techniques, which also constitute core educational content in physical education in Bulgaria.

During the examined age period, the level of motor development in children is still relatively low. This is evidenced by studies conducted by McGarrigal et al. (2025) and Radnor et al. (2018), which suggest a probable immaturity of the neuromuscular system. The authors describe neuromuscular control in preschool children as being characterized by slower muscle activation, greater co-activation of agonists and antagonists, and lower tendon stiffness. From a practical perspective, these manifestations may be explained by the presence of weak relationships between the level of development of motor qualities and the level of mastery and execution of physical exercise techniques.

In fact, during the examined age period, it is not entirely accurate to use the term “technique,” as it implies that movements are executed precisely, specifically, and efficiently. Therefore, when discussing children between 2 and 8 years of age, the concept of “motor abilities” should be applied instead, as it combines the unity and interrelationships between motor qualities and the corresponding required technique necessary for the execution of a specific movement.

In this regard, the aim of the present study was to determine the level of development of the fundamental motor abilities of 3- and 6-year-old children regularly attending kindergarten. To achieve this aim, the following objectives were established:

To examine and analyze the problem based on literature sources.

To select motor exercises for assessing the level of motor abilities.

To conduct a one-time assessment of the motor abilities of 3- and 6-year-old children at the beginning of the academic year.

To process and analyze the obtained data.

Materials and Methods

A total of 571 children were examined, including 287 children aged 6 years and 284 children aged 3 years. The participants were assessed through 12 motor exercises, which were used to determine the condition of the different manifestations of their motor abilities. The nine motor exercises were selected and subsequently validated as part of our original research focused on the assessment of motor abilities in preschool children (Naydenova et al., 2023). The assessment was conducted once in six kindergartens located in the city of Sofia at the beginning of the academic year.

The results obtained from the study were subjected to mathematical and statistical processing using the software package IBM SPSS Statistics. The data were analyzed through frequency, variation, and comparative analyses. The analysis of the results was carried out using two different approaches for processing the data from the 3- and 6-year-old children.

For the 3-year-old boys and girls, due to the large number of children who were unable to perform the exercises during testing, frequency analysis was used to determine both the achievements and the number of children who successfully completed the exercises. In addition, data from the variation analysis were examined.

For the 6-year-old children, the data were subjected to variation and comparative analyses in order to identify gender differences in the individual motor exercises. Comparisons between the results of boys and girls were conducted using the non-parametric statistical criterion Mann–Whitney U, due to the lack of normal distribution in most of the motor exercises.

Results and Discussion

The analysis of the study results was carried out by dividing the group of examined participants according to gender and age. According to the age criterion, the participants were divided

into 3-year-old and 6-year-old children. The observations conducted during the assessment of motor abilities revealed numerous quantitative and qualitative differences between the 3- and 6-year-old children.

Considering the fact that, nowadays, movement and play in most children have been replaced by activities involving electronic devices, very low levels of mastery of basic fundamental movements were observed among the 3-year-old children. In this age group, it is impossible to speak of exercise execution technique. Their performance is rather a consequence of natural development, and to a large extent the successful execution of movements is due not to purposeful motor control, but to chance. These observations made during the diagnostic procedures were also confirmed by the statistical processing of the results.

When the data were subjected to variation analysis, very high levels of variation, lack of normal distribution, and numerous minimum values of 0 were identified, which led us to apply a non-traditional approach to data processing. A frequency analysis was therefore conducted in order to determine the percentage of children who were able to perform the respective motor action. The data from the frequency analysis are presented in the following figure.

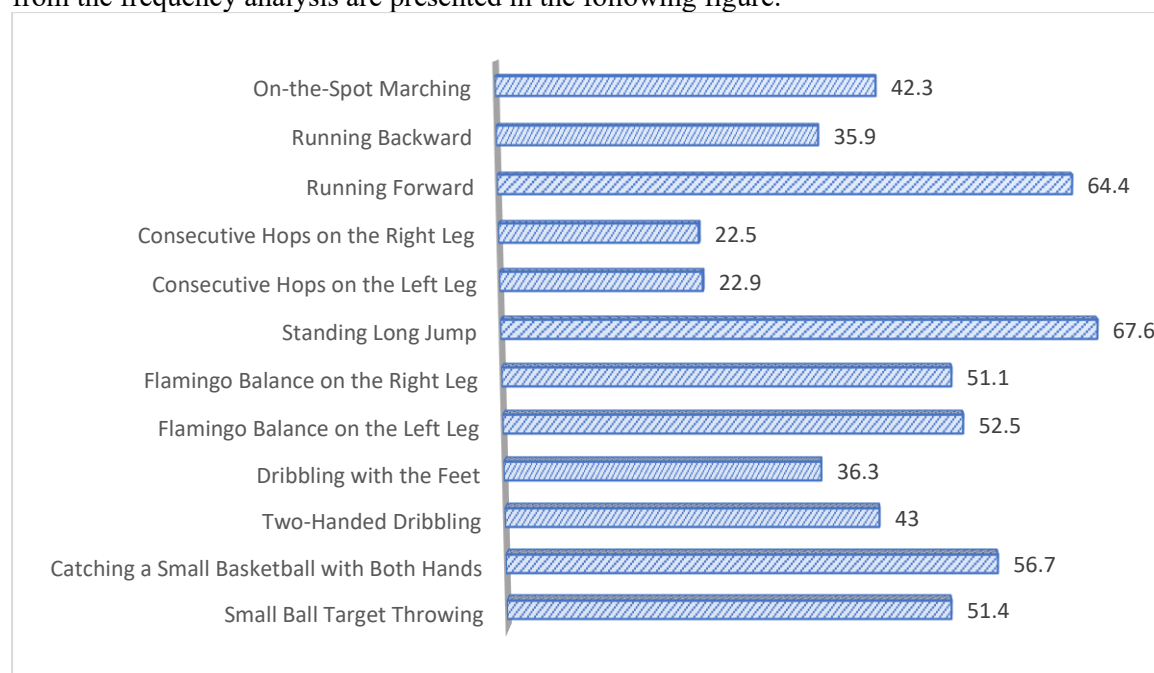


Figure 1. Percentage data of the children who managed to perform a specific motor exercise.

An examination of the figure reveals the high proportion of children who were unable to perform specific motor exercises. It can be noted that the exercises Standing Long Jump and Running Forward demonstrated the highest success rates, with 67.6% and 64.4%, respectively, of the 284 tested 3-year-old children successfully performing the two exercises. At the opposite extreme were the left- and right-leg hopping exercises, where the success rates were only 22.5% and 22.9%, respectively. In other words, nearly 80% of the examined 3-year-old children were unable to perform single-leg hopping.

A similarly low success rate was observed in the exercises Running Backward and Dribbling with Feet, which were successfully completed by only 35.9% and 36.3% of the children, respectively. In the remaining exercises, the percentage of children who successfully performed the movements ranged between 42.3% and 56.3%.

The results obtained from the 6-year-old children were substantially different. During the assessment, no children were observed who were unable to perform any of the exercises. At the same time, numerous individual manifestations of the separate motor abilities were identified, which led us to choose an analytical approach in which the children were divided according to gender.

Table 1.

Variation data analysis of 6-year-old boys

Tect	N	R	X _{min}	X _{max}	X	V %	S	A _s	E _x
Small Ball Target Throwing	151	5,00	1,00	6,00	4,49	27,61	1,24	-,55	-,40
Catching a Small Basketball with Both Hands	151	5,00	1,00	6,00	5,44	16,17	,88	-1,99	4,76
Two-Handed Dribbling	151	26,00	4,00	30,00	15,88	33,22	5,27	-,08	,05
Dribbling with Feet	151	35,81	8,32	44,13	20,88	37,11	7,75	,92	,76
Flamingo Balance on the Left Leg	151	71,11	2,00	73,11	17,71	70,58	12,50	1,21	2,43
Flamingo Balance on the Right Leg	151	72,56	2,00	74,56	16,70	72,27	12,07	1,44	3,31
Standing Long Jump	151	112,00	38,00	150,00	86,85	20,25	17,59	,26	,57
Consecutive Hops on the Left Leg	151	5,68	1,78	7,46	3,39	31,56	1,07	1,46	2,70
Consecutive Hops on the Right Leg	151	7,26	,00	7,26	3,20	29,68	,95	,88	3,22
Running Forward	151	3,24	1,17	4,41	2,37	24,47	,58	,98	1,13
Running Backward	151	7,09	1,64	8,73	3,03	31,23	,94	1,96	8,17
On-the-Spot Marching	151	26,14	6,12	32,26	21,13	16,65	3,52	-,56	4,07

The data presented in Table 1 indicate high values of the coefficient of variation (V%) among the boys. The values range between 16.7% and 72.7%, indicating a lack of homogeneity within the examined group of boys. High values of the coefficients of skewness (As) and kurtosis (Ex) were also observed, which indicate the absence of normal distribution in the values of the individual performances. Normal distribution was identified only in the tests Two-Handed Dribbling, Dribbling with Feet, and Standing Long Jump.

It should also be noted that the negative sign preceding the coefficient of skewness (As) in the tests Small Ball Target Throwing, Catching a Small Basketball with Both Hands, Two-Handed Dribbling, and On-the-Spot Marching indicates that the boys' performances were concentrated around the minimum achievement values. From a practical perspective, this suggests that there are opportunities for the targeted development of the specified motor skills, since at the time of measurement they had not yet reached the required level of development.

Table 2.

Variation data analysis of 6-year-old girls.

Tect	N	R	X _{min}	X _{max}	X	V %	S	A _s	E _x
Small Ball Target Throwing	136	5,00	1,00	6,00	4,29	30,76	1,32	-,40	-,83
Catching a Small Basketball with Both Hands	136	5,00	1,00	6,00	5,41	17,74	,96	-2,04	4,60
Two-Handed Dribbling	136	28,00	2,00	30,00	14,46	32,36	4,68	,34	,65
Dribbling with Feet	136	43,26	11,56	54,82	25,61	33,81	8,66	,84	,72
Flamingo Balance on the Left Leg	136	79,41	2,00	81,41	19,45	79,02	15,37	1,47	2,47

Flamingo Balance on the Right Leg	136	93,93	1,17	95,10	21,57	72,04	15,54	1,65	4,09
Standing Long Jump	136	97,00	21,00	118,00	78,83	23,58	18,59	-,33	,15
Consecutive Hops on the Left Leg	136	8,02	1,98	10,00	3,69	37,39	1,38	2,23	6,85
Consecutive Hops on the Right Leg	136	6,52	1,71	8,23	3,37	30,56	1,03	1,59	4,28
Running Forward	136	6,29	1,38	7,67	2,52	29,36	,74	3,11	17,83
Running Backward	136	6,47	1,79	8,26	3,30	31,81	1,05	1,64	3,78
On-the-Spot Marching	136	18,48	13,80	32,28	21,22	15,08	3,20	,60	1,28

The data from the variation analysis of the girls' performances presented in Table 2 are, to a large extent, similar to those of the boys. The same high values of the coefficient of variation are observed, indicating a lack of homogeneity, as well as high values of the coefficients of skewness (As) and kurtosis (Ex), which demonstrate the absence of normal distribution.

Unlike the boys, a negative sign preceding the coefficient of skewness (As) was observed in only three exercises, namely Small Ball Target Throwing, Catching a Small Basketball with Both Hands, and Standing Long Jump, where there are prerequisites for their purposeful further development.

Table 3.

Data from the comparative analysis of the tests in which there are no statistically significant differences between the two sexes

Test	Boys		Girls		d	α
	X	S	X	S		
Small Ball Target Throwing	4,49	1,24	4,29	1,32	0,20	0,215
Catching a Small Basketball with Both Hands	5,44	,88	5,41	,96	0,03	0,920
Flamingo Balance on the Left Leg	17,71	12,50	19,45	15,37	-1,74	0,666
Consecutive Hops on the Left Leg	3,39	1,07	3,69	1,38	0,30	0,063
Consecutive Hops on the Right Leg	3,20	,95	3,37	1,03	0,17	0,288
On-the-Spot Marching	21,13	3,52	21,22	3,20	-0,09	0,986

The data from the comparative analysis between boys and girls will be discussed with regard to the presence or absence of gender differences. The results presented in Table 3 illustrate the findings from the six tests in which no statistically significant differences were observed between the mean performances of boys and girls. Despite the lack of statistically significant differences, in four of these exercises girls demonstrated better results than boys.

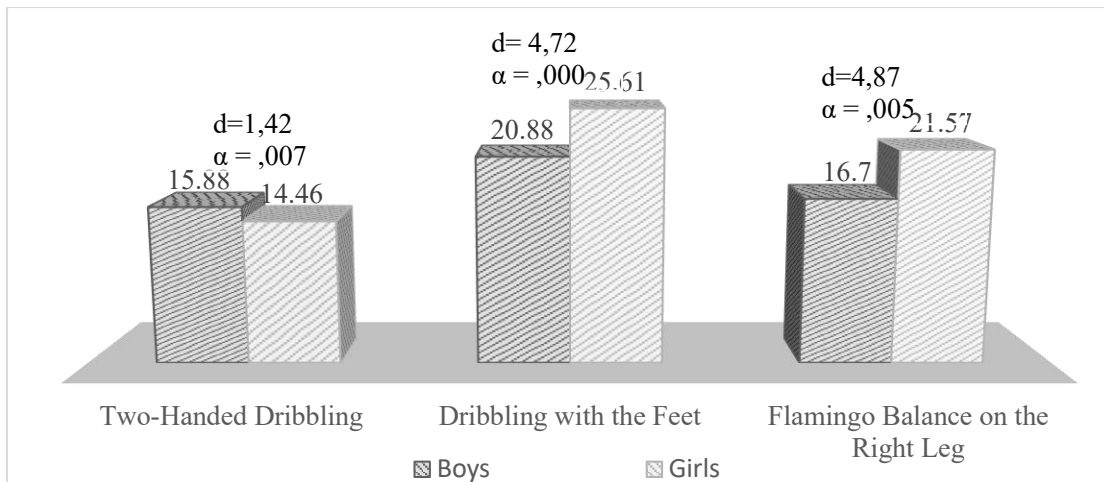


Figure 2. Data from the comparative analysis of the tests Two-Handed Dribbling, Dribbling with Feet, Flamingo Balance on the Right Leg

The results presented in Figure 3 indicate the presence of statistically significant differences in the mean performances between boys and girls. In the exercises Two-Handed Dribbling and Flamingo Balance on the Left Leg, girls demonstrated better results than boys, with differences of 1.42 seconds and 4.87 seconds, respectively, confirmed at significance levels (α) of 0.007 and 0.005. In the Dribbling with Feet test, boys completed the exercise 4.72 seconds faster than girls.

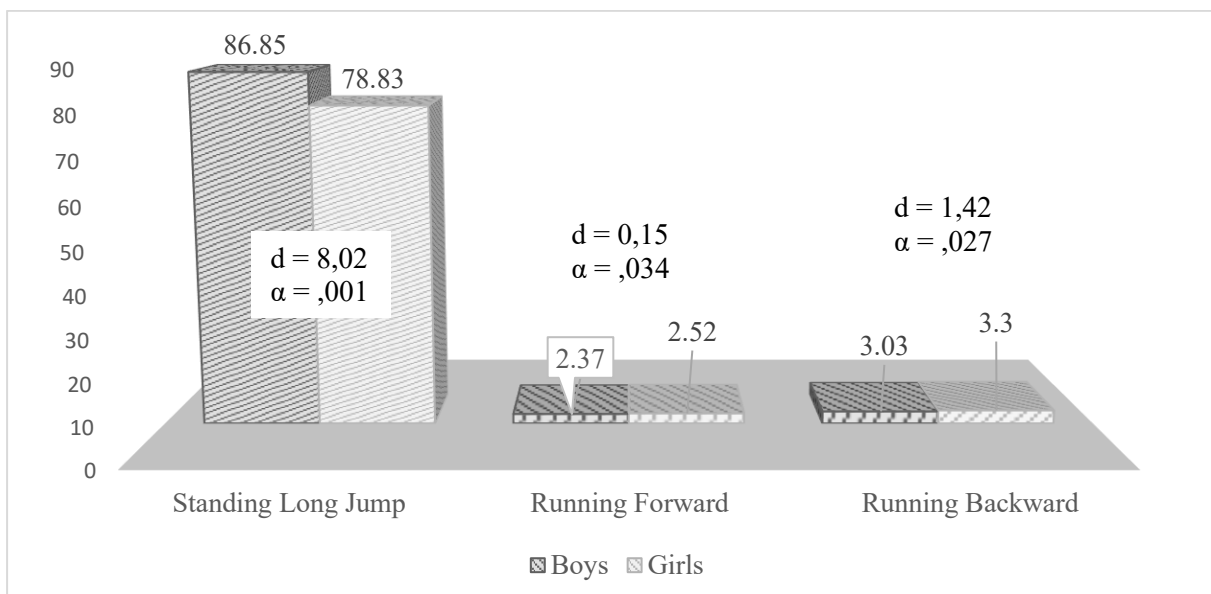


Figure 3. Data from the comparative analysis of the tests Standing Long Jump, Running Forward, Running Backward

Similarly to dribbling with the feet, boys also performed better than girls in the remaining three exercises. In forward and backward running, they completed the respective distances 0.15 and 1.42 seconds faster, and these differences reached the required levels of significance to be considered statistically significant. The difference of 8.02 cm in favour of boys in the *Standing Long Jump* test is supported by a significance level of $\alpha = 0.001$.

Conclusions

Among the 3-year-old children, low levels of motor skills were observed. A substantial proportion of the examined children did not master basic fundamental movement skills. The highest percentage of children were able to run forward and perform a two-footed standing jump. At the same time, for exercises requiring object control, approximately 50% of the children were unable to perform tasks

such as catching and dribbling with the hands or feet. Furthermore, difficulties were observed in single-leg hopping, balance maintenance, and coordination during on-the-spot marching. Among the 6-year-old children included in the study, statistically significant differences between boys and girls were found in 6 out of the 12 motor exercises. Girls demonstrated better performance in exercises requiring balance control and ball handling with the hands, whereas boys performed better in tasks involving ball control with the feet, two-footed jumping from a stationary position, and running forward and backward along a designated direction of movement. The results of the conducted study indicate an unsatisfactory level of development of fundamental motor skills across all examined age and gender groups.

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COMPLEX APPLICATION OF SELECTED PSYCHOLOGICAL MEANS FOR THE DEVELOPMENT OF STUDENTS' PHYSICAL QUALITIES

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Abstract

The study examines the effectiveness of integrating selected psychological tools into physical education lessons to enhance the development of key physical qualities in sixth-grade students. Two parallel classes (N = 58) from a secondary school in Stara Zagora, Bulgaria, were observed over two academic years and assigned to experimental and control groups. Both groups followed an identical curriculum, training structure, and physical workload; however, the experimental group received additional psychological interventions, including visual aids, precisely formulated tasks, motivational verbal cues, competitive elements, and systematic self-monitoring of performance. Methods: a comprehensive test battery assessed speed, strength, explosive power, flexibility, and endurance at four measurement points. Results demonstrated significantly greater improvements in the experimental group across all indicators, with increases often two to three times higher than those of the control group. The findings highlight the substantial role of psychological means in stimulating motivation, enhancing cognitive engagement, and improving physical performance in school-aged children. The study supports the integration of psychological tools as an effective pedagogical strategy within physical education to optimise the development of physical qualities. Conclusions: the use of psychological tools contributes to more purposeful, more active, and more effective specialised work for the development of physical qualities. Psychological tools enhance students' awareness and engagement — an important prerequisite for effective work on developing physical qualities. Among the psychological tools applied in combination, the most effective influence was exerted by visual materials, the recording and reporting of results, and the precisely formulated task.

Keywords: physical education, motor qualities, school-aged children, performance development

Introduction

During the restructuring of physical education in schools, particular attention is directed towards the development of physical qualities, which necessitates identifying the most effective means and methods for their improvement.

The application of diverse training tools and methods helps maintain students' interest in the learning process (Belomazheva-Dimitrova, 2020; Ignatova & Angelova 2025). More reliable approaches are sought for the development of strength and speed. It is recommended to include speed exercises performed at a self-selected pace, as dynamic activities introduce variety and evoke positive emotions among students (Margaritov, 2017; Genov, 2024). Furthermore, mental and physical preparation occur simultaneously and in unity, according to Davidova (2016).

A reserve of means for influencing lesson-based work lies in the psychological dimension of the educational process (Ignatova, 2018). Numerous authors in Bulgaria and abroad have examined the impact of various psychological tools in training practice, yet they remain insufficiently represented in lesson-based physical education (Ignatova, 2022; 2023).

The aim of the study is to determine the development of the physical qualities strength, speed, flexibility, and endurance when psychological means are applied during the lesson.

Methods

Participants

The study involved 58 sixth-grade students (aged 12) from “Zheleznik” Secondary School, Stara Zagora, divided into an experimental group (n = 30) and a control group (n = 28).

Design and Procedure

The research was conducted over two academic years. Both groups followed the same curriculum, training structure, and physical workload. The experimental group additionally received psychological interventions: visual diagrams and tables illustrating correct exercise execution; precisely formulated

tasks tailored to students' abilities; motivational verbal cues during performance; competitive tasks (e.g., improving personal records); self-monitoring through recording results in individual notebooks. Circuit training was used to develop specific physical qualities, with individualised loads and structured rest intervals.

Test Battery - To compare the results between the two classes, we used indicators of physical ability. Seven indicators of physical ability were assessed:

60 m sprint (sec)

Squats for 10 seconds (count)

Hand dynamometry (dominant and non-dominant hand, kg)

Push-ups to failure (count)

Vertical jump (cm)

Standing long jump (cm)

Forward bend depth (cm)

Measurements were taken at the beginning and end of each academic year. Data were processed using variation analysis.

Methodology

Over the course of two academic years, we examined two sixth-grade classes (12-year-old students). The working conditions at the school were favourable. We had access to all necessary equipment and materials required for implementing the curriculum. The lesson content was distributed according to the requirements of the Ministry of Education and Science. The organisation, working tools, and teaching methodology were identical in both classes.

Each lesson concluded with targeted work aimed at developing one of the physical qualities — speed, strength, or flexibility — lasting between 6 and 8 minutes, followed by a concluding part. Students in each class were divided by sex into 3–4 groups of 4–5 students. Each group included students with both high and low performance levels, enabling all participants to compare themselves with the more capable peers. We conducted circuit training to develop specific physical qualities, applying repeated loads, loads with small weights and high intensity, movements with small amplitude but high speed, and swinging movements with large amplitude performed in series. The duration of each exercise, with or without equipment, ranged from 10 to 30 seconds, followed by active rest lasting 40 seconds to 1 minute. To facilitate faster recovery, breathing and relaxation exercises were included. Relaxation exercises were also combined with flexibility exercises. The loads and their dosage were individualised. We used dumbbells, skipping ropes, medicine balls, wall bars and benches, elastic resistance bands, sticks, and other equipment. The difference in the work between the two classes consisted in the fact that during the exercises aimed at developing physical qualities, the experimental class applied the psychological tools listed above, whereas the control class was given only the physical tasks.

The visual aids included diagrams illustrating the correct execution of exercises for developing physical qualities.

The precisely formulated task was developed in accordance with the students' knowledge from other subjects (anatomy, mathematics, physics — even at an elementary level) and their individual capabilities for performing the exercise. The competitive task was introduced before the exercise — for example, to improve one's personal record, to catch up with or keep pace with the better-performing students.

The verbal reporting of results was carried out at the end of the active rest period. Each student recorded their result in a notebook. Encouraging words were used during the exercise whenever a decrease in rhythm, tempo, or quality of execution was observed.

At the beginning of the work on developing physical qualities, students in the experimental class were familiarised with data on the physical performance of their peers who regularly practised sports. A short, clear, and well-justified task was set, formulated in language accessible to the students.

Upon the signal, the exercise began — with or without equipment — aimed at developing the specific quality. During the activity, students were encouraged for various reasons. After each series, active rest followed, and at the end, the work was evaluated. Each student recorded their results in their notebook to monitor the development of their physical qualities. Praise was given, along with instructions for the next exercise.

The test battery was administered at the beginning and end of both the first and second academic year in both classes. The same test battery was used to collect data from children who regularly practised sports. All children were in the sixth grade.

Results

The visual aids and tables enabled students to analyse the work performed by comparing their own data with the physical performance indicators of their peers who regularly practised sports. Higher-performing students compared their results with the maximum values, average-performing students compared theirs with the mean values, while lower-performing students compared their results with the minimum values. This increased students' interest and encouraged active and conscious engagement. The visual tools created conditions for faster, more accurate, and correct mastery of the exercises, thereby increasing their effectiveness. This phenomenon was not observed in the control class, where most students did not work with motivation to develop their physical qualities. The precisely formulated tasks influenced students' cognitive activity and helped to focus their efforts and engagement. The tasks were meaningful to the students and corresponded to their specific needs and abilities. The essence and significance of the precisely formulated task lie in the clarity of understanding achieved by the students. This is supported by the results of the experimental class, expressed in the changes in the mean values. The competitive task had a strong impact on positive emotional experiences and contributed to the development of students' moral and volitional qualities. Encouraging words given at moments of fatigue had a complex and stimulating effect on the participants. During the activity, when encouraging words were provided, an increase in effort and physical engagement was observed. This was evident from changes in tempo and quality of execution, as well as from students' smiles, nods, and other signs of motivation. During the verbal reporting, all students stated that the encouraging words motivated them to work with greater effort. Recording the results of the exercises in individual notebooks enabled students to monitor the development of their physical qualities, which strengthened self-criticism and self-initiative — both essential in the learning process.

Table 1. Results test of 60 m Sprint

To determine the effectiveness of the applied means, we monitored the dynamics in the development of physical qualities when psychological tools were applied in combination. A comparison of the data from the experimental class with those of the control class was made. From the analysis of the 60 m sprint results (Table 1), it is evident that the mean value of the experimental class improved by 0.3 seconds during the first year and by 0.2 seconds during the second year. The control class improved by only 0.1 seconds in each of the two years. The individual results of the experimental class were more closely grouped around the mean value compared to the control class. When comparing the mean values from the beginning to the end of the experiment, it becomes clear that the experimental class demonstrated better development of the quality of speed. The data from the "Squats for 20 seconds" test (Figure 1) show a significant difference in the development of dynamic leg strength in favour of the experimental class. The increase in the experimental class was 1.2 repetitions during the first year, and 3.3 repetitions during the second year. The control class improved by 0.3 repetitions in the first year and by 0.5 repetitions in the second year. The changes in the increases indicate that speed and leg strength developed better during the second year.

Figure 1. Squats performed in 20 seconds (count).

From the graphical representation of dynamometry for the dominant (Figure 2) and non-dominant (Figure 3) hand, an upward trend in strength development is observed in the experimental class, with increases approximately 2–3 times greater than those of the control class.

Figure 2. Dynamometry of dominant hand (kg).

Figure 3. Dynamometry of non-dominant hand (kg).

The analysis of the "Push-ups to failure" test (Table 2) shows that the increases in the experimental class were 1–2 times greater than those in the control class. The better development of strength

endurance in the experimental class is also indicated by the smaller standard deviation compared to the control class.

Table 2. Push-ups to failure test

The development of explosive strength was monitored using the “Vertical jump from standing” test (Figure 4) and the “Standing long jump” test (Figure 5). As shown in the graphs, this quality developed significantly better in the experimental class. The increases were 2–3 times greater than those in the control class. When comparing the increases by year, it becomes evident that the first year showed greater improvement than the second.

Figure 4. Vertical jump from standing (cm).

Figure 5. Standing long jump (cm).

Flexibility also demonstrated dynamic development, similar to explosive strength, as shown by the “Forward bend depth” test (Figure 6). The mean increases indicate greater improvement in flexibility during the second year. When comparing the data between the experimental and control classes, the experimental class again shows better development of flexibility.

Figure 6. Forward bend depth (cm).

Discussion

The findings confirm that psychological tools significantly enhance the development of physical qualities in school-aged students. Visual aids improved understanding and execution of exercises, while precisely formulated tasks increased cognitive engagement. Motivational cues and competitive elements stimulated effort, persistence, and positive emotional responses. Self-monitoring through written records strengthened self-regulation and personal responsibility. These results align with existing research emphasising the interplay between psychological and physical preparation. The study demonstrates that integrating psychological means into physical education lessons is not only feasible but also highly effective.

Conclusions

The use of psychological tools contributes to more purposeful, more active, and more effective specialised work for the development of physical qualities. Psychological tools enhance students’ awareness and engagement — an important prerequisite for effective work on developing physical qualities. Among the psychological tools applied in combination, the most effective influence was exerted by visual materials, the recording and reporting of results, and the precisely formulated task.

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Table 1. Results test of 60 m Sprint

Group	Year	$\bar{X}_1$ (sec)	$\bar{X}_2$ (sec)	n	Absolute Increase (sec)	σ	Pt
Experimental	I	9,8	9,5	80	0,3	2,45	0,99
	II	9,4	9,2	30	0,2	2,70	0,99
Control	I	9,7	9,6	31	0,1	2,80	0,94
	II	9,5	9,4	31	0,1	2,87	0,96

Figure 1. Squats performed in 20 seconds (count).

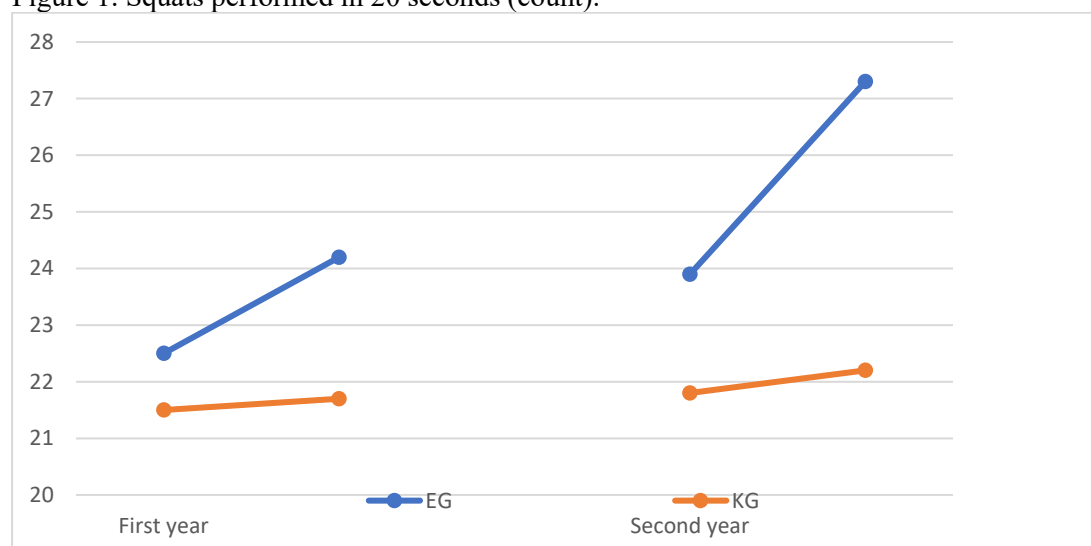


Figure 2. Dynamometry of dominant hand (kg).

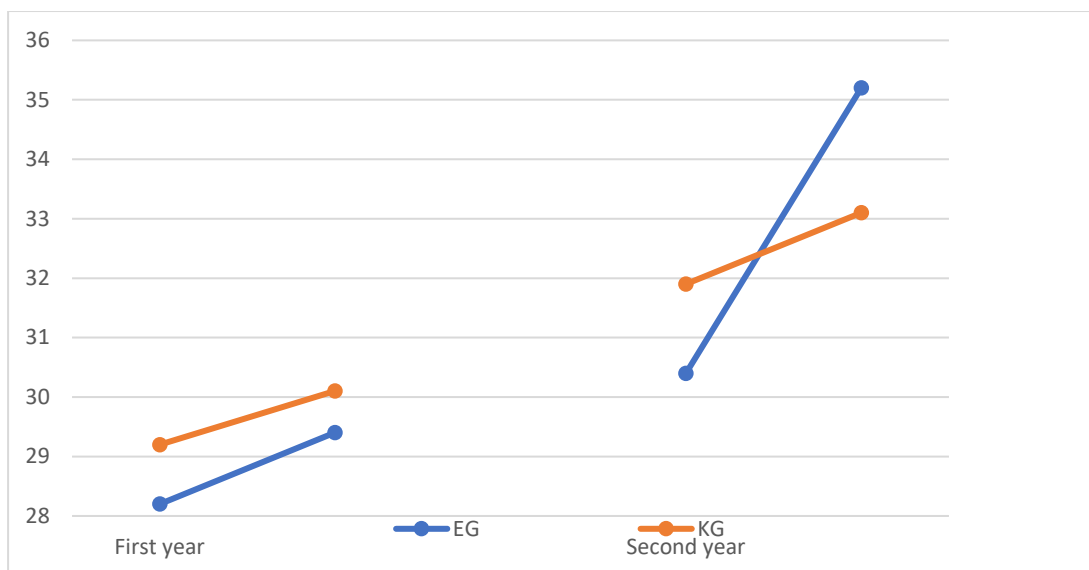


Figure 3. Dynamometry of non-dominant hand (kg).

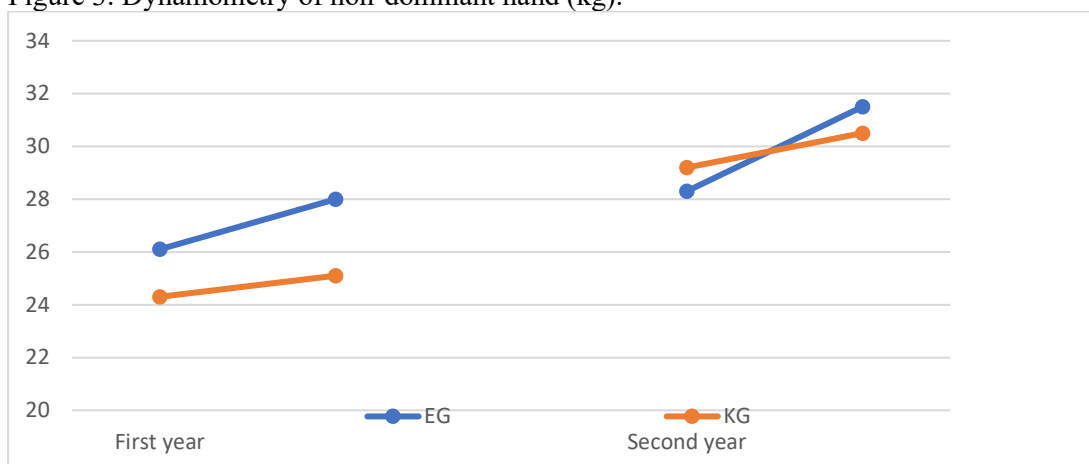


Table 2. Push-ups to failure test

Class	Year	n	$\bar{X}_1$	$\bar{X}_2$	Absolute Increase	σ	Pc
Experimental	I	30	5,8	8,2	2,4	2,06	0,98
	II	30	8,4	9,8	1,4	1,40	0,70
Control	I	31	8,4	8,6	0,2	3,81	0,97
	II	31	9,0	9,3	0,3	2,37	0,71

Figure 4. Vertical jump from standing (cm).

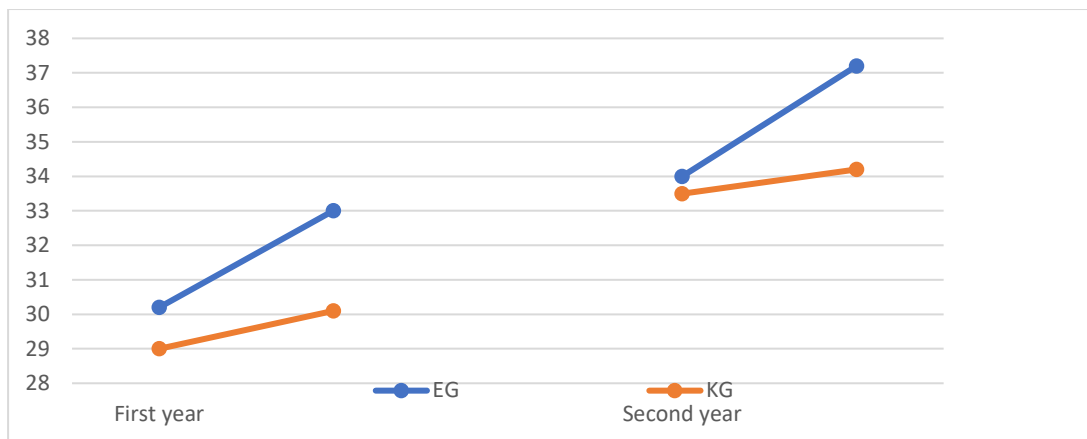


Figure 5. Standing long jump (cm).

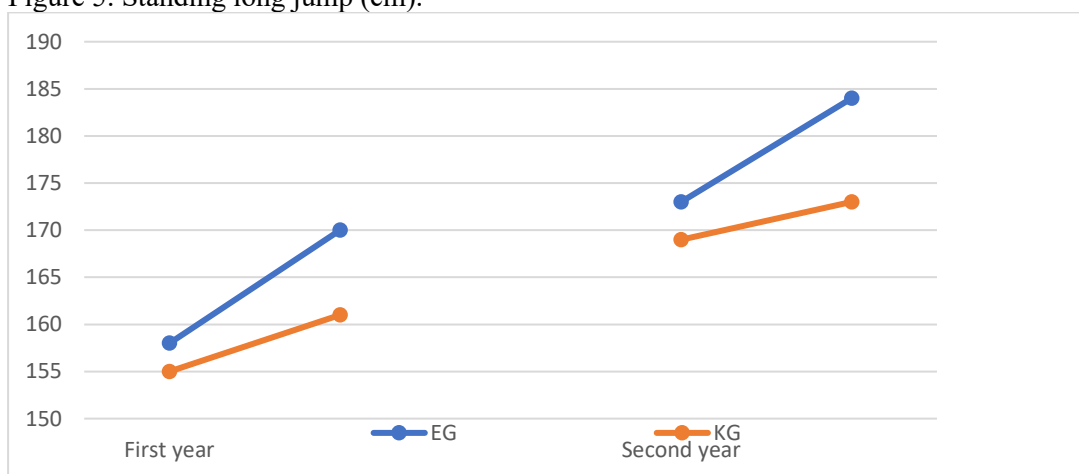
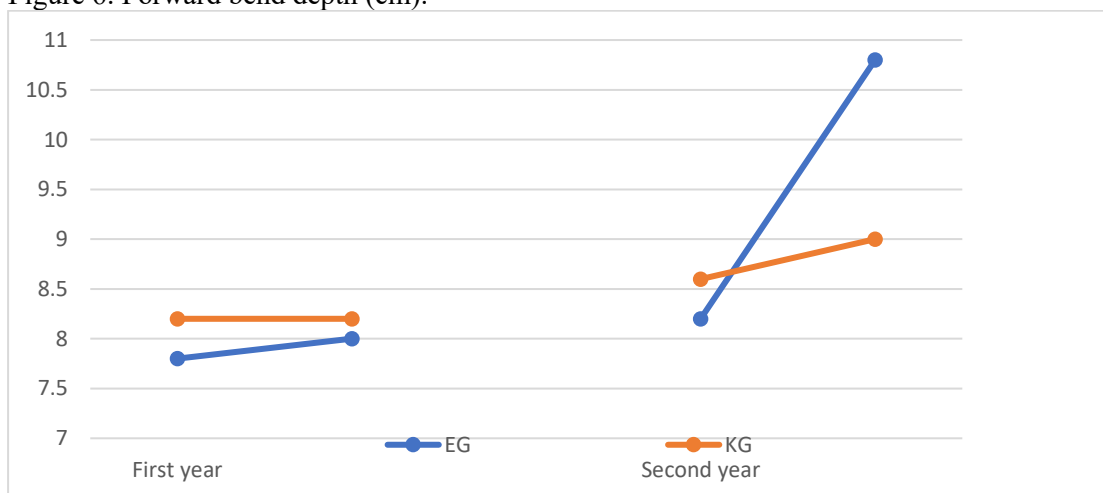


Figure 6. Forward bend depth (cm).



WELLNESS CULTURE IN THE PEDAGOGICAL INTERACTION FAMILY-KINDERGARTEN-SCHOOL

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Abstract:

This material has a scientific-applied nature, aimed at familiarizing the pedagogical audience with the influence of motivation for learning as a major factor in the formation of the child's personality and with the role of wellness culture in the pedagogical interaction between the family and kindergarten-school. The family is considered one of the main external factors motivating learning. At the preschool age, the development of wellness culture and pedagogical interaction begins, creating conditions in which the child and family can actively participate in this process, and the teacher can apply modern didactic technologies. *Aim:* To establish the influence of family relationships on the development of motivation for learning and pedagogical interaction between family, kindergarten, and school. *Tasks:* To establish the influence of wellness development on the personality of children, the wellness relationship between family relationships, and the motivation for learning of children of preschool and primary school age. *Methodology:* A study was conducted to assess the level of cooperation between teachers and parents using a questionnaire survey. The research contingent consists of 25 parents of children from I, II, III and IV age groups in preschool age. Of the research contingent followed, 18 participants were women, representing 72% of the representative sample, and 7 were men, representing 28%. *Main results:* it is necessary to support and stimulate interest in various motor activities: outdoor games, role-playing games, competitive games, sports, excursions, workshops, art studios, theater, concerts and exhibitions, children's events and festivals, competitions, outdoor learning, karaoke, themed parties, yoga classes, hiking, archery, and cooking. It can be said that high in the hierarchy of the value system are the values related to security and stability. *Conclusions:* the most important thing is the support of the family and the teacher, which children must receive. Positive assessment and encouragement with rewards are important for their motivation and success, even when they do not show the expected result. In this way, they feel significant and valued in their environment, which is of particular importance for their internal sense of significance and a stimulus for continued cognitive development.

Keywords: wellness, culture, pedagogical, interaction, Family-Kindergarten-School

Introduction

The problem of educating the young generation is as ancient as it is modern. The moral formation of the personality is one of the most complex and delicate educational problems in every era (Dimitrova et al, 2021; 2019; 2018; Apturkar, Iliev et al, 2020; Iliev, 2009). From ancient times to today, every civilization has created its value system and forms virtues. It is a multi-component and contradictory process, requiring purposeful, specific, and organized interaction between the adult and the child (Ignatova, 2023; Angelova & Petkov, 2020; Angelova, 2019). This interaction takes place by creating pedagogical conditions in which the child actively participates in this process, and the teacher applies modern didactic technologies for the maximum development of general cognitive and special abilities (Ignatova, 2023b; Angelova, Belomazheva-Dimitrova, 2023). Motivation to learn can be defined as a system of stimuli causing learning activity (Ignatova, 2024; Iliev, 2016). The question of the nature of this system is fundamental to understanding and directing personality behavior (Ignatova, 2023a; Iliev, Stanchev, 2018). The most widespread is the division of motivation into external and internal (Ignatova & Iliev, 2023). An expression of this division is the understanding of the immediate and mediated nature of learning motives for developing a culture of well-being in the pedagogical interaction of family kindergarten (Ignatova, 2018; Iliev, 2016a).

- Extrinsic motivation is a carrier of incentives in the social environment that offers rewards or punishments for a certain type of behavior.

- Internal motivation expresses the self-regulation of the personality, manifested in the pursuit of satisfying needs that are important to it.

The family, as part of the concept of "environment", is one of the main external factors influencing motivation to learn. Children's home environment shapes initial attitudes toward learning. Satisfying children's natural curiosity about the world, studying it, and answering their questions helps develop and stimulate their curiosity. Developing cognitive independence and autonomy at an early age is important because it prepares children for the risks inherent in learning.

Materials and Methods

In the last dozen years, powerful factors have emerged that destabilize family relations, lower the standard of living and family well-being, and undermine moral standards and moral guidelines. Until recently, the kindergarten performed well in the function of directing the influence of family education, but today, as an institution, it is also unable to fully realize the functions assigned to it for the motivation of children. Teachers often note children's lack of interest in learning. The results of various studies in this direction show that in modern kindergartens, there is a tendency towards negative motivation for learning, which can be considered as school maladaptation associated with deterioration of well-being. It is necessary to clarify the reasons for this, as well as the factors that have the greatest impact on the formation of motivation to learn.

The regulated school system proves demotivating for many of them because of the restrictions it imposes. An unfavorable classroom environment makes the learning process difficult, leading to a loss of interest and, in some cases, refusal and reluctance to attend class. The main reasons for the lack of motivation to learn in preschool and primary school age are:

The stress of the new environment.

The burden of responsibilities and obligations.

Low self-esteem and marked sensitivity.

Children need help to overcome all the negativity to get the most out of what school has to offer. Motivation is achieved by realizing the benefit of learning, building a clear idea of the goals of learning, and the essence of learning itself. A positive attitude and good examples are other ways to motivate the child. When supported by parents and teachers, it copes with the task many times better. This gives him courage and a powerful incentive to achieve success in the learning process and beyond. The child must feel significant to learn with pleasure. It needs an opportunity to express its opinions and ideas and to be encouraged by them. Support is needed for his achievements. Thus, the child understands the importance of his participation in the given activity. Experiencing satisfaction with the learning process develops his inner motivation. Despite the extensive study by several authors, on the one hand, of the motivation for learning, and on the other, of the family as an element of the social environment, there is a lack of a complete, systematic, in-depth study of the problem of the family as a factor of learning motivation. This necessitates the present study to focus on this problem. It can be considered that when studying the problem of the influence of family upbringing on the development of motivation to learn, it is necessary to take into account the educational atmosphere as a whole, since the same educational interactions can have an opposite character in families. Different types of parental relationships. As the initial, first, and only reference group for the child, the family plays a crucial role as an institution of socialization during the schooling stage. Preferentiality makes family values personally meaningful to the child, ensuring their assimilation. The mother plays an important role in establishing emotional connections between the child's level of achievement and emotional support. This determines the need to study the types of maternal upbringing and its influence on the characteristics of the child's motivation to learn. The study of the motivation to learn is of great importance during the period of the child's most intensive development. It is at this age that a certain type of attributions for success and failure begins to be built, and a conscious correlation of failures with the reasons for their occurrence begins.

Research methodology:

A study was conducted to establish the level of cooperation between teachers and parents based on a questionnaire survey. The study was conducted during the 2025 school year in the "Sun" Kindergarten in Sofia.

The research contingent consists of 25 parents of children from I, II, III and IV age groups, in the preschool period. Of the research contingent tracked, 18 participants are women, representing 72% of the representative sample, and 7 are men, representing 28%.

The forms of pedagogical interaction with parents applied in the study are diverse, daily, and periodic. They are specified as: consultations and information to parents regarding educational and upbringing activities, holding parent meetings, and holding open lessons and celebrations.

The organization and stimulation of pedagogical interaction between kindergarten and family, as a basic and dynamic building unit, is of utmost importance and is based on:

- Family relations and family upbringing, as part of social life and are influenced by socio-economic changes;
- The family is an important educational institution, and the mother and father are natural teachers of their children.
- Parents influence the development of the child's personality with their knowledge, value system, and behavior models.
- The family is the initial practical mastery of morality and the rules regulating human society.

Results

The family is a social factor in the development of personality. The family is an indispensable environment for human life. Even Aristotle called the family "the basic cell of society", which is essentially a community that arose naturally to satisfy daily needs. The analysis of the literature on the issue of family relations and the styles of parents' treatment of children allows us to be convinced of the enormous role of the family in the child's health and psyche. Many definitions of the family from different countries give insight into this complex phenomenon. Various scientific studies and developments on family issues highlight some aspects of its importance for the personal development of children.

In the course of the survey, 25 parents aged between 20 and 55 were surveyed. 18 of them were women, representing 72% of the representative sample, and 7 were men, representing 28%. In summary, the results of the study are presented in Chart 1.

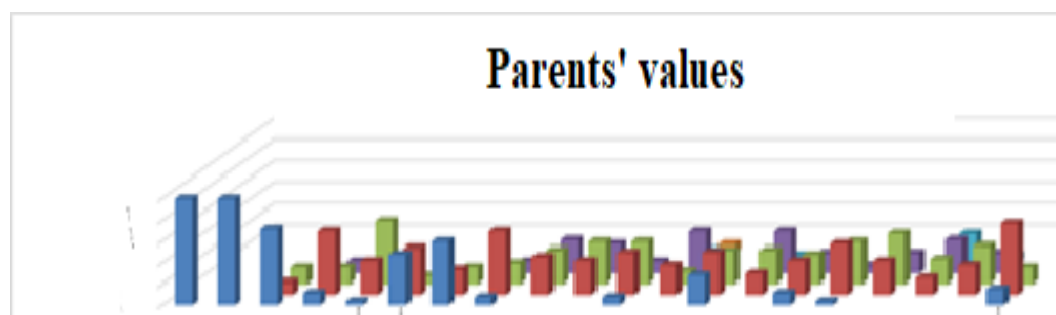


Chart 1. Survey - parents: Values

In summary, it can be said that high in the hierarchy of the value system are the values related to security and stability. These priority values – both for the individual and for the family – are viewed through the prism of public security and stability. That is why the first subcategory can be interpreted as a category of social values. The second, broader subcategory contains values related to the individual personality. The family is the child's first social group in which he acquires and organizes his social experience. It also strengthens the sense of belonging to a certain social group. The style of educational interactions in the family creates prerequisites for building certain personal qualities. Basic human needs are satisfied in the family (physiological needs, needs for communication, respect, love, and self-actualization). Relationships in the family have a strong influence on the overall formation of the personality. This statement applies to both self-esteem and personal qualities, emotional expressiveness, social competence, value orientations and attitudes, as well as motor development. Traditional norms, rules, values, and patterns of behavior of a given society are internalized in the child's personality, primarily through the prism of the family environment. Thus, family values are one of the main components of a harmonious and happy life. The basic system of

national values is fundamental not only in the field of education, but also in all areas. It reveals the understanding of society and the attitude of a person to the family, homeland, and labor, and gives priority to social and individual development. That is why it is so important to value and carefully pass on the traditions and customs of the family from generation to generation. Family values are qualities, traits, and actions that are respected and emphasized by all household members and form a solid foundation for family relationships.

Constant communication with loved ones and a sense of confidence that there are close relatives or friendly people nearby inspire peace of mind in a person. You can always count on their support and help in any life situation.

The results of a survey - parents: Traditional family values are summarized in Chart 2 based on empirical data on Table 1.

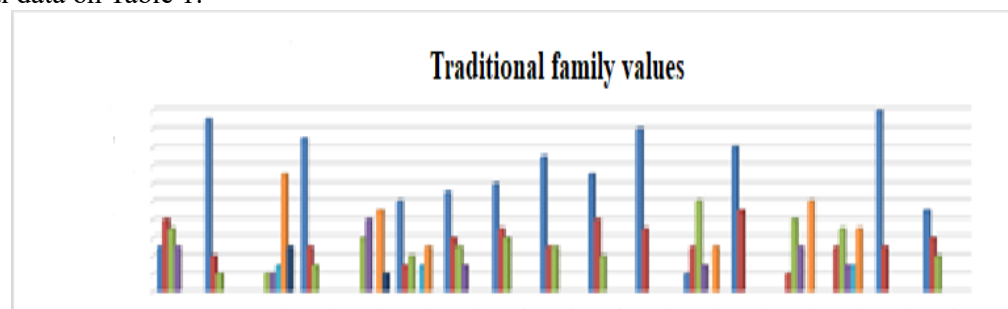


Chart 2. Survey - parents: Traditional family values

Table 1. Traditional family values: Parents' attitude towards forms of cooperation

Forms of pedagogical interaction: Family-Kindergarten-School	I group		II group		III group		IV group	
	successf ul	unsucces sful	success ful	unsucces sful	success ful	unsucces sful	success ful	unsucces sful
Visit to the family home	0%	25%	0%	25%	0%	25%	0%	25%
Parent meetings	23.75%	1.25%	23.75%	1.25%	23.75%	1.25%	25%	0%
Maintaining constant contact between parents and teachers	25%	0%	25%	0%	25%	0%	25%	0%
Conversations	2.5%	22.5%	2.5%	22.5%	1.25%	23.75%	1.25%	23.75%
Consultations with specialists	20%	5%	20%	5%	22.5%	2.5%	22.5%	2.5%
Discussions	1.25%	23.75%	2.5%	22.5%	0%	25%	0%	25%
Parents' club	0%	25%	0%	25%	0%	25%	0%	25%
Parent board	25%	0%	22.5%	2.5%	22.5%	2.5%	25%	0%
School for parents	0%	25%	0%	25%	2.5%	22.5%	0%	25%
Seminars	0%	25%	0%	25%	5%	20%	0%	25%
Parent participation in the educational process	0%	25%	0%	25%	0%	25%	0%	25%
Open days in the kindergarten	25%	0%	25%	0%	25%	0%	25%	0%
Holidays, entertainment	25%	0%	25%	0%	25%	0%	25%	0%
Excursions, green school	6.25%	18.75%	8.75%	16.25%	25%	0%	25%	0%
Suggest other forms of cooperation	25%	0%	25%	0%	25%	0%	25%	0%

Traditional in the family value system is the image of the father, although in a certain sense unstable, as a dominant figure and the main source of the family's financial stability. Mutual aid relationships

between parents and children are also traditional. Parents have the greatest rights and the greatest responsibilities regarding the upbringing and education of their children, according to their own beliefs and philosophy. From an early age, when they communicate with their children, they transmit their ideology, their beliefs, and understandings of right and wrong, good and bad. As biological guardians, mothers and fathers know their little ones best and know what is best for them. They support them and influence their thoughts and feelings to shape their personality and correct them when they make mistakes. They create the rules in the family that must be followed. At preschool age, children learn about the moral values in their families. Through their relationship with their parents, they learn what is good and what is bad, what they should and should not do. The recognition of good and evil is inherent in every person - a person is neither only good nor only bad, but the moral value is found in the act of this person, who, in a specific situation, acts in such a way that they prefer good to evil. The problem of good and evil is in the genesis of human nature. When a person distances himself or acts against the moral norms of his environment, he isolates himself; it is difficult for him to prosper, he degrades socially, and can end up with antisocial and criminal acts, lose his personal qualities, or even die. One of the high values associated with goodness is humanity. The issue of interaction between kindergarten and family is extremely relevant, since these two educational institutions have one common goal - the formation of the child's personality. It is especially important to know how the educational work in kindergarten is perceived by parents. What are their recommendations, in what directions would they like the kindergarten to help them, and what are they satisfied and dissatisfied with in the upbringing of their children? The family is the group in which a person grows up. It helps to determine our attitude towards ourselves and others. A person's initial ideas about the world are formed in the family. The directions of his social development are also predetermined to a significant extent. The family has a fundamental and very important role in the survival and development of children.

The forms of pedagogical interaction with the parents of children are diverse, with daily and periodic consultations and informing parents about educational activities, parent meetings, open lessons, and celebrations. Organizing and stimulating the interaction between kindergarten and family is extremely important because:

Family relations and family upbringing are part of public life and are influenced by socio-economic changes.

The family is an important educational institution, and the mother and father are the natural teachers of their children.

Parents influence the development of the child's personality with their knowledge, value system, and behavior models.

The family is the place where the initial practical learning of morality and the rules governing human society takes place.

Considering parents as partners, the European Education Strategy raises the thesis of a transition from social engagement to priority participation of the family in the educational process. The content of positive upbringing of children is determined by their rights, but also by the rights of parents, as well as by the right of the family to receive support from the state in fulfilling its obligations. The upbringing of children is related to the concepts of “cooperation” and “child-parent interaction”, as well as to the extent and how parents perceive the intrinsic value of childhood and provide an environment for the development of abilities, care, and emotional warmth, and set a framework in which children feel safe and develop in the best way. The results of a survey - parents: Family and Kindergarten - competitors or partners are summarized in Chart 3.

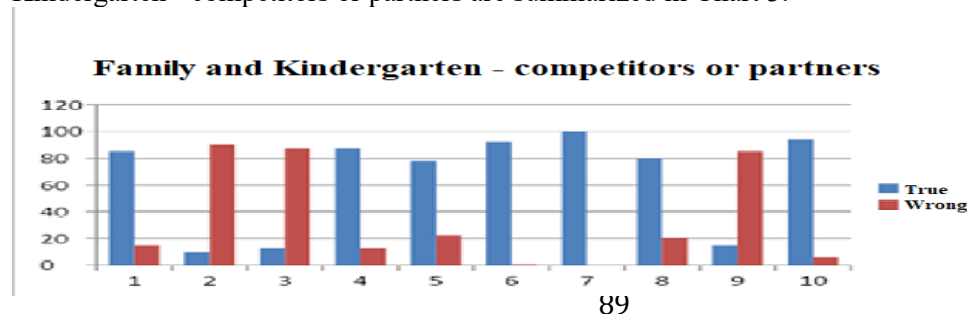


Chart 3. Survey - parents: Family and Kindergarten - competitors or partners

Discussion

According to the recommendation of the Committee of Ministers of the Member States of the European Union on policies to promote positive family upbringing. Positive family upbringing means that parents should take care of children, raising them in such a way that children achieve the best relationships in the family, society, and in communication in kindergarten and school. This can be achieved when there is warmth and support in the family, attention to children, understanding, established rules, and discipline.

Successful approaches for high motivation of children with the participation and support of parents and teachers

Play is the best way for children to learn about the world around them. Play is essential for the formation of overall development. Through it, children achieve better results and gain life experience. Games are an inexhaustible source of joy and pleasure. They are also important for the emotional development of children. They learn to regulate their emotions. By participating in the game, students experience all the events in it. They observe, experiment, create, and imagine. They ask questions and seek an explanation for everything. Story-role-playing and mobile games are of great importance, facilitating the perception of the educational material and building teamwork skills with their dynamic nature. Curiosity naturally arises - an emotion that prompts them to explore and study it. Learning through play is an effective and natural way to acquire knowledge and skills. When children are involved in game situations, they are engaged in an active process of exploring and discovering new worlds. It is necessary to support and stimulate interest in various motor activities of interest: outdoor games, role-playing games, competitive games, sports, excursions, workshops, art studios, theater, concerts and exhibitions, children's events and festivals, competitions, outdoor learning, karaoke, themed parties, yoga classes, hiking, archery, and cooking.

This is how friendships are created, and skills are acquired in different areas:

Make learning fun and engaging through the use of educational applications, games, and videos.

Provide opportunities for additional learning by providing additional educational resources and opportunities to develop the child's interests.

Develop hobby interests according to the child's preferences and direct his attention and creativity towards them.

Conclusions

In conclusion, the culture of well-being in the pedagogical interaction family-kindergarten-school occupies a fundamental place. It can be summarized that the supreme family value of the Bulgarian family is the family itself, its integrity, and the well-maintained positive image both before its members and before the outside world.

The following conclusions can be drawn:

- The family bears primary responsibility for the upbringing of the child.
- The kindergarten bears primary responsibility for the education of the child.
- The family and the kindergarten are competitors and opponents in education.
- The family and the kindergarten are collaborators and partners.

It can be said that once the motivation for learning has already been created, it must be maintained and developed. The most important thing is the support of the family and the teacher, which children must receive. Positive assessment and encouragement with rewards are important for their motivation and success, even when they do not show the expected result. In this way, they feel significant and valued in their environment, which is of particular importance for their internal sense of significance and a stimulus for continued cognitive development.

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THE INFLUENCE OF PHYSICAL EDUCATION LESSONS TAUGHT BY TEACHERS WITH DIFFERENT PROFESSIONAL PROFILES ON THE MOTOR ABILITIES OF 8- TO 9-YEAR-OLD PUPILS

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Abstract

Physical education in the primary stage plays a key role in the formation of basic motor skills, social competences, and healthy habits. Early school age is a critical period for the development of motor culture, which accompanies the individual throughout life. In Bulgarian practice, physical education lessons are often taught by teachers who are not specialists in physical education and sport. There is a tendency for physical education lessons to be assigned to primary school teachers without a specialized methodological profile, which limits the purposeful development of motor skills and the quality of instruction. The aim of the study is to determine the influence of the teacher's professional profile on selected parameters of motor development in 8–9-year-old pupils.

To achieve this aim, the study was conducted during the 2024–2025 school year in three schools in Sofia. A total of 97 pupils aged 8–9 years were divided into two groups. The first group, which included pupils from 119 Secondary School "Acad. Mihail Arnaudov", was defined as the experimental group. This group worked with a specialist physical education teacher. The second group, defined as the control group, included pupils from 85 Secondary School "Otets Paisii" and 109 Primary School "Hristo Smirnenski". Physical education and sport lessons in this group were conducted by a non-specialist teacher. Both groups were tested at the end of the school year using two motor tests: "Balance" and "Dribbling with the preferred hand".

The results obtained from the testing were processed using the statistical software product SPSS v.25. The data were subjected to variation and comparative analysis. The results indicate significant differences in the motor abilities of the two groups. A statistically significant difference was found in the dribbling test, indicating a stronger influence of professional teacher training on coordination and specific motor skills.

Keywords: pupils, physical education, motor abilities, specialist teacher, non-specialist teacher 1.

Introduction

Physical education in the primary stage of basic education occupies a key place in the overall development of pupils' personalities. At this age, the foundations of motor culture are formed, which have a long-term influence on health, physical capacity, and social behavior. Early school age is defined as a sensitive period for the development of motor abilities, as regular physical activity supports the physical, mental, and social development of children (Chaput et al., 2020). Current recommendations of the World Health Organization emphasize that children should engage in at least 60 minutes of daily physical activity, which is a key factor for their health and normal development (World Health Organization, 2020). In this context, school physical education is a major instrument for implementing these recommendations. The effectiveness of physical education instruction directly depends on the quality of pedagogical influence. Studies show that the positive effects of physical education are fully manifested when the educational process is well organized and conducted by qualified teachers (Bailey, 2006). In the absence of systematic organization and methodological justification, pupils' motor development may be

limited.

In Bulgarian educational practice, physical education and sport instruction in the primary stage is often carried out both by specialists and by teachers without specialized training. This leads to differences in the quality of teaching, the organization of the educational process, and the effectiveness of instruction. In many cases, lessons are conducted without clearly defined objectives and without systematic control over the development of motor abilities. There is a tendency for physical education and sport lessons among the youngest pupils to be assigned to primary school teachers, often for administrative purposes, such as completing the required teaching workload. Practice shows that these lessons are often used to compensate for instructional time in other subjects or become free motor activity without methodological guidance. The lack of appropriate sports equipment is also a common problem, which further limits pupils' physical activity (Ivanov, 2006).

Such an approach represents a serious problem, because it is precisely at this age that the foundations of technical skills in sport games are laid and personal qualities such as discipline, teamwork, and willpower are formed. Physical education should be viewed as a purposeful pedagogical process for the overall formation of the personality, including the acquisition of knowledge, skills, and values related to a healthy lifestyle and physical activity (Ivanov, 2006). Similar problems are observed at the European level as well. Data from the European Physical Education Barometer show significant differences in the quality of teaching and emphasize the importance of teachers' professional qualifications as a key factor in the effectiveness of instruction (European Physical Education Association, 2025).

Bulgarian scientific studies also confirm the importance of purposeful pedagogical influence. Analyses published in the scientific editions of the National Sports Academy show that systematic and methodologically grounded instruction leads to significant improvements in pupils' physical capacity (Nancheva, 2024). Other studies emphasize the need to improve the educational process and increase its effectiveness (Hristova, 2019). Data from a study among primary school teachers indicate differences in the implementation of the sport-pedagogical process, which influences the development of pupils' motor abilities (Stoychev, 2016). Reports from scientific forums emphasize the role of the teacher as a main factor for achieving high educational results, highlighting the relationship between professional training and the level of pupils' motor development (Sofia University, 2021).

All of this determines the need for an in-depth study of the influence of the teacher's professional profile on the motor development of pupils in early school age. Similar conclusions regarding the development of motor abilities in primary school pupils have been reported by Simeonov (2016) and Ignatova (2021), who emphasize the importance of systematic assessment and targeted pedagogical influence.

Methodology

To achieve the aim of the study, the research was conducted during the 2024–2025 school year in three schools in Sofia: 85 Secondary School "Otets Paisii", 109 Primary School "Hristo Smirnenski", and 119 Secondary School "Acad. Mihail Arnaudov".

A total of 97 pupils aged 8–9 years participated in the study. They were divided into two groups according to the professional profile of the teacher conducting the physical education and sport lessons:

Experimental group – pupils from 119 Secondary School "Acad. Mihail Arnaudov", taught by a specialist teacher in physical education and sport;

Control group – pupils from 85 Secondary School "Otets Paisii" and 109 Primary School "Hristo Smirnenski", taught by a non-specialist teacher.

The aim of the study was to determine the influence of the teacher's professional profile on the development of motor abilities in pupils aged 8–9 years.

To achieve this aim, the following tasks were set:

To conduct a theoretical analysis of literature sources on the problem;

To examine indicators of motor abilities in pupils aged 8–9 years;

To perform comparative and variation analysis of the results between the experimental and control groups;

To perform comparative and variation analysis of the results between boys and girls. The object of the study was second-grade pupils from the primary stage of education. The subject of the study was the specific characteristics of pupils' motor ability development depending on the professional profile of the physical education and sport teacher. The pupils were tested at the end of the school year using two motor tests: Balance test – for assessing static equilibrium; Dribbling with the preferred hand test – for assessing coordination and agility. The results of the tests were measured in time, in seconds, with lower values interpreted as better performance. Testing was conducted under identical conditions for all participants, following the same requirements for test performance. The obtained results were processed using the statistical software product SPSS v.25. The data were subjected to variation and comparative analysis in order to determine the differences between the two groups.

Results and Discussion

The variation analysis of the results from the “Balance” and “Dribbling with the preferred hand” tests, presented in Table 1, reveals significant differences both in the level of achievement and in the degree of variability between the studied groups. In the “Balance” test, the experimental group was characterized by a lower mean value ($X = 27.35$ s), which indicates better performance compared with the control group ($X = 32.62$ s). However, both groups showed high variability ($V > 40\%$), which indicates considerable heterogeneity in the results.

In the “Dribbling with the preferred hand” test, the differences between the groups were more pronounced. The experimental group demonstrated not only better results ($X = 4.86$ s), but also significantly lower variability ($V = 16.87\%$), indicating greater homogeneity. In contrast, the control group was characterized by very high variability ($V = 68.13\%$), which indicates uneven development of motor abilities.

The analysis of skewness (As) and kurtosis (Ex) allows for a more detailed assessment of the distribution of the results and the degree of deviation from normal distribution in the studied groups. In the experimental group, the skewness values were relatively low ($As = 0.76$ for balance and $As = 0.56$ for dribbling), indicating slightly expressed positive skewness and a distribution close to normal. This means that the results were relatively evenly distributed around the mean value, without a substantial shift toward lower or higher values. The kurtosis values ($Ex = 0.11$ and $Ex = -0.55$) were also close to zero, confirming that the distribution was close to normal in terms of peakedness and that extreme values were absent.

In contrast, the control group showed considerably higher values of both skewness and kurtosis. In the balance test ($As = 1.42$; $Ex = 3.24$), and especially in the dribbling test ($As = 2.36$; $Ex = 5.95$), clearly expressed positive skewness and high kurtosis were observed. This indicates that the distribution was shifted toward lower results, while at the same time there was a concentration of values around the mean and the presence of extreme results.

The comparative analysis of the results between the experimental and control groups is presented in Table 2, with the aim of determining statistically significant differences in the studied indicators.

In the “Balance” test, the experimental group showed better results ($X = 27.35$ s) compared with the control group ($X = 32.63$ s). The difference between the two groups was $d = -5.27$, and the value of the t-criterion was $t = -1.86$. The level of significance ($P = 93.4\%$) shows that the observed difference was not statistically significant ($p > 0.05$).

In the “Dribbling with the preferred hand” test, the experimental group again showed better results ($X = 4.86$ s) compared with the control group ($X = 7.72$ s). The established difference ($d = -2.86$) was accompanied by a t-value of $t = -3.38$ and a high level of significance ($P = 99.9\%$), indicating that the difference was statistically significant ($p < 0.05$).

The obtained results show that the experimental group, taught by a specialist teacher in physical education and sport, achieved better results in both tests. However, a statistically significant difference was found only in the “Dribbling with the preferred hand” test, which indicates a stronger influence of the teacher's professional training on the development of specific motor

skills.

The variation characteristics of the results from the balance and dribbling tests by sex are presented in Table 3. The analysis of central tendencies and dispersion makes it possible to assess the degree of homogeneity of the studied groups and the specific characteristics of the distribution of results.

Among boys, the results of the “Balance” test showed a mean value of $X = 29.68$, accompanied by a high coefficient of variation ($V = 51.65\%$), which indicates considerable heterogeneity in the group. The high standard deviation ($S = 15.33$) further confirms the presence of substantial dispersion around the mean value. The combined analysis of skewness and kurtosis ($As = 1.42$; $Ex = 3.00$) shows a positively skewed distribution with a more sharply expressed peak compared with the normal distribution, indicating concentration of results around the mean and the presence of extreme values.

Regarding the dribbling test among boys, a lower mean value was observed ($X = 5.29$), together with moderate variability ($V = 37.61\%$). Nevertheless, the combined values of skewness and kurtosis ($As = 3.33$; $Ex = 13.89$) reveal a strongly skewed distribution with clearly expressed extreme results, which indicates a low degree of homogeneity and considerable differences in the level of motor skill development.

Among girls, the “Balance” test was characterized by a mean value of $X = 30.42$. The coefficient of variation ($V = 36.91\%$) and the standard deviation ($S = 11.23$) were lower compared with boys, which indicates greater homogeneity. The combined analysis of skewness and kurtosis ($As = 0.56$; $Ex = 0.48$) shows a distribution close to normal, with relatively even distribution of the results around the mean value.

In the dribbling test among girls, the highest mean value was recorded ($X = 7.99$), together with an extremely high coefficient of variation ($V = 72.46\%$), which indicates strongly expressed heterogeneity. The combined values of skewness and kurtosis ($As = 2.33$; $Ex = 5.37$) confirm the presence of an asymmetric distribution with extreme values and substantial deviations from normal distribution.

The results of the comparative analysis between boys and girls for the balance and dribbling indicators are presented in Table 4. Mean values (X), standard deviations (S), differences between means (d), empirical t-values (t_{emp}), and levels of significance ($P(t)\%$) were used. In the “Balance” test, girls ($X = 30.42$) showed a higher mean value compared with boys ($X = 29.68$). However, the value of the t-criterion ($t_{emp} = -0.24$) and the level of significance ($P = 19.5\%$) indicate that the difference was not statistically significant ($p > 0.05$). This means that the observed difference between boys and girls in balance cannot be considered statistically meaningful and is probably due to random variation.

Regarding the “Dribbling” test, a more pronounced difference was observed between the two groups. Girls had a higher mean value ($X = 7.99$) compared with boys ($X = 5.29$). Since the results are measured in seconds and lower values indicate better performance, the data show better performance among boys. The difference between the mean values was substantial ($d = 2.69$). The value of the t-criterion ($t_{emp} = -3.10$) and the high level of significance ($P = 99.7\%$, corresponding to $p < 0.01$) indicate that this difference was statistically significant.

The findings demonstrate that no substantial differences between the sexes were found in balance, despite the slight difference in mean values. In dribbling, however, a clearly expressed and statistically significant advantage of boys was observed. The comparative analysis confirms that sex differences in motor abilities are not uniform and depend on the nature of the motor task. While balance appears to be a relatively universal ability without significant differences between groups, dribbling shows a statistically significant difference with practical importance. The results obtained from the present study confirm the significant role of the professional training of the physical education and sport teacher as a key factor in the effectiveness of the educational process in the primary stage. The observed differences between the experimental and control groups correspond to contemporary scientific views, according to which the quality of pedagogical influence is decisive for the development of motor abilities (Bailey, 2006). Regarding the “Balance” test, a tendency toward better performance was observed in the

experimental group, although without a statistically significant difference. This result can be explained by the fact that balance is a complex motor quality that depends not only on purposeful instruction but also on children's individual characteristics, their level of general physical activity, and their biological development. Similar conclusions are supported by the studies of Chaput et al. (2020), which emphasize the multifactorial nature of physical development in childhood. In the "Dribbling with the preferred hand" test, a statistically significant difference was found in favor of the experimental group, confirming the stronger influence of the teacher's professional training on the development of specific motor skills. This corresponds to Bailey's (2006) conclusions that well-structured instruction has a substantial influence on the acquisition of coordination-demanding movements.

The analysis of variation indicators further supports these results. The lower values of the coefficient of variation in the experimental group indicate a higher degree of homogeneity, which is an indicator of systematic and consistent pedagogical influence. In contrast, the high variability in the control group suggests uneven development of motor abilities, which may be related to the lack of methodological consistency in instruction. Similar results have been reported by Nancheva (2024) and Hristova (2019). The results of the analysis by sex show a lack of significant differences in the "Balance" test, confirming its relatively universal character. In the "Dribbling" test, however, a statistically significant difference was observed, with boys achieving better results due to their lower completion times. This may be explained by differences in previous movement experience, participation in ball games, and the level of development of coordination abilities in this age group. In a broader context, the obtained results correspond to data from the European Physical Education Barometer (EUPEA, 2025), which emphasizes the importance of teacher qualification as a leading factor in the quality of instruction. This confirms that the effectiveness of the educational process depends not only on the presence of physical activity, but also on its pedagogical structuring.

Conclusion

The results of the present study confirm the significant role of the professional competence of the physical education and sport teacher as a key factor in the effectiveness of the educational process in the primary stage of education. It was established that pupils taught by a specialist demonstrated a better level of motor abilities. This influence was most clearly expressed in the "Dribbling with the preferred hand" test, where statistically significant differences were found, indicating a stronger impact of professional preparation on the development of coordination and specific motor skills.

In the "Balance" test, no statistically significant differences were found between the groups, which shows that this motor quality is influenced by multiple factors and does not depend to the same extent on the nature of instruction.

The analysis of the results by sex shows that sex differences are not uniform. No significant differences were observed in balance, while in dribbling a statistically significant difference was found, with boys demonstrating better results because lower time values indicate better performance. In summary, the obtained results emphasize the need to ensure qualified specialists in physical education and sport in the primary stage, in order to improve the effectiveness of the educational

process and support the optimal development of pupils' motor abilities.

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Table 1

Variation characteristics of the results from the balance and dribbling tests by group

	Test	N	R	Xmin	Xmax	X	V %	S	A _s	E _x
EG	Balance	47	50.15	9.49	59.64	27.35	43.72	11.96	0.76	0.11
	Dribble	43	3.22	3.59	6.81	4.86	16.87	0.82	0.56	-0.55
CG	Balance	46	78.31	11.93	90.24	32.62	46.78	15.26	1.42	3.24
	Dribble	40	25.36	3.14	28.50	7.72	68.13	5.26	2.36	5.95

Table 2

Comparative analysis between the experimental and control groups

Test	EG		CG		d	t emp	P(t) %
	X	S	X	S			
Balance	27.35	11.96	32.63	15.26	-5.27	-1.86	93.4
Dribble	4.86	0.82	7.72	5.29	-2.86	-3.38	99.9

Table 3

Variation characteristics of the results from the balance and dribbling tests by sex

	Test	N	R	Xmin	Xmax	X	V %	S	A _s	E _x
Boys	Balance	58	80.75	9.49	90.24	29.68	51.65	15.33	1.42	3.00
	Dribble	54	12.21	3.14	15.35	5.29	37.61	1.99	3.33	13.89
Girls	Balance	35	50.17	13.03	63.20	30.42	36.91	11.23	0.56	0.48
	Dribble	29	24.62	3.88	28.50	7.99	72.46	5.79	2.33	5.37

Table 4
Comparative analysis between boys and girls

Test	Boys		Girls		d	t emp	P(t) %
	X	S	X	S			
Balance	29.68	15.33	30.42	11.23	-0.74	-0.24	19.5
Dribble	5.29	1.99	7.99	5.79	-2.69	-3.10	99.7

DUAL CAREER OF ELITE ADOLESCENT ATHLETES (AGED 15–19): A COMPARATIVE ANALYSIS OF POLICIES AND PRACTICES IN EUROPE

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Abstract

The development of "Dual Careers" for athletes has emerged as a high-priority constituent of European sports policy. This framework aims to establish the necessary conditions for the effective integration of elite-level athletic pursuits with academic requirements and future professional transition. Providing robust support for adolescent athletes during this phase is critical; the developmental window of 15–19 years is a definitive period where athletic performance, educational attainment, and long-term vocational prospects are simultaneously forged. Successful dual career management necessitates systematic coordination between sports organizations, educational institutions, and diverse sectoral stakeholders. The primary objective of this study is to evaluate the policies, systemic challenges, and best practices associated with the dual career progression of adolescent volleyball players across four European nations: the Republic of Bulgaria, the Republic of Serbia, Croatia, and Austria. To fulfill this objective, the research addresses the following thematic areas: 1. An assessment of the level of institutional awareness regarding national dual career strategies and policy frameworks; 2. The identification of fundamental impediments and barriers to the synchronization of athletic and academic commitments; 3. An analysis of the support mechanisms currently implemented by sports organizations; 4. An investigation into existing evidence-based best practices within the selected jurisdictions. The study's cohort comprises club presidents and managers, representatives from national volleyball federations, and professional coaches. The scope of the inquiry focuses specifically on the management practices, policy architectures, and support mechanisms tailored for the volleyball sector.

The findings indicate that literacy regarding national dual career policies remains fragmented. Adolescent athletes consistently report significant challenges, most notably temporal constraints for academic study, high-intensity training loads, and a lack of formalized communication channels with educational environments.

From an institutional perspective, the primary barriers to effective implementation include a deficit of targeted information, a shortage of specialized personnel, and the absence of comprehensive national strategies. The analysis suggests that the optimization of dual career management is predicated on cross-sectoral partnerships between sports and educational entities, the adoption of flexible pedagogical models, and the provision of structured mentorship.

Key words: dual career, volleyball players, management, policy, practice

Introduction

The development of "Dual Careers" for athletes has emerged as a high-priority constituent of European sports policy.

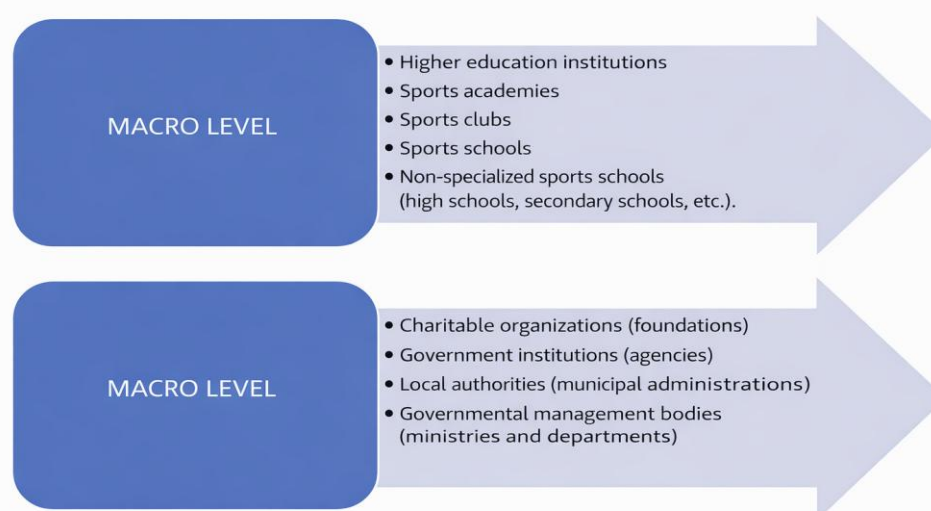
The management of dual careers requires an understanding of the specific determinants that define their scope, significance, and strategic impact on athletes. In the scientific literature, "dual career" is conceptualized as proactive mentoring (Hallmann et al., 2019; Kuokkanen et al., 2022), a bidirectional identity within the integration of athletic and academic careers (van Rens et al., 2019), values underpinning coaching behavior (Nikander et al., 2020), declared value-based support from sports clubs (Pink et al., 2015), as well as personal and professional development (Debois et al., 2015).

There has been a growing call for more flexible entry and exit opportunities in professional sports careers, with dual career pathways increasingly recognized as a key strategy for mitigating the challenges faced by contemporary athletes. As a result, an expanding body of research has emerged, examining various aspects of dual career development.

Nam (2021) and Stambulova et al. (2015) focus on the challenges and opportunities associated with athletes' career transitions, athlete identity, and the role of the dual career ecosystem in supporting their development (Mateu et al., 2020; van Rens et al., 2019).

In the specialized literature, an integrative model for dual career development - *the Dual Career Development Environment* (Linner et al., 2017) - has been identified. According to this model, the dual career ecosystem operates across three interrelated levels: the micro-level (the athlete's immediate environment, including family, coaches, and educational institutions), the meso-level (interactions between these systems), and the macro-level (the broader social and institutional context, including policies and organizations). Key stakeholders include athletes as the central element, educational institutions, sport organizations, specialized support staff, and the family, which plays a crucial role in supporting young athletes.

Hong H. et al. (2022), based on an in-depth theoretical analysis, examine support systems for talented youth athletes (aged 15–19) and the role of sport organizations within a European context. The authors formulate four main conclusions: financial support represents the most prevalent form of assistance; existing mechanisms are not clearly differentiated by age and are characterized by a lack of coherence; significant disparities exist among higher education institutions in terms of the scope of support provided; and finally, support at the secondary education level remains underdeveloped, highlighting a substantial gap in the system for youth athlete development and dual career pathways. The identification of dual career support systems/programmes has been conducted at two distinct levels—micro and macro (Figure 1).



In recent years, the *Erasmus+* programme has placed increasing emphasis on the development of dual careers, recognizing them as essential for enhancing athletes' education and training, with the aim of fostering their capacities beyond the sporting domain (European Commission, 2012).

These projects contribute to the development of guidelines for the implementation of dual career pathways, raise awareness of the associated benefits and barriers, and support the advancement of research in this field. In light of the need to expand existing knowledge on dual careers and to build upon the outcomes of previous *Erasmus+* projects, conducting research focused on young athletes as an underexplored group (aged 15–19) would represent a significant contribution.

Materials and Methods

Aim of the study:

The primary objective of this study is to evaluate the policies, systemic challenges, and best practices associated with the dual career progression of adolescent volleyball players across four European nations: the Republic of Bulgaria, the Republic of Serbia, Croatia, and Austria. To fulfill this objective, the research addresses the following thematic areas:

1. An assessment of the level of institutional awareness regarding national dual career strategies and policy frameworks.
2. The identification of fundamental impediments and barriers to the synchronization of athletic and academic commitments.
3. An analysis of the support mechanisms currently implemented by sports organizations.
4. An investigation into existing evidence-based best practices within the selected jurisdictions.

Subjects of the study are the various policies, strategies, and specific practices for dual career management.

Objects of the study are team managers, chairs of sports clubs, representatives of national federations (chairs, board members, managers), and representatives of employer organizations.

Methods:

To conduct the overall research, a methodological toolkit was employed, comprising the following scientific research methods:

Content Analysis – examination and theoretical analysis of specialized literature sources, including: Scientific literature related to dual career characteristics and managing models.

2. *Case study* - the method of intensive case study research was utilized to identify key aspects of sports organizations' policies regarding the support of talented athletes. The research examined experiences and best practices in supporting talented athletes within the sport of volleyball.

3. *Marketing-oriented survey methods – the questionnaire method*. For the purposes of the study, an online form was developed and distributed across the various countries. All the participants examined are over 18 years of age and took part in the research voluntarily. While completing the online form, they had the opportunity to withdraw at any time without any consequences. All these clarifications have been included in the content of the questionnaire. A purposive sampling method of respondents was used.

Results and Discussion

A central focus of the study is the expert survey conducted on the management and coordination of dual career pathways across individual countries. The study was carried out with the participation of presidents/managers of sports clubs, representatives of national volleyball federations in different countries, as well as volleyball coaches. The number of respondents is shown in Figure 2.

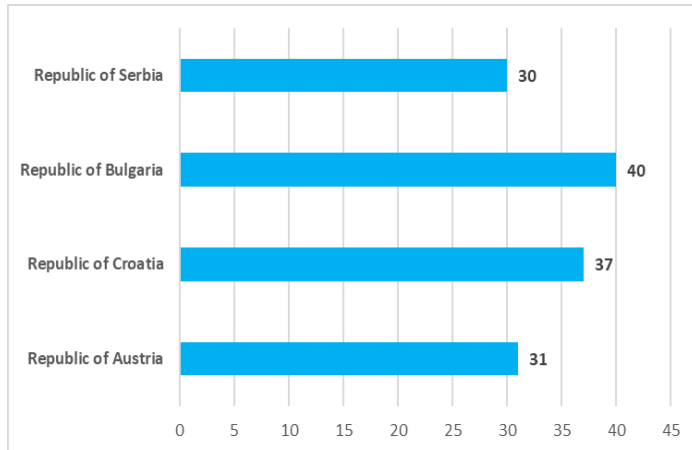


Figure 2. Number of persons surveyed

A key strategic objective of the research was to identify the main challenges faced by young athletes in balancing elite sport and quality education.

The findings highlight substantial cross-national differences in both priorities and challenges encountered by athletes. Communication gaps with educational institutions are most pronounced in Croatia (81%), whereas this issue appears considerably less significant in the other countries. This suggests an urgent need for institutional reform in Croatia aimed at improving coordination mechanisms.

With regard to another key component—motivational barriers—a notable imbalance is observed across countries. While lack of motivation constitutes a serious issue in Bulgaria (62.8%) and Serbia (63.3%), this indicator is reported at 0% in Croatia. This suggests that Croatian athletes are highly motivated but face predominantly administrative and organizational constraints.

With regard to physical load, the highest levels of fatigue are reported in Serbia (76.6%) and Austria (48.4%), which is likely associated with more intensive schedules or higher demands within their sports programmes.

The identified challenges can be translated into specific objectives to be addressed by federations and clubs in their future activities.

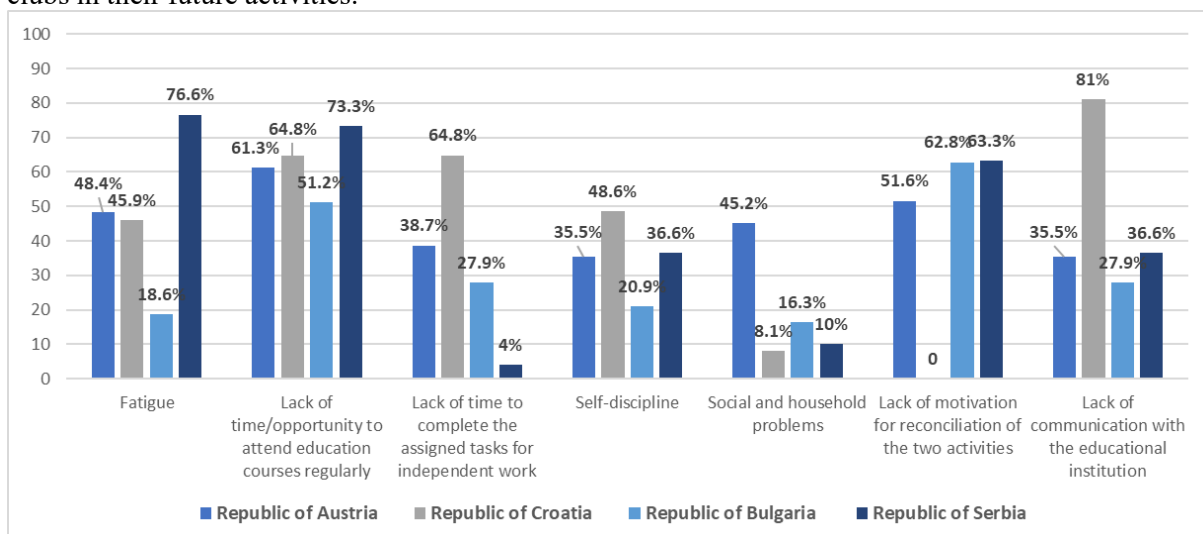


Figure 3. Main challenges faced by youth athletes (aged 15–19) in balancing sport and education across countries.

The study reveals key institutional challenges across the examined countries (Fig. 4). The lack of qualified specialists emerges as the most significant issue in Croatia (94.5%) and Serbia (93.3%). Institutions in these countries evidently face an acute shortage of personnel with the expertise required to manage dual career pathways. In contrast, Bulgaria (35.9%) and Austria (23.3%) demonstrate considerably better performance in this regard.

The lack of accessible and structured information represents a major challenge in Serbia (83.3%) and Croatia (86.4%). The absence of clearly defined methodologies and reliable databases upon which institutions can rely creates uncertainty in setting strategic directions for development.

A third major issue concerns the methodological deficit. Serbia (60%) experiences the greatest difficulties in implementing methodological guidelines for specialists. By comparison, this issue is reported by only 8.1% of respondents in Croatia, suggesting that although adequate methodologies may exist, their effective implementation is hindered by a lack of qualified personnel.

The empirical data provide a basis for several conclusions. Serbia exhibits the highest level of systemic instability. Elevated values across nearly all negative indicators (lack of personnel, information, and methodology) suggest that its support system is still in an early stage of development.

Austria, on the other hand, demonstrates the most balanced profile. While it faces moderate challenges related to funding (43.3%) and methodological frameworks (50%), it encounters notable difficulties in establishing effective communication with educational institutions (50%). This indicates that the primary issue lies not within the sports system itself, but rather in the interaction between key institutional stakeholders.

In Bulgaria, the most significant barrier is insufficient funding (69.2%).

All identified challenges exert a complex influence on the operational capacity to develop effective dual career pathways. They may serve as a starting point for formulating a comprehensive strategic vision for their development.

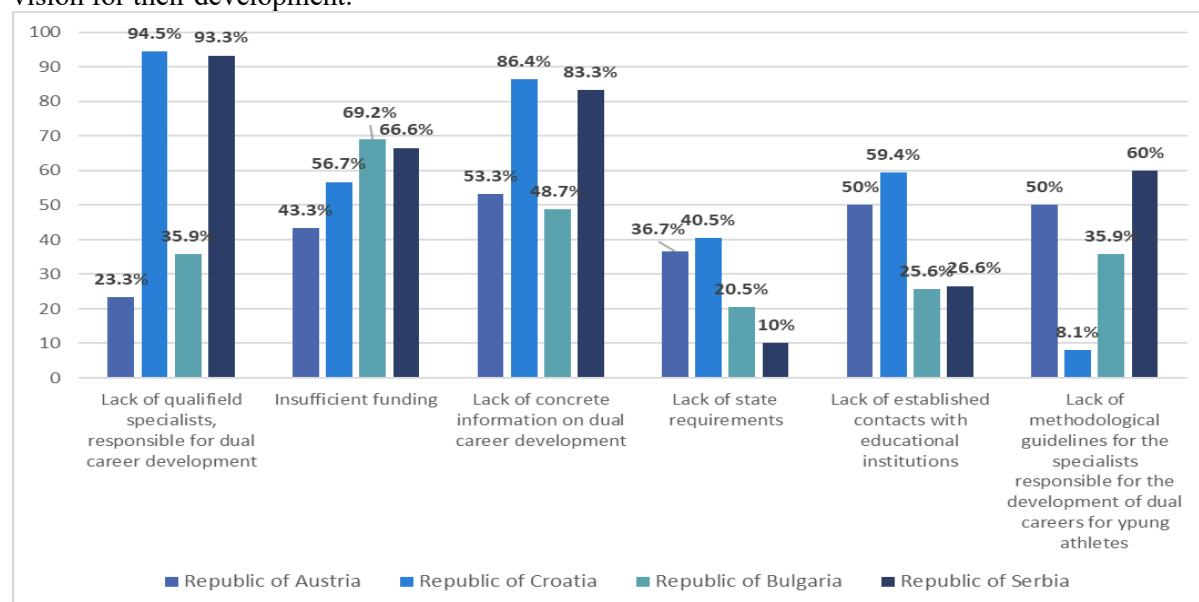


Figure 4. What are the main barriers faced by your institution in implementing dual career practices for youth athletes.

Financial support occupies a central position in strategies aimed at enhancing competitiveness and optimizing the socio-economic dimensions of sports activities. In this context, there is a clear need to examine the specific mechanisms for financial support of volleyball players' dual careers across the countries under study.

The findings of the study reveal significant differences in funding approaches. The analysis of the collected data indicates the absence of targeted state or public structures engaged in the financial support of dual careers in the Republic of Serbia. At present, no established funding mechanisms have been identified that address the specific needs of athletes within this process.

According to respondents in the Republic of Bulgaria, financial support for elite volleyball players in acquiring educational qualifications and achieving professional realization is provided through decentralized sources. The model is based on a mixed funding approach, incorporating targeted municipal subsidies, revenues from sponsorship agreements and the commercialization of advertising rights, as well as funds allocated through programs of the Ministry of Youth and Sports and the Bulgarian Volleyball Federation.

The country that applies a structured support system based on scholarship programs with three levels of governance is Croatia. At the national level, direct support is provided to elite athletes. The National Olympic Committee allocates targeted funds for Olympic preparation, based on the official categorization of athletes. At the local (municipal) level, support is available for athletes with proven achievements. In addition, a practice of targeted funding from educational institutions and private business entities is also observed.

Another important aspect of the study concerns the specific measures and activities implemented by public sports organizations (sports federations and clubs) across the countries under investigation (Fig. 5).

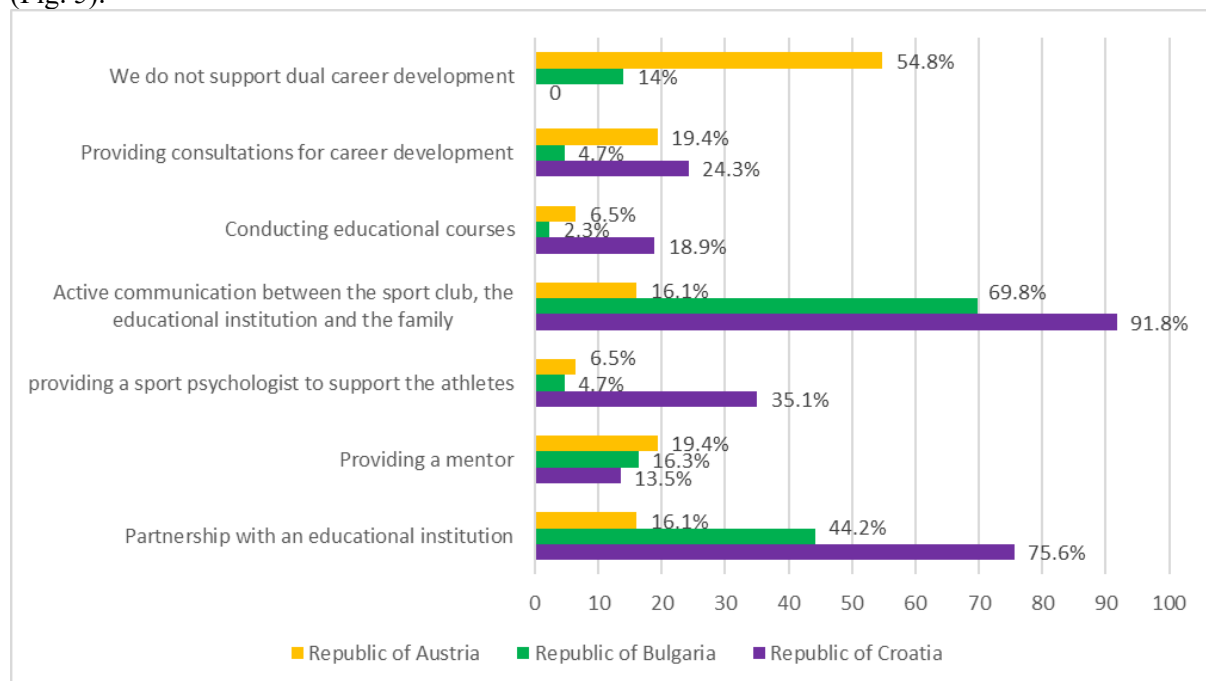


Figure 5. Support for Dual Career Development by Sports Federations and Clubs

A common feature across all three countries is the strong emphasis on active communication between key stakeholders (sports club–educational institution–family), identified as the most widely applied measure. This highlights its role as a fundamental and effective mechanism for preventing early dropout and facilitating balance between sport and education.

However, substantial disparities emerge in the provision of structured support. Croatia demonstrates a highly developed and systematic approach, particularly evident in its strong reliance on partnerships with educational institutions (75.6%) and the integration of sport psychologists (35.1%). These findings suggest a comprehensive model that addresses both institutional coordination and athletes' psychological well-being.

In contrast, Bulgaria shows a moderate level of structural support, with a notable presence of institutional partnerships (44.2%) but limited implementation of psychological services. Austria, on

the other hand, is characterized by a less structured support framework, as indicated by the high percentage of respondents reporting no dual career support (54.8%).

The results of this inquiry highlight several areas for discussion that could support individual countries in improving their policies for talented athletes.

The distribution of responses indicates that, in all countries, active communication among key stakeholders (club–school–family) is considered a primary instrument. This is identified as the most effective preventive measure against early dropout from the educational system among young athletes. Some differences are observed in the provision of psychological and mentoring support. Croatia stands out as a country that integrates psychological support (35.1%) as a substantial component of the dual career framework. In contrast, this component is almost absent in Bulgaria and Austria, indicating a gap in addressing mental health and the adaptive needs of young volleyball players.

The data further illustrate that Croatia relies predominantly on structured partnerships (75.6%), whereas Austria, despite the overall limited support system, tends to emphasize individualized approaches, such as mentorship and counseling, when such support is available.

The integrated support model for elite athletes encompasses a range of key services aimed at the simultaneous development of both athletic and professional potential (Ilieva, 2024). Those with a strong focus on educational and professional adaptation are directly relevant to the present study. In this regard, the author identifies several core components, including facilitated access to higher education and specialized vocational training; programs for social reintegration and career counseling to support the transition to the labor market (e.g., coaching, expert, or managerial roles); and assistance in securing employment following the conclusion of an active sports career.

The analysis of the data collected across the four countries provides a basis for identifying specific actions that can be implemented at the national level in order to improve these services. KADA, a non-governmental association in Austria, offers support and counseling to elite athletes in balancing sport and education, as well as in achieving comprehensive personal development. The organization is funded by the Ministry of Sport and the Austrian Public Employment Service and acts as their official advisory body. Consequently, the services it provides are free of charge. KADA maintains an extensive network of partnerships with Austrian sports federations and organizations, educational institutions, and socially responsible enterprises. It also collaborates with elite sports schools in Austria.

The organization provides guidance to young talented athletes (aged 15 and above), introducing them at an early stage to the opportunities associated with dual career pathways. Furthermore, KADA cooperates with both public and private Austrian universities and supports elite athletes in identifying suitable educational programs aligned with their training and competition schedules.

Elite sport in Bulgaria is predominantly characterized by a strong focus on high athletic performance, which contributes to a relative lack of a comprehensive legal framework and a sustainable state policy for dual career development. Despite the existence of strategic documents (e.g., the National Development Program 2020), the implementation of dual career pathways is largely carried out through isolated examples of good practice. In this context, institutional support provided by centers affiliated with the Ministry of Defence and the Academy of the Ministry of Interior plays a prominent role, offering departmental employment opportunities for elite athletes.

A second key factor supporting promising athletes is the system of sports schools, which functions as a primary structural element for dual career development. These institutions offer flexible forms of education (individual, combined, and independent learning). Through cooperation between the Ministry of Youth and Sports, the Ministry of Education and Science, and the National Sports Academy, athletes are enabled to obtain a Level III professional qualification in the field of Sport, thereby facilitating their transition to the labor market.

In the field of higher education, the National Sports Academy “Vasil Levski” implements adapted curricula for “active” and “elite” athletes, aligned with their competition schedules. The legislative framework also provides for the admission of medalists from the Olympic Games, World Championships, and European Championships without competitive entrance examinations.

Additionally, sector-specific initiatives such as the “Volleyball at School” project demonstrate the capacity of sports federations for early talent identification and support in athletes’ career orientation.

Croatia demonstrates a high level of coordination between state institutions and sports organizations. In terms of regulatory framework, several key documents are in place, including the *National Program for the Development of Sports Careers (2017–2020)* and a specific regulation adopted by the Conference of Rectors, which governs the status of student-athletes. At the secondary education level, specialized sports classes operate under a mentorship-based approach, with admission based on athletic achievements verified by national federations. The state also provides social guarantees through the Sports Act, which ensures government-funded scholarships for higher education for medalists of the highest rank (Olympic, Paralympic, and Deaflympic Games). In addition, promotional initiatives such as the “Athletes and Education” project (2012–2016) actively support the transition to post-athletic careers through targeted information campaigns.

In Serbia, the focus is directed toward integration into the European educational space and the development of academic discourse. The country’s full participation in the Erasmus+ programme expands opportunities for mobility and project development in the field of dual careers. Academic contribution is notably represented by the University of Niš, which has established itself as a center for dual career research by organizing international scientific forums (e.g., FIS COMMUNICATIONS), thereby positioning the topic at the forefront of the regional academic community.

Conclusion

In conclusion, the successful management of dual careers in the Balkan and Central European regions requires a transition from isolated best practices to integrated national strategies. While the Erasmus+ program provides a valuable framework for mobility and research, the ultimate success of these policies depends on the willingness of national stakeholders to harmonize the demands of elite sport with the fundamental right to a comprehensive education. Strengthening the "micro-level" support - specifically the immediate environment of the athlete - remains the most effective safeguard against early dropout and the primary driver of long-term vocational success.

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ENHANCING CLASSROOM SOCIAL CLIMATE THROUGH PROJECT-BASED LEARNING WITH COOPERATIVE GAMES

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Abstract

The social climate of a classroom is closely connected with students' well-being, sense of belonging, cooperation, and willingness to participate in learning. In physical and sport education, this social dimension is especially important because movement tasks make interpersonal relations visible through communication, support, competition, and shared responsibility. The aim of this study was to examine whether a project-based learning intervention using cooperative movement games could enhance or protect the classroom social climate in early lower-secondary students. A quasi-experimental pre-test-post-test design with a non-equivalent control group was used. The sample consisted of 45 students from two sixth-grade classes. One class participated in a 10-week project-based learning unit built around cooperative movement games and structured reflection (PBL group, $n = 22$), whereas the second class continued with the standard curriculum without the same cooperative project structure (control group, $n = 23$). Classroom climate was assessed using the KLIT questionnaire, with three subscales included in the analysis: Supportive Classroom Climate, Motivation for Negative School Performance, and Self-Assertion. Internal consistency was examined using Cronbach's alpha. Data were analysed using descriptive statistics and analysis of covariance, with pre-test scores entered as covariates. The results showed a statistically significant intervention effect on supportive classroom climate, $F(1, 42) = 26.34$, $p < .001$, partial eta squared = .385. The PBL group remained stable with a slight increase from pre-test to post-test, whereas the control group showed a marked decline. Significant effects were also found for motivation for negative school performance, $F(1, 42) = 8.76$, $p = .005$, partial eta squared = .173, and self-assertion, $F(1, 42) = 6.75$, $p = .013$, partial eta squared = .139; however, the self-assertion scale showed low reliability and was interpreted only cautiously. Qualitative observations from the intervention diary indicated that cooperative movement games supported the development of encouragement, tactical communication, non-verbal coordination, and positive interdependence. The findings suggest that project-based learning with cooperative movement games can serve as a protective pedagogical approach for classroom social climate, particularly when students are guided to reflect on the transfer of cooperation from physical tasks to wider classroom life. This study was supported by the Slovak Scientific Grant Agency (VEGA) under grant number 1/0748/26, titled "*Project Based Learning in Physical and Sport Education and Its Impact on the Motor, Cognitive, and Affective Development of Pupils in Primary and Lower Secondary Education*".

Keywords: project-based learning, cooperative games, classroom social climate, physical education, lower secondary education

Introduction

The social climate of the classroom is one of the central conditions through which schooling becomes either supportive or stressful for students. Classroom climate refers to students' shared perceptions of the interpersonal, organizational, and emotional qualities of the learning environment (Fraser, 2012; Moos, 1979). It includes the extent to which students feel accepted, supported, respected, and able to participate without fear of humiliation. In educational practice, classroom climate is often experienced through ordinary interactions: whether classmates help each other, whether success is celebrated or envied, whether mistakes are treated as part of learning, and whether students believe that they belong to the group. These everyday experiences influence motivation, engagement, and social-emotional development. A supportive climate does not simply make school more pleasant; it creates the psychological safety needed for students to take learning risks, express ideas, ask for help, and work with peers.

The importance of social climate is particularly evident in the transition to lower secondary education. Students in this age group are strongly influenced by peer acceptance, comparison, and status within the group. At the same time, school demands become more complex and students are increasingly expected to cooperate, solve problems, and regulate their behaviour. When classroom relationships are weak, students may respond to this pressure by withdrawing, becoming invisible, competing for attention, or avoiding challenging tasks. From the perspective of social cognitive theory, learning is shaped by reciprocal interactions between personal factors, behaviour, and the environment (Bandura, 1997). A classroom in which students expect criticism or ridicule increases the social and emotional cost of participation. Conversely, a classroom in which students expect help and encouragement reduces this cost and supports engagement.

Physical and sport education provides a distinctive context for studying classroom social climate.

Movement activities make social relations visible in a direct and embodied way. Students cannot easily hide patterns of communication, leadership, exclusion, blame, or support when they must coordinate movement, solve tactical problems, and depend on one another to complete a task.

Traditional physical education, however, often includes competitive structures in which success is defined by defeating others or by demonstrating superior individual performance. Competition can be motivating, but if it dominates the learning environment it may also reinforce status differences, expose less skilled students to negative peer judgement, and reduce opportunities for mutual support.

This is not an argument against competition as such; rather, it highlights the need for pedagogical balance and for intentional activities that develop cooperation as a learnable social competence.

Project-Based Learning (PBL) offers one such approach. PBL is a student-centred model in which learners investigate a meaningful problem or challenge over an extended period and produce a concrete outcome, presentation, or shared product (Thomas, 2000). Instead of receiving knowledge passively, students plan, negotiate, test solutions, evaluate progress, and reflect on their learning. This structure is consistent with constructivist and social-constructivist views of learning, according to which knowledge is developed through active engagement and social interaction (Vygotsky, 1978).

PBL is also motivationally relevant because authentic tasks can support students' sense of autonomy, competence, and relatedness, which are key psychological needs in self-determination theory (Ryan & Deci, 2000). In the context of movement education, PBL can help students see physical activities not only as isolated exercises but also as opportunities to solve social, tactical, and organizational problems.

The social potential of PBL depends strongly on how cooperation is structured. Social interdependence theory explains that the way goals are organized determines patterns of interaction and, ultimately, learning outcomes (Johnson & Johnson, 2009). Positive interdependence exists when students perceive that they can achieve their goals only if other group members also achieve theirs. In such conditions, students are more likely to encourage one another, share resources, communicate effectively, and assume responsibility for both individual and group progress. Cooperative learning research has repeatedly emphasized that cooperation is not the same as simply placing students in groups. Effective cooperation requires shared goals, individual accountability, promotive interaction, social skills, and group processing (Johnson & Johnson, 2009; Slavin, 1995). These elements are

highly compatible with PBL, especially when students are guided to reflect on how their group is functioning.

Cooperative movement games can operationalize positive interdependence in a concrete and developmentally appropriate way. In such games, students often succeed only when they coordinate actions, adapt to weaker or less confident group members, communicate under time pressure, and regulate frustration. The body becomes part of the learning process: students experience the consequences of cooperation immediately. If one member drops an object, loses balance, or does not understand the strategy, the group must respond. This creates a powerful pedagogical opportunity. The teacher can frame the situation either as an individual failure or as a collective problem of support, communication, and strategy. When carefully facilitated, cooperative movement games can therefore function as a practical laboratory for empathy, peer support, leadership, and shared responsibility. Previous research on cooperative learning in physical education suggests that well-structured cooperative tasks can contribute to social learning, inclusion, and engagement (Casey & Goodyear, 2015; Dyson, 2001). However, more empirical work is needed on how movement-based cooperation can be integrated with broader project-based pedagogies and how such interventions affect classroom social climate over time. The present study responds to this need by examining a project-based unit in which cooperative movement games were used not as isolated activities but as a structured pedagogical agent supported by reflective questions.

Students were repeatedly asked to identify the skills being developed, explain how cooperation occurred, and transfer these insights to classroom projects and broader school life.

The primary aim of the study was to examine the influence of a project-based learning unit focused on cooperative movement games on the social climate of a classroom. The main research expectation was that students participating in the PBL intervention would demonstrate more favourable development in supportive classroom climate than students following the standard curriculum.

Secondary analyses explored motivation for negative school performance and self-assertion, although these constructs were interpreted with attention to scale reliability. The study also used qualitative observations from an experimental diary to interpret the quantitative findings and to identify pedagogical mechanisms through which cooperative movement games may influence classroom social climate.

Materials and Methods

The study used a quasi-experimental pre-test-post-test design with a non-equivalent control group. This design was selected because the research was conducted in a natural school setting in which random assignment of individual students was not feasible. Existing class groups were therefore maintained, which strengthened ecological validity but required statistical control of baseline differences. Pre-test scores were used as covariates in the main analyses to estimate the effect of the intervention on post-test outcomes while accounting for initial group variation.

The sample consisted of 45 students from two sixth-grade classes in a national Slovak curriculum context and an international Middle Years Programme context. The experimental group included 22 students who participated in the project-based learning intervention with cooperative movement games. The control group included 23 students who continued with the standard national curriculum without the same structured cooperative project framework. Both groups were taught within the normal school timetable. The age and school level of the students were developmentally appropriate for the intervention because early adolescence is a period in which peer relations, belonging, self-presentation, and group status become especially salient.

The intervention lasted approximately 10 weeks and was implemented from late March to May. It combined cooperative movement games, tactical group challenges, guided reflection, and transfer questions. The games included, among others, Wizard, Octopus, Eagle and Chick, Dragon Chase, Flying Saucer, Shipwrecked, Three-Person Races, Amoeba, Bench Races, The Pit, Ants on a Log, Strength of Three, 4-UP, Knots, and Hoop Pass. These activities were not treated as recreational additions but as a deliberate sequence of social-learning tasks. Early games established basic cooperation and group awareness. Later games increased the need for tactical planning, physical support, non-verbal communication, and shared problem solving. The intervention was therefore progressive: students first experienced cooperation as a rule of the task, then increasingly as a condition for group success.

A central feature of the intervention was structured reflection. After selected activities, students discussed four guiding questions: What skills did we develop? What type of cooperation were we developing? How specifically did we cooperate? How can we use this skill in our classroom? These questions were designed to support transfer from physical activity to broader classroom functioning. The teacher-researcher also used immediate feedback during critical incidents. For example, when students reacted negatively to a peer's mistake in the Flying Saucer task, the lesson was paused and the idea of the 'weakest link' was reframed as a collective responsibility. The group was encouraged to understand that improving support for the struggling member improves the performance of the whole group. This reflection transformed the activity from a simple coordination challenge into a social learning episode.

The intervention was documented in an experimental diary. The diary captured the development of group communication, students' reactions to failure, examples of encouragement or frustration, tactical solutions, gender-related interaction patterns, and moments when cooperation appeared to transfer beyond the original task. These qualitative notes were not analysed as an independent ethnographic dataset. Rather, they were used to support interpretation of the quantitative results and to identify plausible pedagogical mechanisms behind changes in classroom social climate.

This mixed interpretive approach was appropriate because climate is both measurable through questionnaire data and observable through interaction patterns during learning situations.

The primary instrument was the KLIT questionnaire, which assesses classroom atmosphere and student attitudes related to school performance. Three subscales were included. The Supportive Classroom Climate subscale contains 12 items and measures perceived friendship, mutual help, emotional safety, collective unity, and belonging. Example items include 'When I am in trouble, I know the class will help me,' 'Most students rejoice at the school success of one of us,' and 'In our class, we help each other to learn.' The Motivation for Negative School Performance subscale contains 9 items and assesses avoidance tendencies, fear of failure, preference for remaining unnoticed, and reduced achievement orientation. The Self-Assertion subscale contains 6 items and aims to capture students' willingness to show competence, choose their own way of working, and position themselves in relation to group work.

Internal consistency was evaluated using Cronbach's alpha. At pre-test, the Supportive Classroom Climate scale demonstrated high reliability, $\alpha = .887$, and the Motivation for Negative School Performance scale demonstrated acceptable reliability, $\alpha = .775$. The Self-Assertion scale showed low reliability, $\alpha = .495$. This limitation was important because the scale appeared to combine potentially different meanings of assertion, including healthy confidence, individual efficiency, reluctance to cooperate, and resistance to collective work. Post-test reliability for the Self-Assertion scale was even weaker, which led to cautious and exploratory interpretation of this outcome.

Data analysis included descriptive statistics, reliability analysis, and analysis of covariance (ANCOVA). For each outcome, the post-test score was the dependent variable, group was the independent variable, and the corresponding pre-test score was included as a covariate. This approach was used to control for baseline differences between the two classes. Statistical significance was evaluated at the conventional alpha level of .05. Effect sizes were reported using partial eta squared.

In interpreting the findings, statistical results were considered together with descriptive score trajectories and qualitative observations from the intervention diary, because the practical meaning of the intervention depended not only on whether group differences were statistically significant but also on how social behaviours developed during the intervention.

Results and Discussion

The reliability analysis supported the use of the Supportive Classroom Climate and Motivation for Negative School Performance scales as the main quantitative outcomes. The Supportive Classroom Climate scale showed strong internal consistency at both pre-test and post-test. The Motivation for Negative School Performance scale showed acceptable reliability, although the post-test value was somewhat lower than the pre-test value. In contrast, the Self-Assertion scale did not demonstrate adequate internal consistency. For this reason, results for self-assertion are reported for completeness but are not treated as firm evidence of intervention impact.

The primary finding concerned supportive classroom climate. Descriptive statistics showed that the PBL group remained stable and slightly improved, with the mean score increasing from 34.23 at pre-test to 34.82 at post-test. The control group, in contrast, declined from 32.74 to 28.13.

ANCOVA confirmed a statistically significant effect of the intervention on post-test supportive classroom climate after controlling for pre-test scores, $F(1, 42) = 26.34$, $p < .001$, partial eta squared = .385. According to conventional benchmarks, this represents a large effect. The finding should be interpreted not simply as a dramatic increase in the PBL group, but as a protective effect: the intervention appears to have helped the experimental class maintain and slightly strengthen its social climate while the comparison class experienced a substantial decline.

This protective interpretation is pedagogically meaningful. Classroom climate can deteriorate over a school term as academic demands, fatigue, peer tensions, and repeated performance comparisons accumulate. In the control group, the decline may reflect such social erosion in a more traditional learning environment. The PBL intervention appeared to interrupt this trajectory by repeatedly placing students in situations where group success depended on mutual support.

Cooperative games made peer support functional rather than rhetorical. Students did not merely discuss cooperation; they experienced the need for cooperation through tasks that required shared strategy, physical coordination, and immediate adjustment to mistakes.

The qualitative diary helps explain how this change may have occurred. In the early phase, students often approached tasks with excitement but also with individualistic reactions to failure. During the Flying Saucer activity, several students initially responded to a peer's mistake by rolling their eyes or showing frustration. After the teacher reframed the situation through the 'weakest link' principle, the group shifted from blame to encouragement. This moment was pedagogically important because it made the social meaning of the task explicit. Students began to see that a weak link was not an obstacle to collective success but the precise point at which support had to be directed. Such reframing is central to positive interdependence: the group succeeds when it improves the conditions for every member to contribute.

Later activities showed further development of communication. In Bench Races, students moved from disorganized shouting to more purposeful rhythmic coordination. In Amoeba, they discussed how maintaining group connection in a movement task resembled maintaining connection in academic group projects. In 4-UP, the PBL group achieved silent, non-verbal coordination for a full minute, suggesting that cooperation had become more internalized and less dependent on constant teacher direction. These observations support the interpretation that the intervention influenced classroom climate by developing concrete interaction skills: noticing others, adjusting pace, encouraging peers, negotiating tactics, and regulating emotional reactions to mistakes.

The second analysed outcome was Motivation for Negative School Performance. The PBL group increased from 21.41 at pre-test to 22.68 at post-test, whereas the control group decreased from 20.78 to 19.74. ANCOVA indicated a statistically significant intervention effect, $F(1, 42) = 8.76$, $p = .005$, partial eta squared = .173. This result is more complex than the supportive climate finding. Because higher scores on this scale reflect more negative motivational tendencies, the increase in the PBL group cannot be interpreted as an unequivocal improvement. A plausible interpretation is that the collaborative project format heightened students' awareness of performance demands and made it more difficult to remain passive or invisible. In traditional instruction, students may hide behind teacher-led structures. In cooperative PBL tasks, each student's contribution becomes more visible to peers.

This interpretation is consistent with the emotional demands observed during the intervention.

Cooperative learning is often presented as supportive, but it is not necessarily easy. Students must tolerate exposure, negotiate disagreement, manage frustration, and accept that their performance affects others. For students accustomed to individualistic or teacher-directed learning, this visibility

can temporarily increase anxiety or avoidance-related self-perceptions. The rise in negative motivation may therefore represent a transitional cost of social accountability. It suggests that teachers implementing PBL should not assume that cooperation automatically reduces all forms of pressure. Instead, they should prepare students for the emotional work of collaboration and build routines that normalize mistakes, role rotation, and constructive feedback. The self-assertion results were statistically significant, $F(1, 42) = 6.75$, $p = .013$, partial eta squared = .139, but must be interpreted with caution. The PBL group decreased slightly from 15.05 to 14.77, while the control group increased from 15.35 to 16.39. However, the scale reliability was weak, especially at post-test. One reason may be that the items do not capture a single construct. Some items refer to confidence in showing competence, whereas others refer to reluctance to cooperate or unwillingness to conform to collective work. In a cooperative intervention, a decrease in individualistic resistance could be positive, while a decrease in healthy self-confidence would be negative. Because these meanings are not clearly separated, the scale cannot support strong conclusions in the present sample.

The intervention diary also revealed that task difficulty must be carefully calibrated. During *The Pit* and *Ants on a Log*, the movement challenges created high cognitive and physical demands. In some moments, frustration threatened cooperation. This finding aligns with the idea that social learning occurs within a zone of proximal development (Vygotsky, 1978). If the task is too easy, students do not need to develop new social strategies. If the task is too difficult, the group may fracture under pressure. The teacher's role is therefore to regulate the challenge so that students experience productive struggle rather than social collapse. In practical terms, this means pausing activities, asking reflective questions, simplifying constraints when needed, and helping students identify what kind of communication the task requires.

Another noteworthy observation concerned gendered interaction patterns. In the *Ants on a Log* task, a predominantly female subgroup used close physical support and efficient communication to maintain balance and complete the task. Some male students, by contrast, initially relied on louder verbal expression without comparable coordination. This observation should be interpreted cautiously because the study was not designed to analyse gender differences.

Nevertheless, it points to an important issue in physical education: students may bring socially learned norms about touch, leadership, noise, and dominance into cooperative tasks. Teachers may need to make efficient communication explicit and create conditions in which all students can use supportive strategies without embarrassment or status threat.

Taken together, the results suggest that cooperative movement games within a PBL framework can support classroom climate through several mechanisms. First, they create positive interdependence by making success dependent on coordinated group action. Second, they make social behaviours visible and therefore teachable. Third, they provide immediate feedback: ineffective communication usually leads to task failure, whereas encouragement and coordination improve performance. Fourth, reflection helps students transfer the meaning of movement cooperation to wider classroom life. These mechanisms connect the quantitative improvement in supportive climate with the qualitative evidence of behavioural change. The findings have practical implications for physical and sport education.

Teachers who wish to strengthen classroom climate should not rely only on general messages about teamwork. They need to design tasks in which teamwork is structurally necessary, observe how students respond to difficulty, and guide students to name the social skills being developed.

Cooperative movement games are useful because they are engaging, embodied, and immediate, but their educational value depends on reflection. Without reflection, students may experience the game as entertainment. With reflection, the same activity can become a lesson in encouragement, belonging, leadership, and shared responsibility.

Several limitations must be acknowledged. The sample was small and consisted of two intact classes, which limits generalizability. The quasi-experimental design improved ecological validity but did not provide individual random assignment. The intervention was implemented in a specific school context, and results may differ in other cultural, curricular, or age settings. The KLIT Self-Assertion scale showed insufficient reliability, indicating the need for a more precise measure of confidence, assertiveness, and individualistic resistance within cooperative contexts. Finally, the qualitative diary was used interpretively and should be developed into a more systematic observational protocol in future research. Despite these limitations, the convergence between the large effect on supportive

classroom climate and the observed development of cooperative behaviours provides a strong rationale for further investigation.

Conclusions

This study examined the effect of a project-based learning intervention using cooperative movement games on classroom social climate. The main finding was that the intervention had a large and statistically significant effect on supportive classroom climate after controlling for baseline differences. The most important practical meaning of this result is the protective function of the intervention. While the control group showed a clear decline in supportive climate over time, the PBL group maintained and slightly improved its score. This suggests that structured cooperation in physical and sport education may help protect the social fabric of the classroom during periods when peer relations and school demands could otherwise create social fatigue.

The qualitative observations indicate that the intervention worked not through movement alone, but through the combination of movement, positive interdependence, teacher feedback, and reflection. Students gradually moved from frustration and blame toward encouragement, tactical communication, physical support, and non-verbal coordination. Cooperative movement games made social relations visible, and the reflective questions helped students connect these experiences with classroom life. In this sense, physical education can be understood not only as a space for developing motor skills but also as a powerful setting for social-emotional and relational learning.

The secondary findings also show that collaborative PBL may create complex motivational experiences. The increase in motivation for negative school performance in the PBL group suggests that students may initially experience greater visibility and pressure when their contribution becomes important to the group. Future interventions should therefore include explicit emotional support for students adapting to cooperative learning. Future research should use larger samples, longer follow-up periods, stronger measures of self-assertion, and systematic observation tools. Overall, the study supports the use of project-based learning with cooperative movement games as a promising pedagogical approach for building more supportive, resilient, and socially connected classrooms.

Acknowledgements

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Tables and Figures

Table 1

Reliability statistics for KLIT subscales

Subscale	Number of items	Pre-test Cronbach alpha	Post-test Cronbach alpha
Supportive Classroom Climate (ISCC)	12	.887	.881
Motivation for Negative School Performance (IMNSP)	9	.775	.714
Self-Assertion (ISA)	6	.495	.067

Note. The Self-Assertion subscale showed low internal consistency and was interpreted only cautiously.

Table 2

Descriptive statistics for KLIT subscales by group

Dimension	Group	Pre-test M (SD)	Post-test M (SD)	Direction of change
Supportive Classroom Climate	PBL	34.23 (6.22)	34.82 (5.01)	Slight increase
Supportive Classroom Climate	Control	32.74 (7.56)	28.13 (7.32)	Decrease
Motivation for Negative School Performance	PBL	21.41 (5.32)	22.68 (5.22)	Increase
Motivation for Negative School Performance	Control	20.78 (5.13)	19.74 (3.97)	Decrease
Self-Assertion	PBL	15.05 (2.52)	14.77 (2.29)	Slight decrease
Self-Assertion	Control	15.35 (2.60)	16.39 (2.06)	Increase

Table 3

ANCOVA results for post-test outcomes with pre-test scores as covariates

Outcome	F	df	p	Partial eta squared
Supportive Classroom Climate	26.34	1, 42	< .001	.385

Motivation for Negative School Performance	8.76	1, 42	.005	.173
Self-Assertion	6.75	1, 42	.013	.139

Note. Self-Assertion results should be interpreted as exploratory because of low internal consistency.

Table 4

Overview of the cooperative movement game intervention

Phase	Activities	Main pedagogical focus
Late March	Wizard; Octopus	Establishing basic cooperation, group awareness, and reflection on transferable skills.
Early April	Eagle and Chick; Dragon Chase; Flying Saucer	Developing tactics, encouragement, and the weakest-link principle.
Mid-April	Shipwrecked; Three-Person Races; Amoeba; Bench Races	Improving communication, strategic feedback, and connection between movement and classroom projects.
Late April	The Pit; Ants on a Log	Managing cognitive load, physical support, balance, and frustration under pressure.
May	Strength of Three; 4-UP; Knots; Hoop Pass	Internalizing cooperation, non-verbal coordination, tactical innovation, and group problem solving.

Table 5

Item statistics for Supportive Classroom Climate at pre-test

Item	Item description	Mean	SD
ISCC1	I have several close friends in our class.	3.60	.688
ISCC2	When I am in trouble, I know the class will help me.	2.64	.802
ISCC3	Most students rejoice at the success of one of us.	2.42	.812
ISCC4	It matters to me what others think of me.	2.93	.863
ISCC5	It is nice to meet classmates outside of school.	3.18	.834
ISCC6	We encourage each other during exams or papers.	2.71	.843
ISCC7	I feel that I really belong in this class.	3.04	.928
ISCC8	Our class has a better team than other classes.	2.67	.826
ISCC9	We have a good system for solving tasks together.	2.20	.919
ISCC10	I feel satisfied; the class appreciates me.	2.80	1.014
ISCC11	The majority of the class can unite for something important.	2.60	.986
ISCC12	In our class, we help each other to learn.	2.67	.769

Figure 1. Supportive Classroom Climate: pre-test and post-test mean scores by group.

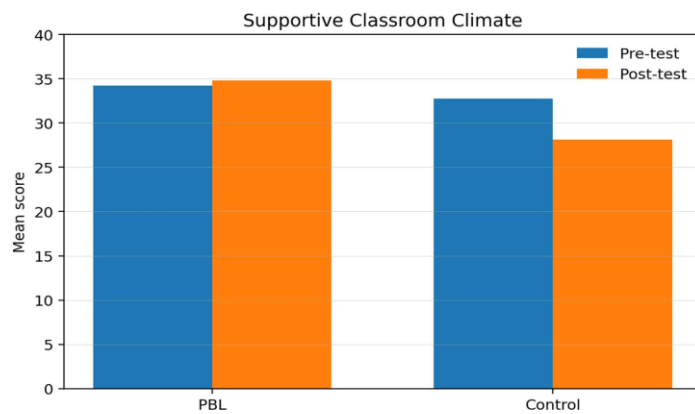


Figure 2. Motivation for Negative School Performance: pre-test and post-test mean scores by group.

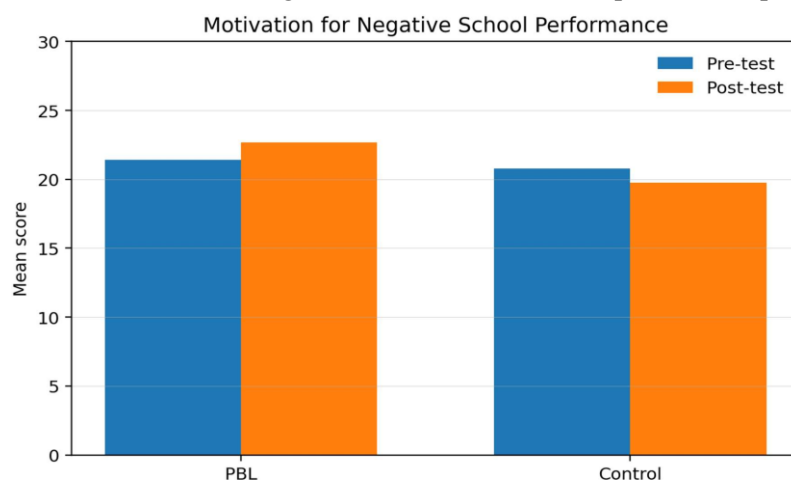
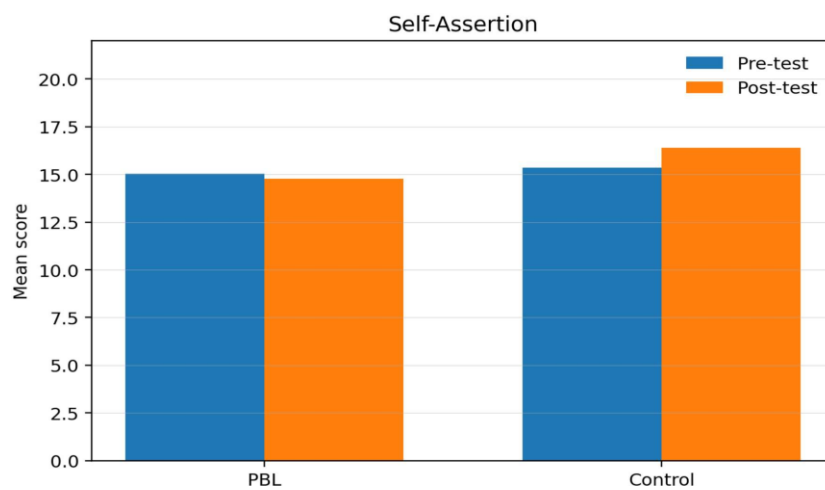


Figure 3. Self-Assertion: pre-test and post-test mean scores by group.



EFFECTS OF RHODIOLA ROSEA SUPPLEMENTATION ON EXERCISE PERFORMANCE AND RECOVERY-RELATED OUTCOMES IN ATHLETES AND PHYSICALLY ACTIVE ADULTS: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS

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Abstract

Background: Rhodiola rosea (RR) is an adaptogenic herbal supplement increasingly used by athletes for its proposed ergogenic, anti-fatigue, and recovery-enhancing properties.

However, evidence from randomized controlled trials (RCTs) remains inconsistent. This systematic review aimed to synthesize RCT evidence on the effects of acute and/or chronic RR supplementation on exercise performance and recovery-related outcomes in athletes and physically active adults.

Methods: This review was conducted in accordance with PRISMA guidelines. Electronic searches of PubMed, Web of Science, Scopus, EBSCO, and ScienceDirect, and Google Scholar identified studies published between September 2015 and September 2025. Eligible studies were human RCTs comparing RR supplementation with placebo and reporting performance- or recovery-related outcomes. Two reviewers independently screened studies, extracted data, and assessed risk of bias using the Cochrane RoB 2 tool. **Results:** Six RCTs met the inclusion criteria. RR supplementation did not consistently improve endurance-related outcomes such as VO₂max or time to exhaustion.

However, modest benefits were observed in selected domains, including psychomotor performance, anaerobic power output, movement velocity during resistance exercise, enhanced antioxidant capacity, and attenuated creatine kinase responses during recovery. Effects on inflammatory markers were generally minimal. Substantial heterogeneity existed across studies in supplementation protocols, exercise models, and outcome measures.

Conclusions: Current RCT evidence suggests that RR supplementation may produce small, context-dependent benefits, particularly for anaerobic performance and recovery-related outcomes, but does not reliably enhance endurance performance. Larger, well-controlled trials with standardized methodologies are required before firm recommendations can be made.

Keywords: athletic performance; ergogenic aids; randomized controlled trials; recovery; rhodiola rosea; systematic review

Introduction

Rhodiola rosea (RR), commonly known as golden root or arctic root, is an adaptogenic plant traditionally used to enhance resistance to physical and psychological stress (Amsterdam & Panossian, 2016; Ivanova Stojcheva & Quintela, 2022; Tao et al., 2019). In recent years, RR has gained increasing attention in sports nutrition because of its potential ergogenic and recovery-enhancing properties (Jówko et al., 2018). Its biological activity is primarily attributed to bioactive compounds such as rosavins and salidroside, which have been associated with antioxidant activity, mitochondrial regulation, and modulation of neuroendocrine responses (Jówko et al., 2018; Li et al., 2017; Liu et al., 2023; Tinsley et al., 2024). Evidence from athletic and physically active populations suggests that RR supplementation may reduce exercise-induced muscle damage and perceived exertion while improving selected aspects of performance and recovery (Jówko et al., 2018; Li et al., 2017; Lu et al., 2022). However, findings across studies remain inconsistent. Although several mechanisms have been proposed, including effects on oxidative stress, mitochondrial bioenergetics, and the hypothalamic–pituitary–adrenal axis, no universally accepted mechanism has been established (Hung et al., 2011; Panossian et al., 2021; Walker & Robergs, 2006). In addition, substantial

heterogeneity exists regarding supplementation protocols, dosage, exercise modalities, and participant characteristics. Importantly, previous reviews have frequently combined randomized and non-randomized studies, limiting the strength of causal interpretations. In sports nutrition research, randomized controlled trials (RCTs) are considered the gold standard for evaluating ergogenic aids because they minimize bias and confounding effects (Kerksick et al., 2018; Maughan et al., 2018). Therefore, an evidence synthesis focusing specifically on RCTs may provide more robust and practically relevant conclusions. Accordingly, this systematic review aimed to evaluate the effects of acute and/or chronic RR supplementation on exercise performance and recovery-related outcomes in athletes and physically active adults, while identifying current gaps in the literature and priorities for future research.

Materials and Methods

Study Design

This study was a systematic review evaluating the effects of plant-derived RR supplementation on physical performance and muscle damage-related outcomes in athletes and physically active individuals. The review was designed and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). The review protocol followed established methodological standards for evidence synthesis in sports nutrition research.

As this systematic review was based exclusively on data derived from previously published studies, ethical approval was not required.

Search Strategy

A systematic literature search was conducted to identify studies examining the effects of RR supplementation on physical performance and recovery-related outcomes. Electronic searches were performed in MEDLINE/PubMed, Web of Science, Google Scholar, Scopus, EBSCO, and ScienceDirect for studies published between September 2015 and September 2025.

The search strategy combined controlled vocabulary and free-text terms related to RR supplementation and exercise performance. Core keywords included “*Rhodiola rosea*”, “adaptogen”, “athletes”, “exercise performance”, “endurance”, “strength”, “fatigue”, and “recovery”, combined using Boolean operators (AND/OR).

Studies investigating non-nutritional interventions, supplements other than RR, or combined supplementation protocols were excluded during screening. No study-design filters were initially applied to maximize search sensitivity. Reference lists of included studies and relevant reviews were also manually screened for additional records.

Two reviewers independently screened titles, abstracts, and full texts according to predefined PICOS criteria, and disagreements were resolved by consensus. Only human randomized controlled trials reporting performance- or recovery-related outcomes were included in the final analysis.

Eligibility Criteria

Eligibility criteria were defined a priori using the PICOS framework: Participants, Intervention, Comparator, Outcomes, and Study design. Studies were excluded if they were case reports, case series, uncontrolled or quasi-experimental studies, reviews, duplicate publications, animal or in vitro studies, or non-English publications without reliable full-text translation.

Studies combining RR with other nutritional or ergogenic supplements were also excluded. Only randomized controlled trials conducted in human participants with placebo or non-intervention control groups were eligible. Additional exclusions included studies involving participants younger than 18 years, clinical populations, or studies not reporting athletic performance- or recovery-related outcomes. Studies with insufficient outcome data for meaningful extraction or comparison were likewise excluded.

Table 1. Inclusion and Exclusion Criteria of the Studies Based on the PICOS Framework

Inclusion Criteria	Exclusion Criteria
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P	Healthy male and/or female adults aged ≥ 18 Years	Individuals aged < 18 years; clinical or patient populations
I	<i>Rhodiola rosea</i> supplementation or ergogenic supplements	Combined supplementation with other nutritional
C	Placebo group or non-intervention control group	-
O	Outcomes reflecting physical performance (e.g., aerobic/anaerobic capacity, strength, recovery, and biochemical markers)	Outcomes not related to physical performance or recovery
S	Randomized controlled trials and controlled clinical trials conducted in humans, published between September 2015 and September 2025.	Studies published before September 2015; non-English publications for which a reliable full-text translation could not be obtained; animal or in vitro studies; systematic reviews; pilot studies; theses or dissertations; conference abstracts
	<u>book chapters.</u>	

Study Selection and PRISMA-Guided Screening

In accordance with PRISMA guidelines, 261 records were identified through database searches. After removal of 50 duplicates, 211 records were screened by title and abstract. During screening, 170 studies were excluded for not meeting the eligibility criteria, and three were excluded because full texts were unavailable. The remaining 38 full-text articles were assessed for eligibility.

Of these, 17 studies were excluded because of inappropriate publication type, and 15 were excluded due to unsuitable study design, including animal studies, non-English publications, and studies combining RR with other supplements. Ultimately, six randomized controlled trials met all predefined inclusion criteria and were included in the final qualitative synthesis.

Study selection and screening were independently conducted by P.B.Ç. and Y.M. Any disagreements were resolved through discussion and consensus with a third reviewer (H.K.). Only studies fulfilling all PICOS eligibility criteria were included in the review.

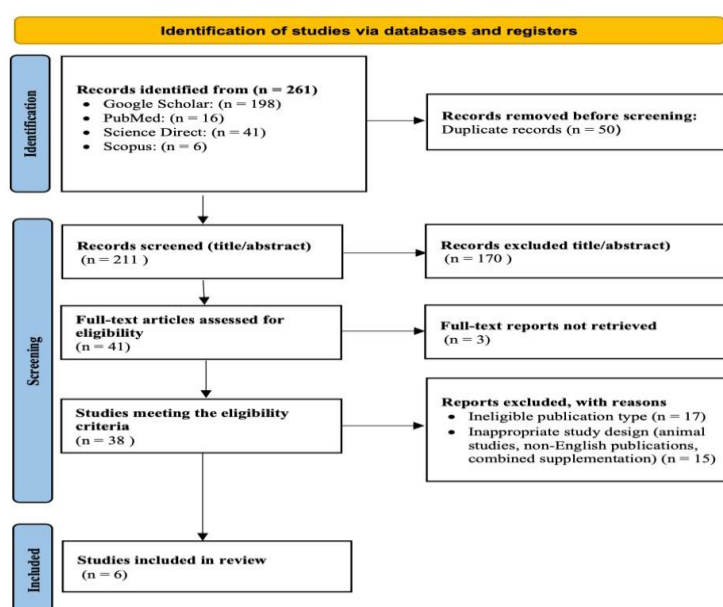


Figure 1. PRISMA flow diagram of study selection

Risk of Bias Assessment

Independently, two authors (P.B.Ç. and Y.M.) assessed the risk of bias in the included studies using the Cochrane Risk of Bias Tool, version 2 [19]. The assessment covered the following five domains: bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in measurement of the outcome, and bias in selection of the reported results. Each domain was judged as 'low risk of bias', 'some concerns', or 'high risk of bias' in accordance with the RoB 2 guidelines. Any disagreements between the reviewers were resolved by consensus or, when necessary, through consultation with a third reviewer (H.K.).

Results and Discussion

Study Selection and Study Characteristics

Study selection followed the PRISMA 2020 flow diagram presented in Figure 1. A total of 261 records were identified through database searches. After removal of 50 duplicate records, 211 records were screened by title and abstract. During this stage, 170 records were excluded for not meeting the predefined eligibility criteria, and three were excluded because full-text articles were unavailable.

Subsequently, the full texts of 38 studies were assessed for eligibility. Of these, 17 studies were excluded because they did not meet publication-type criteria, and 15 were excluded due to inappropriate study design, including animal studies, non-English publications, and studies combining RR with other supplements. Ultimately, six original randomized controlled trials met all inclusion criteria and were included in the final systematic review.

Risk of Bias

The risk of bias of the included studies was evaluated using the Cochrane Risk of Bias 2 (RoB 2) tool, and a summary of the judgments is presented in Figure 2.

Across the two parallel-group randomized controlled trials (n = 2), the overall risk of bias was judged as 'some concerns' (Figure 2A). In these trials, concerns were primarily related to the randomization

process and the selection of the reported results, whereas domains addressing deviations from intended interventions, missing outcome data, and measurement of outcomes were consistently rated as low risk of bias.

For crossover randomized controlled trials ($n = 4$), the overall risk of bias was assessed as low risk in one study and as 'some concerns' in the remaining three studies (Figure 2B).

Domains related to the measurement of outcomes, missing outcome data, and deviations from intended interventions were predominantly judged to be at low risk of bias. However, several studies noted concerns regarding the selection of reported results, the randomization process, and bias arising from period and carryover effects, which are specific to crossover trial designs.

Overall, while most RoB 2 domains across the included studies demonstrated a low risk of bias, recurrent concerns related to reporting practices and randomization procedures warrant cautious interpretation of the findings.

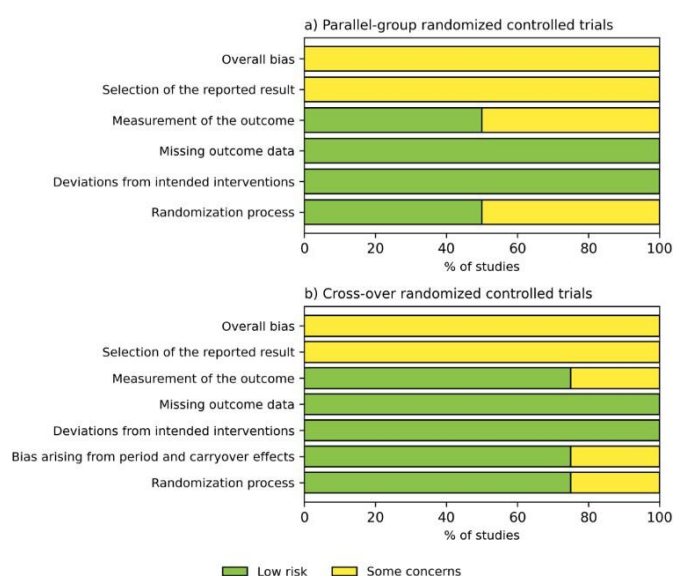


Figure 2. Risk of bias assessment of the included randomized controlled trials using the Cochrane RoB 2 tool, presented separately for parallel-group (a) and cross-over (b) designs

Effect of RR Supplementation on Physical Performance and Muscle Damage

Across the six RCTs that met the inclusion criteria, the effects of RR supplementation on parameters related to physical performance and muscle damage in athletes were examined. The main characteristics of these studies are summarized in Table 2.

Table 2. Characteristics of the RCTs included in the systematic review

Authors (Year)	Study design	Participants	Age	Intervention	Supplementation	Duration	Tests
Timpmann et al. [20] (2018)	Randomize, double- blind, placebo- controlled, parallel- group trial	20 male military cadets	22.5 ± 3.0 years	Group 1: <i>RR</i> supplementation Group 2: Placebo (potato starch mixed with cocoa powder in capsules of identical weight)	432 mg/day (2.3% salidroside, 2.7% rosavin)	8 days (30 min before the heat acclimation trial)	Walking at 6 km·h ⁻¹ in a climate chamber (42°C, 18% humidity) until voluntary exhaustion
Jówko et al. [4] (2018)	Randomized, double- blind, placebo- controlled, parallel- group trial	26 healthy male students	Placebo: 20.9 ± 0.2 years <i>RR</i> : 20.5 ± 0.3 years	Group 1: <i>RR</i> supplementation Group 2: Placebo (capsules containing maltodextrin, microcrystalline cellulose, magnesium stearate, and caramel coloring)	600 mg/day for 4 weeks before exercise Additional 200 mg 1.5 h before psychomotor testing on day 28 Additional 200 mg 1.5 h before incremental cycling test on day 29 (3% rosavin, 2.35% salidroside)	29 days (4 weeks before exercise; on day 28 prior to the psychomotor test; and on day 29 prior to the incremental cycling ergometer test)	Incremental cycling ergometer test
Lin et al. [21] (2019)	Randomized, double- blind, placebo- controlled, crossover trial	12 healthy males	24.7 ± 0.5 years	Group 1: Rhodiola rosea capsules Group 2: Placebo (hydroxymethyl cellulose in identical capsules)	Two Rhodiola rosea capsules per day (400 mg per capsule)	8 days (3 days post-exercise and during a 5- day recovery period)	30-min treadmill running at 75% VO ₂ max
Ballman et al. [22] (2019)	Randomized, double- blind, placebo- controlled, crossover trial	11 physically active females	19.4 ± 0.8 years	Group 1: <i>RR</i> supplementation Group 2: Placebo (gluten- free corn starch)	1500 mg/day + 500 mg (1% salidroside, 3% rosavin)	4 days (500 mg three times daily for three days before exercise, plus an additional 500 mg 30 min before each test)	Three 15- second Wingate anaerobic tests

Williams et al. [23] (2021)	Randomized, double-blind, placebo-controlled, crossover trial	10 resistance-trained males	24.8 ± 5.6 years	Group 1: RR supplementation Group 2: Placebo (gluten-free corn starch)	1500 mg/day + 500 mg (1% salidroside, 3% rosavin)	4 days (500 mg three times daily for three days before exercise, plus an additional 500 mg 30 min before testing)	Bench press resistance exercise
Marcos-Frutos et al. [26] (2025)	Randomized, placebo-controlled, triple-blind, crossover trial	18 resistance-trained volunteers (11 males, 7 females)	Males: 22.8 ± 2.1 years Females: 21.9 ± 4.1 years	Group 1: RR + Stroop test Group 2: RR + control video Group 3: Placebo (maltodextrin) + Stroop test Group 4: Placebo + control video	1200 mg/day (1% salidroside, 3% rosavin)	4 days (600 mg twice daily at 12-h intervals for 3 days before exercise, plus an additional 1200 mg 1 h before exercise)	Bench press and bench pull exercises

Summary of Findings from the Included RCTs

Across the six RCTs included in this review, RR supplementation was investigated in athletes and physically active adults, with considerable heterogeneity across supplementation protocols, exercise modalities, and outcome measures.

Timpmann et al. (2018) reported no significant differences between RR and placebo groups in physiological, perceptual, hormonal, or metabolic responses during heat-stress exercise conditions. Similarly, Jówko et al. (2018) found no significant improvements in VO₂max, time to exhaustion, or hormonal variables following four weeks of RR supplementation.

However, RR supplementation was associated with improved psychomotor performance, lower resting blood lactate concentrations, maintenance of peak anaerobic power, and increased resting total antioxidant capacity.

Lin et al. (2019) observed no differences between RR and placebo conditions in inflammatory responses immediately after endurance exercise. Nevertheless, creatine kinase (CK) concentrations were significantly lower 72 hours post-exercise in the RR condition, suggesting a potential reduction in prolonged muscle damage.

Ballmann et al. (2019) demonstrated that short-term RR supplementation improved anaerobic performance outcomes, including mean power, peak power, anaerobic capacity, and total work during repeated Wingate tests. Similarly, Williams et al. (2021) reported greater bench-press movement velocity following RR supplementation, although repetitions to failure were reduced.

Marcos-Frutos et al. (2025) found that RR supplementation did not influence perceived exertion but modestly improved early-set resistance exercise performance, particularly under cognitive stress conditions.

Overall, current evidence suggests that RR supplementation does not consistently improve endurance-related outcomes such as VO₂max or time to exhaustion. However, potential benefits may exist for anaerobic performance, movement velocity, psychomotor performance, antioxidant capacity, and selected recovery-related markers. The variability of findings highlights the influence of supplementation duration, dosage, exercise modality, and participant characteristics on observed outcomes.

Discussion

This systematic review examined the effects of RR supplementation on exercise performance and recovery-related outcomes in athletes and physically active adults. Current RCT evidence suggests that RR supplementation does not consistently improve endurance performance, although small,

context-dependent benefits may occur in anaerobic performance, movement velocity, antioxidant capacity, and selected recovery-related outcomes.

Several mechanisms, including modulation of mitochondrial function, oxidative stress, and neuroendocrine responses, have been proposed to explain the potential ergogenic effects of RR (Wang et al., 2025). While animal studies generally report positive endurance-related effects (Liu et al., 2023; Wang et al., 2024), findings from human studies remain inconsistent.

Some studies suggest that acute RR supplementation may reduce ratings of perceived exertion (RPE) and improve exercise tolerance (Duncan & Clarke, 2014; Noreen et al., 2013). However, Jówko et al. (2018) found no significant improvements in VO_2max , time to exhaustion (TTE), or heart rate responses after four weeks of supplementation, despite favorable trends in cycling performance and lower resting lactate concentrations. Similarly, Timpmann et al. (2018) reported no additional ergogenic effects of RR during heat acclimation in military cadets. Overall, RR may provide modest endurance-related benefits under certain conditions, although evidence remains limited and inconsistent.

Evidence regarding anaerobic and resistance exercise performance is limited but suggests potential benefits in explosive performance. Ballmann et al. (2019) reported improvements in mean power, peak power, and total work during repeated Wingate tests following short-term RR supplementation. Likewise, Williams et al. (2021) observed greater movement velocity during the bench press after RR supplementation, although repetitions to failure were reduced.

Marcos-Frutos et al. (2025) also found modest improvements in early-set resistance exercise performance, particularly under cognitive stress conditions. Collectively, these findings suggest that RR may preferentially enhance explosive or high-intensity exercise characteristics rather than muscular endurance.

RR has also been proposed to influence exercise-induced muscle damage and inflammation through its antioxidant and adaptogenic properties (Panossian et al., 2010). Lin et al. (2019) reported no significant effects on inflammatory markers during recovery, although creatine kinase (CK) concentrations were lower 72 hours post-exercise in the RR condition. Similarly, Jówko et al. (2018) observed increased resting antioxidant capacity after supplementation but no significant effects on post-exercise oxidative stress markers.

Overall, current evidence suggests that RR may modestly support recovery and antioxidant status, although its effects on inflammation and muscle damage remain inconsistent. Further well-controlled studies with larger samples and standardized methodologies are required to clarify the practical significance of these findings.

Limitations

Several limitations should be considered when interpreting the findings of this review. First, only six RCTs met the inclusion criteria, reflecting the limited availability of high-quality evidence on RR supplementation in athletic populations. Second, substantial heterogeneity existed across studies regarding supplementation protocols, participant characteristics, exercise modalities, and outcome measures, limiting direct comparisons between studies.

Third, most included trials had relatively small sample sizes, which may have reduced statistical power to detect small effects. Finally, although all studies used randomized designs, some concerns related to selective reporting, randomization procedures, and potential carryover effects in crossover trials were identified.

Conclusions

Current evidence suggests that RR supplementation may provide small and context-dependent benefits, particularly for anaerobic performance and selected recovery-related outcomes. However, findings remain inconsistent, and current evidence does not support the routine use of RR as a general ergogenic aid for athletes.

Positive findings were most commonly observed with short-term supplementation protocols using doses between approximately 200–600 mg·day⁻¹, although no clear dose–response relationship has been established.

Future RCTs should include larger sample sizes, standardized RR extracts, and clearly defined supplementation protocols. Additional research focusing on chronic supplementation and sex-specific responses is also warranted.

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ANALYSIS OF STUDENTS' PHYSICAL ACTIVITY LEVELS AS A BASIS FOR IMPLEMENTING PROJECT-BASED LEARNING IN PHYSICAL EDUCATION

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Abstract

The global decline in physical activity (PA) levels among adolescents has emerged as a significant public health challenge, with evidence suggesting that a vast majority of youth fail to satisfy international movement recommendations. Physical Education (PE) is recognized as a pivotal platform for achieving health-related activity thresholds; however, current literature indicates that at least 50% of PE lesson time must be dedicated to moderate-to-vigorous physical activity (MVPA) to ensure optimal health outcomes. In light of the identified deficiencies in traditional, teacher-centered instruction, this study establishes a diagnostic baseline to evaluate the necessity of transitioning toward Project-Based Learning (PBL). As a student-centered pedagogical model, PBL integrates motor, cognitive, and affective domains through inquiry-based tasks, potentially addressing the motivational and engagement gaps observed in conventional PE. The research sample comprised 355 adolescents (aged 11–18 years) recruited from an eight-year gymnasium (secondary grammar school). Physical load was objectively quantified using Garmin Forerunner 55 wearable devices, with MVPA operationalized as activity where the heart rate exceeded 125 beats per minute. Data were collected across 30 PE lessons. Statistical analysis focused on disparities across gender and teaching environments (comparing indoor gymnasiums and outdoor multifunctional fields) using the Mann-Whitney U test, with effect sizes calculated via Cohen's d. The findings revealed that the mean MVPA level across all monitored lessons was 28.00%, significantly below the 50% recommendation. A substantial gender disparity was identified; males achieved a mean MVPA of 30.25%, whereas females attained only 15.98% ($p \leq 0.01$, $d = 0.65$). Furthermore, environmental analysis indicated that outdoor settings facilitated higher intensity (30.55%) compared to indoor gymnasiums (26.02%). This difference was found to be statistically significant ($p \leq 0.05$), although the effect size indicated a small effect ($d = 0.19$). The results indicate that traditional PE models currently fall short of providing sufficient physical load, with female students and indoor environments being disproportionately affected. This significant gap provides a robust empirical foundation for implementing PBL within the PE curriculum. By shifting from teacher-directed

instruction to student-centered inquiry, PBL offers a potential framework to enhance intrinsic motivation and autonomy, aiming to increase active engagement and bridge the intensity gaps identified in this study. This study was supported by the Slovak Scientific Grant Agency (VEGA) under grant number 1/0748/26, titled "Project-Based Learning in Physical and Sport Education and Its Impact on the Motor, Cognitive, and Affective Development of Pupils in Primary and Lower Secondary Education".

Keywords: MVPA, physical education, gender differences, teaching environment, project-based learning.

Introduction

Physical activity (PA) encompasses any bodily movement that increases energy expenditure above basal levels and contributes to the prevention of chronic diseases and the improvement of mental health (Biddle & Asare, 2011). However, insufficient levels of physical activity during adolescence lead to low physical activity levels in adulthood (Martins et al., 2015), with up to 81% of adolescents globally aged 11–17 failing to meet adequate levels (Chaput et al., 2020). The World Health Organization (WHO) and other institutions recommend that children and adolescents aged 6 to 17 engage in moderate-to-vigorous physical activity (MVPA) for at least 60 minutes per day (Chaput et al., 2020; Olson et al., 2018). Given that youth spend a substantial portion of their day in the school environment, schools, and specifically Physical Education (PE) lessons, are recognized as a key platform for achieving these health-related physical activity guidelines (Cañadas et al., 2014; Singh et al., 2017).

A primary objective indicator of the quality and effectiveness of a PE lesson is the total time spent in the MVPA zone. Current literature suggests that at least 50% of the total lesson time must be devoted to moderate-to-vigorous activity to ensure optimal health benefits (Hollis et al., 2017). However, practice and numerous studies indicate that traditional, predominantly teacher-directed educational models fail to meet this 50% recommendation and are unable to provide students with sufficient physical load (Lonsdale et al., 2013). Low intrinsic motivation, an inadequate understanding of the importance of health, and static teaching methods contribute to an overall low level of student engagement in physical activities (Martins et al., 2015). Furthermore, the identified deficits in traditional instruction manifest in significant disparities regarding gender and the type of teaching environment (Delextrat et al., 2020; Nica et al., 2019).

In light of these established deficiencies, the innovated State Educational Program in the area of Health and Movement in Slovakia emphasizes a comprehensive approach to the development of physical competencies and provides teachers with the necessary flexibility to implement innovative pedagogical methods (Masaryková & Ržavská, 2024). One of the most effective student-centered educational concepts with the potential to comprehensively address the observed gaps in motivation and engagement is Project-Based Learning (PBL). This pedagogical model is rooted in constructivist learning theories and focuses on the active engagement of students through solving real-world problems and tasks (Coyne et al., 2016).

In the context of PE, PBL represents an innovative holistic framework that systematically integrates the student's motor, cognitive, and affective domains through inquiry-based tasks. By transitioning from direct teacher instruction to meaningful, student-centered projects, opportunities are created to enhance intrinsic motivation and develop critical thinking, teamwork, and autonomy (Behzadnia et al., 2019). These competencies are directly linked to executive functions and overall physical literacy, which is crucial for shaping a lifelong positive attitude toward an active lifestyle (Ružbarská et al., 2025).

However, to thoroughly evaluate the necessity of transitioning to such a model, it is essential to obtain precise diagnostic data regarding the current physical load of students. For this purpose, modern wearable devices with integrated heart rate sensors and accelerometers are successfully utilized in contemporary sports science (Carrier et al., 2020; Fuller et al., 2020). The objective of the present study is to objectively quantify the current levels of MVPA, total step count, and distance covered by students at an eight-year gymnasium during standard PE lessons. By establishing this diagnostic baseline and conducting a detailed statistical analysis of differences based on gender and teaching

environment, this study will provide a robust empirical foundation to justify the systemic implementation of Project-Based Learning (PBL) within the secondary school PE curriculum.

Materials and Methods

The research sample comprised a total of 355 adolescents aged 11–18 years attending an eight-year gymnasium in Bratislava. The sample consisted of 299 male students and 56 female students.

Regarding age categories and internal school organization, students were divided into two primary groups: the "lower gymnasium," which included students of lower grades (prima to quarta), and the "upper gymnasium," comprising students of higher grades (kvinta to oktava).

Objective data collection was conducted during Physical Education (PE) lessons, with a standard lesson duration of 45 minutes. Commercially available Garmin Forerunner 55 smartwatches were utilized to monitor physical load intensity. These wearable devices feature an optical heart rate sensor, enabling accurate and non-invasive recording of the body's physiological response to load in real-time without the need for laboratory equipment (Carrier et al., 2020). At the beginning of each lesson, devices were distributed to students; activity measurement was initiated immediately and terminated promptly upon completion of the lesson.

The primary parameter monitored in this study was the proportion of time spent in the moderate-to-vigorous physical activity (MVPA) zone. This parameter was operationalized as the duration of the lesson during which the student's heart rate exceeded 125 beats per minute. In accordance with international public health and Physical Education standards, achieving at least 50% of the total lesson time (i.e., 22.5 minutes) in this intensity zone was considered the health-beneficial threshold (American College of Sports Medicine, 2021; Hollis et al., 2017).

Data collection was performed in two distinct types of teaching environments (indoor and outdoor) to assess their impact on the intensity of students' physical activity during a total of 30 monitored lessons:

Indoor: Small gymnasium (3 lessons recorded) and large gymnasium (15 lessons recorded).

Outdoor: Outdoor multifunctional sports field (12 lessons recorded). Data obtained from the Garmin devices were synchronized in bulk via Garmin Express software to the Garmin Connect online platform and subsequently exported to Microsoft Excel, where they were categorized by gender and teaching environment. The Kolmogorov-Smirnov test was applied to verify the normality of the data distribution. Since the assumption of normality was not met, the non-parametric Mann-Whitney U test was employed to assess the statistical significance of differences in MVPA levels between two independent groups. To further evaluate the practical (substantive) significance of the observed differences, the effect size was calculated using Cohen's *d* coefficient. The level of statistical significance for all tests was set at $p \leq 0.05$ and $p \leq 0.01$.

Results and Discussion

Overall Levels of Moderate-to-Vigorous Physical Activity (MVPA)

Data analysis from 355 students across 30 Physical Education (PE) lessons demonstrated that the overall mean MVPA level reached only 28.00%. Within the context of a standard 45-minute lesson, this equates to an average of merely 12.6 minutes of active movement within the target heart rate zone (exceeding 125 beats per minute). These findings corroborate our initial hypothesis and clearly indicate that students significantly fall behind the international recommended threshold, which suggests that at least 50% of lesson time (i.e., 22.5 minutes) should be dedicated to moderate-to-high intensity activity. This distressing finding is consistent with global trends indicating that traditional educational models in PE fail to provide adequate physical load, as suboptimal values have been recorded in extensive review studies. For instance, a comprehensive systematic review conducted by Hollis et al. (2017) demonstrated that students in PE lessons spend an average of 40.5% of time in the MVPA zone. Similarly, Iglesias et al. (2022) highlight in their review that although students—regardless of country, gender, or age group—generally do not achieve the 50% threshold, our findings point to an even more critical deficit and passivity in actual school practice.

Gender Disparities

A more detailed examination of demographic factors revealed a significant gender disparity, which is graphically illustrated in Figure 1. While male students achieved a mean MVPA level of 30.25% (approximately 13.62 minutes), female students recorded a critically low value of only 15.98% (7.2

minutes). This disparity of more than 14% (6.42 minutes) proved to be statistically significant at the 1% significance level ($p \leq 0.01$), and the assessment of practical significance indicated a medium effect size ($d = 0.65$). Furthermore, the high variability in data among female students suggested that many of them did not enter the MVPA zone at all during instruction. When comparing gender differences, the profound gap identified in our study (30.25% for males vs. 15.98% for females) is markedly more pronounced than that reported in current literature. Arenas et al. (2024) found in their meta-analysis that although male students tend to dominate in physical activity, the difference is typically much smaller (averaging 28.75% for males versus 25.99% for females). The magnitude of this difference in our research sample highlights a severe motivational crisis among female adolescents within the current traditional PE system. Moreover, the decline in physical activity is amplified by age; as confirmed by Lu et al. (2023), MVPA levels significantly decrease during the transition from primary to secondary school, which corresponds with our findings of lower activity among older students at the eight-year gymnasium.

Environmental Determinants

The location of the lesson was identified as an important determinant of physical intensity, as documented in Figure 2. Comparative results showed that lessons conducted outdoors (on a multifunctional field) stimulated a higher mean MVPA level of 30.55% (13.75 minutes). Conversely, in indoor conditions (gymnasiums), the mean MVPA level dropped to 26.02% (11.71 minutes). This difference was statistically significant ($p \leq 0.05$), although it represented a small effect size in terms of practical significance ($d = 0.19$). Regarding the teaching environment, our data fully correlate with global trends emphasizing the benefits of outdoor settings. Brusseau et al. (2016) found that students achieve, on average, a 3.4% higher MVPA level during outdoor PE lessons compared to indoor gymnasiums. Authors further argue that spatial constraints indoors, frequent organizational downtime, and the nature of intern

didactic procedures reduce active learning time compared to the naturally more dynamic outdoor environment.

The summary of empirical results from this study confirms that traditional teacher-centered approaches, which dominate current instruction, are currently unable to provide adolescents with sufficient physical load or motivation for movement. The current model has a disproportionately negative impact, particularly on female students and in indoor environments, where students exhibit a high degree of passivity. This critical diagnostic status provides an exact and strong empirical foundation for the necessity of a structural change in PE teaching methodology and justifies the systemic implementation of Project-Based Learning (PBL).

Project-Based Learning (PBL) offers a holistic pedagogical framework with the potential to address the identified deficiencies. As a constructivist and student-centered model, PBL shifts the focus from passive compliance with instructions to active, inquiry-based learning. If students take responsibility for creating a real-world output—such as designing their own training program, organizing an inter-class sports event, or creating a healthy lifestyle campaign using data from wearable devices—their intrinsic motivation and sense of autonomy increase rapidly.

Autonomy support and the satisfaction of psychological needs are key factors that, according to Behzadnia et al. (2019) and Baniyadi et al. (2022), lead to significantly higher student participation in the MVPA zone. For female students, who often exhibit a reluctance to engage in traditional competitive games, PBL provides a space for self-realization. In project teams, they can assume roles that combine organizational or analytical tasks with movement, thereby increasing their physical engagement naturally and without performance pressure.

Furthermore, as emphasized by Ružbarská et al. (2025), there is a strong link between engaging in meaningful physical activity and executive cognitive functions. PBL in PE does not merely seek a one-sided increase in heart rate; its objective is the integration of the student's motor, cognitive, and affective domains. Solving projects develops critical thinking, social skills within a team, and overall physical literacy. Experimentally validating this approach is thus a key step toward overcoming the alarming 28% MVPA found in this study and effectively preparing youth for a lifelong active and healthy lifestyle.

Despite the benefits of objective physical load monitoring, our study has certain limitations that should be considered when interpreting the results. The most prominent limitation is the gender disproportion of the research sample, as it consisted of 299 male students but only 56 female students. Furthermore, the research was conducted at only one school (an eight-year gymnasium in Bratislava), which limits the wider generalization of the results to the entire population. At the same time, it should be noted that this cross-sectional study serves primarily as a diagnostic baseline for the implementation of Project-Based Learning (PBL). The impact of this innovative pedagogical approach on increasing MVPA has not yet been experimentally verified in this phase, which remains the main subject of follow-up research within the ongoing VEGA grant.

Conclusions

The present study provides an exact diagnostic baseline for evaluating the traditional, teacher-directed Physical Education (PE) model through the objective quantification of students' physical load. The results clearly demonstrate that the overall mean level of moderate-to-vigorous physical activity (MVPA) reached an alarming 28.00% of the total lesson time. This identified status significantly falls behind the internationally recommended 50% threshold, which is essential for ensuring optimal health benefits for adolescents (Chaput et al., 2020; Hollis et al., 2017).

A more detailed analysis identified significant disparities in students' engagement in active movement. The traditional PE model disproportionately negatively impacts female students, for whom a critically low level of engagement was confirmed (15.98% MVPA) compared to male students (30.25% MVPA). Furthermore, it was demonstrated that instruction in indoor gymnasium settings significantly limits physical intensity compared to the naturally more dynamic outdoor environment of multifunctional sports fields (Nica et al., 2019). These empirical findings confirm the limited effectiveness of the current routine approach and expose a profound motivational crisis among students, which reduces their active engagement in activities.

These findings establish a robust empirical foundation to justify the necessary systemic and methodological transition toward the implementation of Project-Based Learning (PBL) within the

school PE curriculum. By shifting the focus from teacher-directed instructions to student-oriented inquiry-based learning, PBL provides a holistic framework capable of integrating the student's motor, cognitive, and affective domains (Coyne et al., 2016). The integration of PBL has high potential to eliminate identified gaps in load intensity and motivation, provide students with a greater degree of autonomy and competence, and thus successfully shape their lifelong positive relationship with physical activity and health. Consequently, we recommend the targeted application of project-based learning in schools, followed by its long-term experimental validation.

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Tables and Figures

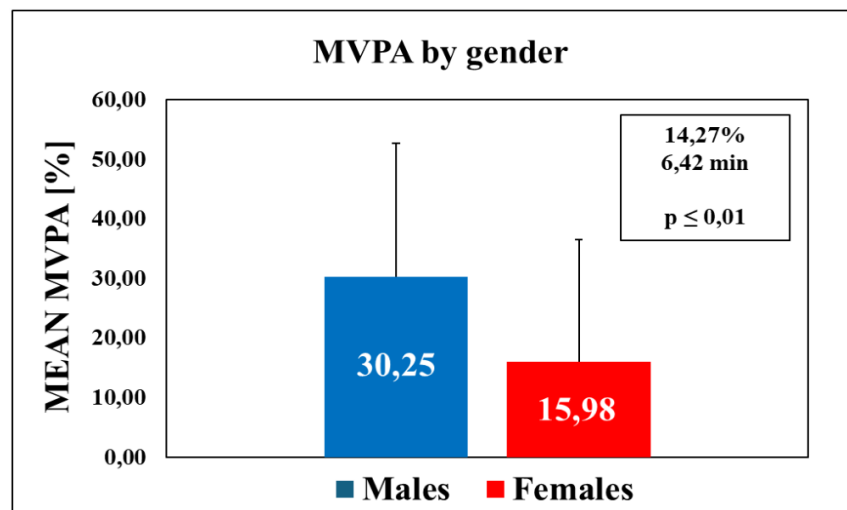


Figure 1 Comparison of moderate-to-vigorous physical activity by Gender

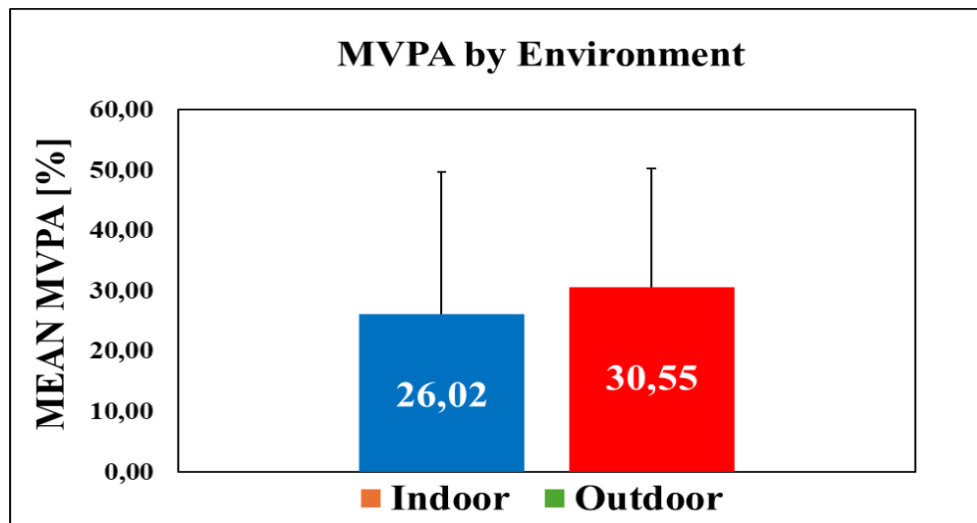


Figure 2 Comparison of moderate-to-vigorous physical activity by Environment

MUSCULAR FITNESS IN ADOLESCENTS. A COMPARISON BETWEEN ITALIAN AND ROMANIAN STUDENTS FOR HEALTH PROMOTION. A PRELIMINARY STUDY

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Absrtract

Muscular fitness during adolescence is a fundamental component of physical fitness development and a significant determinant of lifelong health. Evidence shows that adequate muscular strength is associated with more favorable metabolic profiles and reduced cardiometabolic risk in adulthood. Examining Muscular Fitness across educational contexts may help clarify how sociocultural and organizational factors influence motor development. Within a socio-ecological framework, this preliminary study compares Italian and Romanian students, focusing on gender differences, relationships among strength tests, and percentile distributions. This study adopted an exploratory cross-sectional design. The sample included 447 lower secondary school students (mean age = 12.51 ± 0.98 years). Strength was assessed using standardized and validated tests. Between-country and gender comparisons were conducted, along with correlation analyses among tests and evaluation of percentile distributions (P25–P75) to describe group performance profiles. Among males, the Romanian group achieved higher mean scores in the SLJ and sit-ups, while Handgrip values were comparable. Similarly, Romanian females performed better in the SLJ and sit-ups, with minimal differences in Handgrip. Significant correlations between SLJ and sit-ups emerged in both countries and sexes, indicating coherence between dynamic and endurance strength. Associations involving Handgrip were weak or absent. Romanian students showed higher dynamic and endurance strength, while upper-limb strength appeared less context- sensitive. The consistent association between SLJ and sit-ups suggests neuromuscular integration of explosive and endurance components at this age. Adolescent muscular strength is a recognized indicator of present and future health, linked to cardiometabolic benefits, improved weight control, and reduced premature mortality.

Keywords: Muscular fitness, adolescent motor performance, health promotion, school physical education

Introduction

Muscular Fitness (MF) represents a useful indicator for monitoring motor development and health status during developmental age (Ortega et al., 2023), as well as a marker of present and future health (Faigenbaum et al., 2019).

The association between adequate levels of MF and an active lifestyle contributes to a more favorable health profile, reducing the negative effects of physical inactivity and unfavorable anthropometric conditions (González-Gálvez et al., 2024). Moreover, adequate MF levels may promote perceived competence, motivation, and more positive attitudes toward an active lifestyle (Solera-Sanchez et al., 2023). Conversely, low levels of physical activity and increased sedentary behaviors may negatively affect motor development and health (Colella et al., 2023). In the Italian context, epidemiological data confirm critical issues in adolescents' physical activity levels, with only a minority of young people meeting the WHO recommendation (Lazzeri et al., 2024).

The development of MF and physical activity during adolescence does not depend only on individual factors, but also on their interaction with environmental, social, cultural, and organizational conditions. This highlights the combined role of personal, relational, school, community, and policy-related factors in facilitating or hindering young people's motor participation (Solmon, 2015; Hu et al., 2021). Consequently, health promotion during adolescence should address not only individual behaviors, but also the educational and social contexts that make physical activity accessible, meaningful, and sustainable (Stokols, 1996).

Within this framework, physical education represents a privileged context for health promotion, as it reaches most students and can provide structured, progressive, and inclusive motor experiences capable of influencing not only motor skills, but also motivation, perceived competence, and active behaviors (Hu et al., 2021).

The quality of motor experiences is a central factor: increasing the time devoted to physical activity is not sufficient; activities must also be meaningful, inclusive, and adapted to different ability levels (Weiss, 2020). Therefore, differences in MF levels among students from different national contexts may also reflect different educational, methodological, cultural, and sport-related opportunities.

Studies comparing MF between Italian and Romanian students through gender-based analyses, relationships among tests, and percentile distributions are still limited. This approach allows a more comprehensive interpretation of students' motor profiles, going beyond the comparison of mean values alone.

Therefore, the present preliminary study aims to analyze and compare MF levels in a sample of Italian and Romanian students aged 10 to 14 years. The study also aims to examine differences between the two national groups according to gender, analyze correlations among the different tests, and describe the percentile distributions of performance. From a socio-ecological perspective, the comparison between Italian and Romanian students is intended to provide preliminary evidence useful for understanding how different educational, sociocultural, and organizational contexts may be associated with the development of MF during adolescence and with health promotion through physical education.

Materials and Methods

The present study adopted an exploratory cross-sectional design aimed at comparing MF levels between Italian and Romanian lower secondary school students. The study was preliminary and observational in nature; no experimental intervention was administered, and causal relationships were not investigated. The sample included 447 students aged 10 to 14 years. The mean age of the total sample was 12.51 ± 0.98 years. Participants were recruited from schools located in Southern Italy, in the Apulia region, and in central-northern Romania, in the Transylvania area. The Romanian group included 173 students, 77 females (age 12.99 ± 0.80 years) and 96 males (age 13.04 ± 0.92 years). The Italian group included 274 students, 121 females (age 12.28 ± 0.91 years) and 153 males (age 12.11 ± 0.91 years).

MF was assessed through three field-based tests included in the EUROFIT battery: Standing Long Jump (SLJ), Handgrip (HG), and Sit-ups (Council of Europe, 1993).

Descriptive statistics were expressed as means and standard deviations. Analyses were performed on the total sample and separately by country and gender. Comparisons between Italian and Romanian students were conducted separately for males and females using independent-samples t-tests; considering the unequal group sizes and the possible heterogeneity of variances, Welch's t-test was reported in the results. The Mann–Whitney U test was used as a non-parametric supporting analysis when necessary. Relationships among SLJ, Sit-ups, and HG were analyzed using Pearson's correlations, with Spearman's rho used as a robustness check. Percentile distributions from P5 to P95 were also calculated; in the results, P25, P50, and P75 are mainly reported to describe the central distribution of performance. The significance level was set at $p < .05$. All analyses were performed using JASP, Version 0.95.

Results and Discussion

In males, the Romanian group showed higher mean values than the Italian group in SLJ (1.74 ± 0.23 m vs 1.50 ± 0.31 m) and Sit-ups (23.76 ± 4.00 vs 16.73 ± 5.03 reps), whereas HG showed more similar values between the two groups (29.24 ± 8.94 kg vs 27.63 ± 8.17 kg). Welch's t-test confirmed statistically significant differences between Romanian and Italian students in both SLJ, $t(238.82) = 7.04$, $p < .01$, $d = 0.89$, and Sit-ups, $t(228.91) = 12.13$, $p < .01$, $d = 1.55$. Conversely, no significant differences emerged in HG, $t(192.42) = 1.32$, $p = .19$, $d = 0.19$.

A similar pattern was observed in females. The Romanian group showed higher performance than the Italian group in SLJ (1.49 ± 0.24 m vs 1.30 ± 0.24 m) and Sit-ups (20.01 ± 3.30 vs 14.42 ± 4.57 reps), whereas differences in HG were minimal (24.92 ± 5.16 kg vs 24.33 ± 5.43 kg). Similarly, Welch's t-test showed significant differences in SLJ, $t(159.08) = 5.46$, $p < .01$, $d = 0.80$, and Sit-ups, $t(192.23) = 9.97$, $p < .01$, $d = 1.40$. No significant differences emerged in HG, $t(155.59) = 0.71$, $p = .48$, $d = 0.11$. The supporting non-parametric analyses using the Mann–Whitney U test confirmed the same general pattern, showing significant differences for SLJ and Sit-ups, but not for HG.

Correlation analyses showed significant associations between SLJ and Sit-ups in both countries and in both sexes. These results indicate a relationship between explosive lower-limb strength and abdominal muscular endurance.

Associations with HG were less homogeneous than those observed for the other tests, confirming that grip strength represents a more specific component and is less directly related to dynamic strength.

Percentile analysis confirmed a more marked advantage of the Romanian group in SLJ and Sit-ups, whereas HG profiles were more similar between countries, especially among females. Overall, the findings highlight greater expressions of dynamic and endurance strength in the Romanian sample, while upper-limb strength appears less sensitive to contextual differences. The consistent relationship between SLJ and Sit-ups in both countries suggests a possible neuromuscular integration between explosive and endurance components of strength in this age group. The literature emphasizes that muscular strength during adolescence is a powerful indicator of current and future health, associated with cardiometabolic benefits, better weight control, and reduced premature mortality (Ortega et al., 2023).

The present preliminary study analyzed MF levels in Italian and Romanian adolescents, suggesting that dynamic and functional components of strength may be more sensitive to motor experiences, school context, and opportunities for physical practice, whereas grip strength may more strongly reflect anthropometric, maturational, and individual characteristics.

These results confirm that MF tests do not measure a single dimension of strength, but rather complementary components of neuromuscular functioning: SLJ, Sit-ups, and HG reflect different dynamic, functional, and isometric aspects (Schlegel et al., 2024).

The observed correlations showed a positive and significant relationship between SLJ and Sit-ups in all subgroups, suggesting a possible common basis of neuromuscular efficiency between explosive lower-limb strength and abdominal muscular endurance. Associations with HG were instead more variable and less consistent, confirming that grip strength represents a more specific component and is not always comparable to dynamic tests.

The relationship between muscular strength, motor skills, and physical participation can also be interpreted within the broader perspective of physical literacy, in which physical competence is integrated with motivation, confidence, and active participation (Villa-González et al., 2024).

Percentile analysis confirmed that the Romanian advantage in SLJ and Sit-ups was not limited to mean values but was also evident in the central distribution of performance, providing a more comprehensive description of the motor profile of the groups. European literature on youth fitness has emphasized the importance of normative values and percentiles for interpreting children's and adolescents' performance according to age and sex (Ortega et al., 2023).

From a socio-ecological perspective, these differences may reflect the interaction among personal characteristics, motor opportunities, school context, sport culture, physical education organization, and extracurricular physical activity habits.

Physical education represents a privileged context for promoting physical activity and MF, as it can support the development of motor skills, motivation, perceived competence, and positive attitudes toward an active lifestyle (Solmon, 2015). However, school alone is not sufficient: adolescents' motor participation depends on the interaction among individual, social, family, school, and environmental factors (Hu et al., 2021). In this perspective, strength-oriented activities during developmental age, when appropriately designed, supervised, and adapted, can improve MF, support motor development, and promote long-term physically active habits (Faigenbaum et al., 2023). Nevertheless, motor experiences must be meaningful, inclusive, and accessible, especially for students with low fitness levels, overweight, or low perceived competence, to prevent stigma, negative comparison, and reduced participation (Weiss, 2020; Chen et al., 2024).

Support from the physical education teacher can promote participation, perceived competence, motivation, and persistence in exercise. In particular, the Spectrum of Teaching Styles by Mosston and Ashworth (2008) provides a useful pedagogical framework for diversifying teaching strategies, integrating directive and productive styles according to educational objectives and students' characteristics. Such methodological variability may contribute to creating motor experiences that are more inclusive, motivating, and oriented toward individual success, supporting the development of physical fitness over time (Monacis et al., 2024). In this perspective, the Romanian advantage in dynamic tests may reflect differences in school and extracurricular motor experiences, teaching methodologies, quality of practice, or the value attributed to physical activity in different contexts. However, the cross-sectional and preliminary design of the study does not allow causal relationships to be established; therefore, these differences should be interpreted with caution, avoiding deterministic interpretations. Future research should therefore integrate the assessment of MF with broader information on physical activity levels, sport participation, sedentary time, biological maturation, body composition, and the characteristics of physical education teaching.

The main limitations of the study include its cross-sectional and preliminary design, which does not allow causal relationships to be established, and the fact that the sample cannot be considered fully representative of the Italian and Romanian adolescent populations. Moreover, potentially relevant variables were not considered, such as biological maturation, body composition, extracurricular sport participation, habitual physical activity and sedentary behavior, socioeconomic status, and characteristics of physical education programs. The absence of a test-retest procedure, together with possible differences in testing conditions, familiarity with the tests, or students' motivation, may have influenced performance. Future studies should include larger samples, individual and contextual variables, reliability procedures, and longitudinal or intervention-based designs.

Conclusion

The present preliminary study highlights differences in MF levels between Italian and Romanian adolescents. Romanian students showed higher performance in SLJ and Sit-ups, whereas HG showed more similar values between the two groups. These findings suggest that dynamic and functional components of strength may be more influenced by motor experiences and opportunities for physical practice than upper-limb isometric strength.

Correlations among tests and percentile analysis confirm the usefulness of an articulated assessment of MF, capable of going beyond the comparison of mean values alone. In the school context, simple and applicable field-based tests may represent useful tools for monitoring motor development, identifying educational needs, and guiding targeted interventions.

From an applied perspective, the findings emphasize the role of physical education in health promotion during adolescence. Progressive, inclusive, and individually oriented school programs may contribute to the development of MF, active participation, and more stable physically active habits. Future studies with larger samples and longitudinal designs are needed to further investigate the role of educational, sociocultural, and organizational factors in the development of adolescent MF.

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CARDIORESPIRATORY EFFICIENCY AND AGILITY IN ADOLESCENTS: A COMPARISON BETWEEN ITALIAN AND ROMANIAN STUDENTS FOR HEALTH PROMOTION. PRELIMINARY STUDY.

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Abstract

This preliminary study compared cardiorespiratory endurance and agility in Italian and Romanian lower secondary school students. A cross-sectional study included 168 students (12.57 ± 0.86 years). Endurance was assessed using the 6-Minute Walking Test (6MWT) and agility with the 10×5 m Shuttle Run. Romanian students showed better agility in both sexes; Romanian males performed better in the 6MWT, whereas Italian females achieved higher values. Significant inverse correlations between endurance and agility emerged only in the Italian sample (males $r = -0.76$; females $r = -0.59$; $p < .01$). These findings suggest different motor development patterns between the two groups. Further studies are needed to clarify the influence of sociocultural and educational factors on adolescent motor development. Keywords: cardiorespiratory fitness, adolescent motor performance, health promotion, school physical education

Introduction

Physical inactivity and sedentary behaviour represent major global public health challenges, being associated with an increased risk of chronic diseases, mental health disorders, reduced quality of life, and premature mortality. It is estimated that physical inactivity accounts for more than five million deaths annually, while nearly one-third of adults and 80% of adolescents fail to meet the physical activity recommendations established by the World Health Organization (Bull et al., 2020).

High levels of physical inactivity are also reported across Europe, where 45% of the population declares never participating in sports (European Commission, 2022). In Italy, the situation is particularly critical, as 80.3% of adults and 91.7% of adolescents do not achieve the recommended physical activity levels (TEHA Group, 2025).

In this context, monitoring cardiorespiratory fitness and health-related physical fitness plays a fundamental role during childhood and adolescence. Cardiorespiratory fitness is recognized as an

important indicator of overall health and is associated with a lower risk of cardiovascular and metabolic diseases in children and adolescents (Ortega et al., 2008).

The relationship between physical activity, motor competence, and health can be interpreted through the Pediatric Inactivity Triad model, which describes the interaction among exercise deficit disorder, pediatric dynapenia, and physical illiteracy. Reduced motor competence and muscular strength limit participation in physical activity, thereby promoting sedentary behaviours (Faigenbaum et al., 2018).

Materials and Methods

Study Design

This preliminary study adopted a cross-sectional design to compare selected indicators of cardiorespiratory fitness and agility between Italian and Romanian lower secondary school students.

Participants

The sample consisted of 168 Italian and Romanian lower secondary school students (mean age: 12.57 ± 0.86 years), including 91 Italian and 77 Romanian participants (99 males and 69 females).

Among males, 52 were Italian and 47 Romanian. Italian males had a mean age of 12.52 ± 0.98 years, whereas Romanian males had a mean age of 12.72 ± 0.65 years. Their anthropometric characteristics were: BMI 20.44 ± 4.93 kg/m², height 1.57 ± 0.09 m, and body mass 51.01 ± 14.50 kg for Italians; BMI 18.50 ± 2.87 kg/m², height 1.63 ± 0.11 m, and body mass 49.85 ± 12.02 kg for Romanians.

The female sample included 39 Italian and 30 Romanian students. Italian females had a mean age of 12.41 ± 1.02 years, whereas Romanian females had a mean age of 12.63 ± 0.67 years. Anthropometric characteristics were: BMI 19.88 ± 3.72 kg/m², height 1.57 ± 0.07 m, and body mass 49.32 ± 10.91 kg for Italians; BMI 19.39 ± 4.62 kg/m², height 1.63 ± 0.06 m, and body mass 51.83 ± 12.81 kg for Romanians.

Only students regularly attending school and medically fit to perform the motor tests were included.

Participants presenting medical conditions, physical limitations, or musculoskeletal disorders preventing test execution were excluded.

Written informed consent was obtained from parents or legal guardians before participation, and all students received information regarding the aims and procedures of the study.

Procedures and Instruments

Data collection was carried out during regular school hours in the participating Italian and Romanian schools. Before testing, participants received standardized instructions regarding test procedures.

Assessments were conducted by professionals in sport and exercise sciences.

Cardiorespiratory fitness was assessed using the Six-Minute Walking Test (6MWT) (Kammin, 2022), whereas agility was evaluated through the 10 × 5 Shuttle Run Test (Council of Europe, 1988).

Statistical Analysis

Descriptive statistics (mean $\pm$ standard deviation) were calculated for the whole sample and separately by country and sex.

Comparisons between Italian and Romanian students were performed separately for males and females using independent-samples t-tests. Because of unequal group sizes and the potential violation of homogeneity of variances, Welch's t-test was reported. The Mann–Whitney U test was used as a non-parametric alternative when appropriate.

Relationships between the 10 × 5 Shuttle Run and the 6-Minute Walking Test were analysed using Pearson's correlation coefficient, with Spearman's rho employed as a robustness check. Correlation coefficients, statistical significance, and 95% confidence intervals were reported.

Percentile distributions (P5–P95) were also calculated, although only P25, P50, and P75 are presented in the Results section to summarise the central distribution of performance.

Statistical significance was set at $p < .05$. All analyses were performed using JASP software (Version 0.95.4).

Results and Discussion

This study examined cardiorespiratory fitness and agility in Italian and Romanian lower secondary school students using the 6-Minute Walking Test (6MWT) and the 10 × 5 Shuttle Run (10 × 5 SR), revealing significant differences in physical fitness profiles between the two national groups.

Romanian students achieved significantly better performances in the 10 × 5 Shuttle Run than their Italian peers in both males and females. Percentile distributions confirmed the superiority of the Romanian sample across most of the performance range, suggesting greater efficiency in speed-agility, change-of-direction ability, and neuromuscular control.

Agility is a complex motor ability influenced by coordination, speed, motor control, and neuromuscular function, all closely related to motor experiences and participation in structured physical activity (Cale, 2023). Therefore, the observed differences may reflect variations in habitual physical activity, opportunities for motor practice, and educational and sporting contexts.

The 6MWT showed a more heterogeneous pattern. Romanian males achieved higher mean values than Italian males, although differences were not statistically significant, whereas Italian females significantly outperformed their Romanian counterparts. Percentile distributions also indicated greater variability among Romanian males, suggesting a wider dispersion in cardiorespiratory fitness levels.

These findings may be explained by biological, sociocultural, and environmental factors. During adolescence, physical fitness development is influenced by maturation, physical activity levels, family habits, sport participation, and the quality of school-based motor experiences (Hanssen et al., 2023). From a socio-ecological perspective, these abilities emerge from the continuous interaction between the individual and the surrounding environment, including school, family, and opportunities for physical activity.

Particularly noteworthy were the relationships between the 6MWT and the 10 × 5 Shuttle Run. In the Italian sample, a significant negative correlation indicated that students with higher cardiorespiratory fitness also achieved better agility performances. In contrast, this relationship was less consistent in the Romanian sample, where Pearson's correlations were not statistically significant despite significant Spearman correlations.

These findings suggest a stronger integration between aerobic and neuromuscular capacities among Italian students, whereas the two components appear to develop more independently in Romanian students.

Routine assessment of physical fitness using simple field-based tests may help identify early motor development deficits and support evidence-based educational interventions.

This study has several limitations. The cross-sectional design does not allow causal inferences, and potentially influential variables—including extracurricular physical activity, organised sport participation, socioeconomic status, and dietary habits—were not assessed. Moreover, the preliminary nature of the study and the relatively small sample size limit the generalisability of the findings.

Despite these limitations, this study contributes to the literature on adolescent motor development by providing intercultural comparative data on cardiorespiratory fitness and agility in Italian and Romanian students.

Conclusions

The findings confirm the importance of assessing physical fitness during adolescence, identifying cardiorespiratory fitness and agility as key indicators of motor development and health. The differences observed between Italian and Romanian students also suggest a potential influence of sociocultural, environmental, and educational factors on motor development.

Continuous monitoring of physical activity and physical fitness should therefore represent a priority for both public health and scientific research. Within this perspective, the school setting offers an ideal environment for promoting health and physical literacy through systematic assessment using valid, standardized, and practical field-based tests. Future research should include larger samples and longitudinal designs to investigate the influence of extracurricular physical activity, organised sport

participation, socioeconomic status, and school motor experiences, thereby contributing to the development of international physical fitness surveillance systems during adolescence.

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RELATIONSHIPS BETWEEN AEROBIC CAPACITY AND EXPLOSIVE POWER WITH SPEED AND AGILITY IN ADOLESCENT FEMALE FOOTBALL PLAYERS

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Abstract

This study aimed to examine the relationships between aerobic capacity and lower-body explosive power with speed and agility performance in adolescent female football players in Albania. A total of 41 players (mean age: 15.3 years) participated in the study. Aerobic capacity was assessed using the 20 m Shuttle Run test (Total Laps). Explosive power was evaluated through the Standing Long Jump (horizontal power) and Countermovement Jump (CMJ) (vertical power). Speed performance was measured using 20 m and 50 m sprint tests, while agility was assessed through the 10×5 m shuttle test and the T-test. Pearson correlation analysis was applied to determine the relationships between variables. The results showed that aerobic capacity had weak and non-significant correlations with speed and agility

performance ($r = -0.264$ to 0.197 , $p > 0.05$). Similarly, CMJ performance was not significantly associated with sprint or agility outcomes ($r = -0.288$ to 0.233 , $p > 0.05$). A moderate and statistically significant negative correlation was found between Standing Long Jump and 50 m sprint performance ($r = -0.432$, $p = 0.005$), indicating that greater horizontal explosive power is associated with better sprint performance (lower sprint time). No other significant relationships were observed. In conclusion, aerobic capacity does not appear to be a strong determinant of speed and agility in adolescent female football players. Explosive power, particularly horizontal power, plays a more important role in sprint performance. These findings highlight the importance of incorporating strength and power training in youth football development programs.

Key words: *female, youth, football, speed, agility.*

Introduction

In past two decades, women's football has undergone a significant transformation, with the game becoming faster and more physically demanding (Castagna et al., 2020; Datson et al., 2014). Modern female players are required to perform often high-intensity actions such as sprinting, jumping, and rapid changes of direction, with periods of low-intensity recovery. These intermittent demands highlight the importance of both aerobic and anaerobic energy systems, as well as neuromuscular efficiency. During adolescence, players experience critical moments of trainability for speed, strength, and power development. This developmental stage is particularly important in female athletes, as growth and maturation influence performance capabilities and injury risk. Consequently, understanding the physiological determinants underpinning high-intensity actions is essential for optimizing long-term athlete development in youth female football.

Aerobic capacity always have been considered as most important physiological element of football performance. It enables players to sustain activity levels throughout a match and supports recovery between repeated high-intensity efforts (Stølen et al., 2005; Helgerud et al., 2001). Field-based assessments such as the 20 m Shuttle Run test are widely used to estimate aerobic fitness in youth players. However, the relationship between aerobic capacity and explosive performance variables, such as sprinting and agility, remains unclear. Evidence suggests that while a minimum level of aerobic fitness is necessary, it may not be a strong predictor of short-duration, high-intensity actions in adolescent female players (Manson et al., 2014). Instead, neuromuscular characteristics and anaerobic power appear to play a more decisive role in determining speed and change-of-direction performance.

Lower-body explosive power is determinant of performance in football-specific actions, particularly acceleration and changes of direction. This capacity is commonly assessed using vertical and horizontal jump tests, such as the countermovement jump (CMJ) and standing long jump (SLJ). According to the force–vector theory, the direction of force application significantly influences athletic performance (Loturco et al., 2018). Vertical jumps primarily reflect maximal force production, whereas horizontal jumps better replicate the forward propulsion required during sprint acceleration. Research has demonstrated that horizontal power may have a stronger relationship with sprint performance compared to vertical power due to its biomechanical specificity (Maulder & Cronin, 2005; Cronin & Hansen, 2005). In female football players, significant associations have been reported between jumping ability, sprint speed, and agility, reinforcing the importance of explosive power as a key performance determinant (Alexe et al., 2024).

Speed and agility are fundamental components of football performance. Linear sprint speed (e.g., 20 m and 50 m sprints) and change-of-direction speed (CODS), often assessed through tests such as the T-test or shuttle runs, are essential for successful match actions. These abilities depend on a combination of strength, coordination, technique, and maturation. Research has shown that the relationship between sprinting, agility, and power becomes more pronounced with maturation, highlighting the importance of targeted training interventions (Vescovi & McGuigan, 2008). Identifying the primary physical determinants of these abilities is therefore essential for evidence-based training design.

Despite the global growth of women's football, scientific literature focusing on youth female players in Albania region remains limited. Recent studies have begun to examine physical performance

characteristics such as speed, agility, and strength in adolescent female football players (Mema & Lleshi, 2024;). However, comprehensive analyses of the relationships between aerobic capacity, explosive power, and performance outcomes are still scarce. Similarly, research in Bulgaria has highlighted both performance-related and structural aspects of women's football development. Studies on youth football players have reported significant age-related differences in speed and agility, emphasizing the role of growth and maturation in shaping physical performance (Gadzhev & Ivanov, 2025). Additional findings suggest strong relationships between change-of-direction speed and sprint performance, indicating that these physical qualities are closely interconnected (Baharov, 2025). At the same time, broader analyses of women's football in Bulgaria point to challenges such as limited institutional support and resources, which may influence player development pathways (Angelova-Igova & Naydenova, 2023). Given the limited data, and the ongoing debate regarding the role of aerobic capacity versus explosive power, further investigation is warranted. Therefore, the aim of this study was to examine the relationships between aerobic capacity and lower-body explosive power (vertical and horizontal) with speed and agility performance in adolescent female football players.

Methodology

Forty – one adolescent female football players (mean age = 15.73 ± 2.87 years) from two football teams were selected to participate for our study. All participants trained a minimum of three times per week for at least 90 minutes and had at least one year of structured football experience. Athletes were clinically healthy and free from injury at the time of testing. Written informed consent was obtained from legal guardians, and ethical approval was granted by the university's sports science research committee, in line with the Declaration of Helsinki. The study was held in January 2025. All subjects underwent the same tests to determine the study's results. Aerobic capacity was assessed using the 20 m Shuttle Run test (Total Laps). Explosive power was evaluated through the Standing Long Jump (horizontal power) and Countermovement Jump (CMJ) (vertical power). Speed performance was measured using 20 m and 50 m sprint tests, while agility was assessed through the 10×5 m shuttle test and the T-test. To collect data, we used the protocol tests that were to evaluate the purpose of our study, subjects performed a warm-up of 10 min before the beginning of the tests.

All statistical analyses were performed using IBM SPSS Statistics (Version 26.0; IBM Corp., Armonk, NY, USA). Descriptive statistics (mean and standard deviation) were calculated for all aerobic capacity and explosive power with speed and agility and physical performance variables to summarize the central tendency and dispersion of the data. Pearson product-moment correlation coefficients (r) were computed to examine the relationships between aerobic capacity and explosive power with speed and agility. Correlation values were interpreted using Cohen's (1988) guidelines, with $r = 0.10$ – 0.29 considered small, $r = 0.30$ – 0.49 moderate, and $r \geq 0.50$ large. The level of statistical significance was set at $p < .05$ for all analyses. Two-tailed tests were applied given the exploratory nature of the study. Normality of distribution for each variable was verified through Shapiro –Wilk tests.

Results and Discussion

As presented in Table 1, descriptive statistics for the sample indicated that the participants ($N = 41$) had an average age of (mean age = 15.73 years) years ($SD = \pm 2.87$ years), reflecting a mid-adolescent population. Performance outcomes for shuttle run, standing long jump, and countermovement jump (CMJ).

Shuttle run pre-test scores demonstrated moderate variability, with a mean of 43.78 ± 6.22 laps, while the distribution showed minimal skewness (0.16) and negative kurtosis (-0.94), indicating an approximately symmetrical distribution. Standing long jump performance produced a mean value of 171.09 ± 12.32 cm and demonstrated the greatest variability among the measured variables, accompanied by moderate positive skewness (0.77) and elevated kurtosis (2.09). CMJ performance demonstrated a mean score of 249.17 ± 11.42 , with slight negative skewness (-0.38) and acceptable kurtosis values (0.85), suggesting a relatively symmetrical distribution. Overall, skewness and kurtosis values for all variables were within

acceptable limits, supporting the assumption of approximate normality and the suitability of the data for subsequent parametric statistical analyses.

Table 1

Descriptive statistics for Shuttle Run, Standing Long Jump & Vertical Jump

As presented in Table 2, descriptive statistics for speed and agility performance variables demonstrated generally moderate variability and approximately normal distributions. The 20 m sprint test produced a mean time of 3.68 ± 0.17 s, with slight negative skewness (-0.41) and near-zero kurtosis (0.01), indicating a symmetrical distribution. Similarly, the 50 m sprint test showed a mean performance of 8.21 ± 0.49 s, with minimal skewness (-0.11) and kurtosis (0.07), suggesting normal distribution characteristics. Performance in the 10×5 m agility test demonstrated a mean value of 18.96 ± 0.81 s, with negligible skewness (0.01) and negative kurtosis (-1.19), indicating a relatively flat distribution. The

	Measures of Central Tendency			Measures of Variability				Distribution Shape	
	Mode	Median	Mean	Range	Standard Deviation	Variance	Interquartile Range (IQR)	Skewness	Kurtosis
Total laps Shuttle Run Pre	41.00	44.00	43.78	24.00	6.22	38.73	10.00	0.16	-0.94
Lower Body (Standing Long Jump) cm	177.80	172.70	171.09	62.20	12.32	151.78	15.2	0.77	2.09
Vertical Jump (CMJ- no steps)	245.00	248.00	249.17	55.00	11.42	130.40	12.00	-0.38	0.85

Agility T-Test pre-test recorded a mean score of 13.18 ± 1.04 s and showed moderate positive skewness (0.55), while kurtosis remained close to zero (-0.02). Overall, skewness and kurtosis values across all variables remained within acceptable limits, supporting the assumption of approximate normality and the appropriateness of subsequent parametric statistical analyses.

Table 2

Descriptive statistics for speed and agility

	Measures of Central Tendency			Measures of Variability				Distribution Shape	
	Mode	Median	Mean	Range	Standard Deviation	Variance	Interquartile Range (IQR)	Skewness	Kurtosis
20m	3.74	3.73	3.68	0.79	0.17	0.03	0.22	-0.41	0.01
50M	7.45	8.31	8.21	2.34	0.49	0.24	0.7	-0.11	0.07

	18.70	18.90	18.96	2.96	0.81	0.65	1.31	0.01	-1.19
Agility 10x5 m									
Agility T Test pre	14.50	13.02	13.18	4.44	1.04	1.09	1.33	0.55	-0.02

Pearson correlation analysis was conducted to examine the relationships between aerobic endurance, lower-body power, sprint performance, and agility variables (Table 3). Overall, the observed correlations were predominantly weak, although several statistically significant associations were identified. Shuttle run performance demonstrated weak relationships with sprint and agility measures. A weak negative correlation was observed between shuttle run performance and 50 m sprint time ($r = -0.186$, $p < .001$), indicating that participants with greater aerobic endurance tended to achieve faster sprint performances over longer distances. Similarly, shuttle run scores were weakly negatively associated with 10×5 m agility performance ($r = -0.264$, $p < .001$), suggesting that higher aerobic fitness may contribute to improved change-of-direction ability. In contrast, trivial positive correlations were identified between shuttle run performance and both 20 m sprint time ($r = 0.030$, $p < .001$) and Agility T-Test performance ($r = 0.197$, $p < .001$).

Standing long jump performance demonstrated weak negative correlations with 20 m sprint ($r = -0.091$, $p < .001$), 50 m sprint ($r = -0.091$, $p < .001$), and 10×5 m agility performance ($r = -0.075$, $p < .001$). These findings indicate that greater lower-body explosive power was associated with slightly improved sprint and agility performances. A weak positive association was observed between standing long jump performance and Agility T-Test scores ($r = 0.119$, $p < .001$). CMJ performance demonstrated a weak positive relationship with 20 m sprint time ($r = 0.233$, $p < .001$) and a weak negative relationship with 50 m sprint time ($r = -0.288$, $p < .001$). The strongest association observed in the analysis was between CMJ and 50 m sprint performance, suggesting that greater vertical power output may contribute to enhanced sprinting ability over longer sprint distances. Correlations between CMJ performance and both 10×5 m agility ($r = 0.027$, $p < .001$) and Agility T-Test performance ($r = -0.047$, $p < .001$) were negligible, indicating limited relationships between vertical jumping ability and agility-based tasks in the present sample.

Table 3
Pearson correlation analysis

	20m		50M		Agility 10x5 m		Agility T Test pre	
Total laps Shuttle Run Pre	Correlation:	0.030	Correlation:	-0.186	Correlation:	-0.264	Correlation:	0.197
	P-Value:	1.96E-34	P-Value:	1.34E-32	P-Value:	8.43E-27	P-Value:	1.02E-30
Lower Body (Standing Long Jump) cm	Correlation:	-0.091	Correlation:	-0.091	Correlation:	-0.075	Correlation:	0.119
	P-Value:	3.16E-47	P-Value:	7.67E-47	P-Value:	7.90E-46	P-Value:	1.17E-46
Vertical Jump (CMJ- no steps)	Correlation:	0.233	Correlation:	-0.288	Correlation:	0.027	Correlation:	-0.047
	P-Value:	3.56E-55	P-Value:	5.57E-55	P-Value:	1.94E-54	P-Value:	3.87E-55

The present study examined relationships between aerobic capacity, sprint performance, agility, and lower-body explosive power in adolescent female football players. Descriptive statistics indicated acceptable variability and approximately normal distributions across all variables, supporting the use of parametric analyses. Overall, the sample displayed a heterogeneous performance profile, with the greatest inter-individual variability observed in standing long jump performance. Correlation analysis revealed predominantly weak associations among performance variables. Aerobic capacity showed weak and non-significant relationships with sprint and agility measures ($r = -0.264$ to 0.197 , $p > 0.05$), indicating limited relevance of aerobic endurance for short-duration high-intensity performance. Similarly, CMJ performance was not significantly associated with sprint or agility outcomes ($r = -0.288$ to 0.233 , $p > 0.05$), suggesting that vertical jump ability does not strongly reflect sprint or change-of-direction capacity in this population.

In contrast, a moderate and statistically significant negative correlation was observed between standing long jump and 50 m sprint performance ($r = -0.432$, $p = 0.005$), indicating that greater horizontal explosive power is associated with faster sprint performance. This supports the importance of horizontal force production for sprinting ability, particularly over longer distances. No other significant relationships were identified. Although several correlations reached statistical significance, the overall effect sizes were weak, indicating limited shared variance between aerobic, sprint, agility, and power-related capacities. These findings suggest that these performance components are largely independent during adolescence and should be developed through specific training stimuli.

From an applied perspective, results indicate that aerobic capacity is not a key determinant of sprint or agility performance in adolescent female football players, whereas horizontal explosive power appears more relevant for sprint ability. Accordingly, youth training programmes should prioritise strength and power development, particularly exercises emphasising horizontal force production. In conclusion, physical performance qualities in this population appear largely independent, with horizontal lower-body power showing the strongest relationship with sprint performance.

Practical Implications

The present findings highlight the largely independent nature of aerobic capacity, sprint performance, agility, and lower-body power in adolescent female football players. This suggests that improvements in one physical quality should not be expected to transfer directly to others, reinforcing the need for specific and targeted training interventions within youth football development programs. The weak and non-significant associations observed between aerobic capacity, both sprint and agility performance indicate that aerobic conditioning should primarily be implemented to support match endurance, recovery capacity, and the ability to sustain repeated efforts during competition. However, aerobic training alone appears unlikely to substantially improve high-intensity actions such as sprinting or rapid changes of direction. Consequently, coaches and practitioners should avoid over-reliance on endurance-based conditioning methods when the primary objective is the enhancement of speed or agility performance. In contrast, the moderate relationship identified between standing long jump performance and 50 m sprint performance emphasises the importance of horizontal force production for sprint ability. From a practical perspective, this finding supports the inclusion of training methods specifically targeting horizontal power development. Exercises such as resisted sprinting, sled pushes and pulls, bounding drills, horizontal plyometrics, and lower-body strength exercises with sprint-specific movement patterns may contribute more effectively to sprint performance enhancement than general conditioning approaches alone. The absence of meaningful associations between CMJ performance and sprint or agility outcomes further suggests that vertical jump assessments may not fully reflect the movement-specific demands of sprinting and change-of-direction performance in adolescent female football players. Therefore, practitioners should adopt a multidimensional monitoring approach that incorporates sprint, agility, and horizontal power assessments alongside traditional vertical jump testing in order to obtain a more comprehensive evaluation of athletic performance.

Additionally, the findings reinforce the importance of training specificity during adolescence, a developmental period characterised by substantial neuromuscular adaptation and physical development.

Since sprinting, agility, endurance, and power appear to represent distinct physical capacities, training programs should include separate and appropriately periodised components targeting each quality. This may improve overall athletic development while reducing the likelihood of insufficient adaptation resulting from overly general conditioning strategies. Findings support a multidimensional approach to physical preparation in youth female football, where aerobic fitness, sprint speed, agility, and lower-body power are developed through distinct yet complementary training methods. Particular emphasis should be placed on horizontal force production as a key contributor to sprint performance in adolescent female football players.

Conclusion

The present study investigated the relationships between aerobic capacity, sprint performance, agility, and lower-body explosive power in adolescent female football players. Overall, the findings demonstrated predominantly weak associations among the examined physical performance variables, suggesting that these capacities function relatively independently during adolescence. The results contribute to the growing body of evidence indicating that physical performance in youth football is multifactorial and can't be explained by a single physiological or neuromuscular component. Aerobic capacity showed no meaningful relationship with sprint or agility performance, indicating limited transfer between endurance-related fitness and short-duration, high-intensity locomotor actions in this population. Although aerobic fitness remains important for sustaining match activity and facilitating recovery between repeated efforts, the present findings suggest that it is not a primary determinant of sprinting or change-of-direction performance in adolescent female football players. Similarly, vertical explosive power, assessed through CMJ performance, was not significantly associated with sprint or agility outcomes.

This suggests that vertical jump ability alone may not adequately reflect the complex neuromuscular and biomechanical demands required for multidirectional speed performance.

In contrast, a moderate and statistically significant relationship was identified between standing long jump performance and 50 m sprint performance, highlighting the importance of horizontal lower-body power for sprinting ability. This finding reinforces the biomechanical relevance of horizontal force production during sprint acceleration and running performance, suggesting that horizontally oriented explosive strength may represent a more sport-specific determinant of sprint ability in youth female football players than vertical power characteristics.

Collectively, the findings indicate that aerobic fitness, sprint speed, agility, and lower-body power should be considered distinct physical qualities requiring independent assessment and development within training programmes. Consequently, conditioning strategies in youth female football should adopt a multidimensional and sport-specific approach, integrating targeted interventions for endurance, speed, agility, and strength-power development rather than relying on generalized conditioning methods. Despite the practical relevance of the findings, several limitations should be acknowledged, including the cross-sectional design and the absence of maturation-related variables that may influence physical performance during adolescence. Future research should employ longitudinal approaches to examine how these relationships evolve across growth and development and to determine the effectiveness of targeted training interventions on the interaction between physical performance capacities in adolescent female football players.

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IMPLEMENTATION OF THE UDL (UNIVERSAL DESIGN FOR LEARNING) APPROACH IN TEACHING: TOWARDS INCLUSIVE AND EFFECTIVE EDUCATION

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Abstract

Introduction: In the context of contemporary education, the diversity of students in the classroom presents ongoing challenges for teachers. This diversity encompasses differences in abilities, learning styles, interests, and socio-cultural backgrounds, all of which require flexible and differentiated approaches. The Universal Design for Learning (UDL) framework offers a pedagogical model aimed at creating inclusive learning environments by reducing barriers to learning and increasing access for all students. It is grounded in the principle that every learner can succeed when provided with appropriate and responsive learning opportunities. This study aims to examine the importance and effectiveness of implementing UDL in the teaching process, considering it as a viable alternative to traditional instructional practices.

Methods: The study is based on a qualitative approach, combining a review of contemporary literature with direct classroom observations and reflective teaching practices. In particular, specific instructional situations in which differentiated strategies were applied have been analyzed. The study explores ways of integrating the three core principles of UDL: multiple means of representation, student engagement, and

diverse forms of expression and assessment. The data were analyzed through a comparative lens, contrasting traditional teaching practices with those grounded in UDL, in order to identify their respective advantages and limitations. Results: The findings indicate that the implementation of UDL principles has a positive impact on students' active participation in the learning process. Students demonstrate increased motivation, improved comprehension of content, and greater autonomy in learning. Furthermore, a reduction in learning barriers was observed among students with diverse learning styles and special educational needs, thereby enhancing opportunities for equitable success. The results also highlight a more inclusive and supportive classroom environment. Discussion: The findings suggest that UDL represents an effective approach to fostering inclusive and high-quality education. However, its implementation requires professional preparation of teachers, a shift in pedagogical mindset, and sustained institutional support. The integration of UDL into everyday teaching practice contributes not only to equity in education but also to the development of 21st-century competencies such as critical thinking, collaboration, and creativity. In this regard, it is recommended that educational policies and teacher training programs more extensively incorporate this approach and promote its systematic application.

Keywords: UDL, inclusion, contemporary education, teaching, diversity.

Introduction

Recent transformations in global education have led to a profound reconceptualization of the role of the school and the teacher in society. In an increasingly interconnected world, characterized by rapid technological and social change, the educational system can no longer rely on traditional teaching models that treat students as a homogeneous group. Instead, it must reflect the complexity and diversity of contemporary reality, creating equal opportunities for all learners.

Diversity in the classroom encompasses a wide spectrum of individual characteristics. Students differ not only in their cognitive abilities, but also in the ways they acquire information, in their interests, in their motivation to learn, and in their cultural experiences. Furthermore, factors such as language, socio-economic status, and special educational needs directly influence how students engage in the learning process (Tomlinson, Carol Ann, 2014).

The traditional teaching model, often characterized by frontal lectures and standardized assessments, has demonstrated its limitations in addressing this diversity. In many cases, this model creates barriers that prevent some students from reaching their full potential. As a result, there is a growing need for pedagogical approaches that are more flexible, more inclusive, and more learner-centered.

In this context, Universal Design for Learning (UDL) emerges as a theoretical and practical framework aimed at transforming how teaching is conceptualized and implemented. UDL is based on the idea that learning environments should be designed from the outset to be accessible to all students, thus avoiding the need for subsequent adaptations (Anne Mayer, David H. Rose, David Gordon, 2012).

A fundamental element of UDL is its grounding in neuroscience results, which indicate that learning involves three primary brain networks: the recognition network, the strategic network, and the affective network. The recognition network relates to how learners process and understand information. The strategic network concerns how they plan and express their knowledge, while the affective network is associated with motivation and emotional engagement (Anne Mayer, David H. Rose, David Gordon, 2012).

These three networks translate into three core principles of UDL, which should be integrated in a balanced manner within the learning process. The first principle, multiple means of representation, implies that information should be presented in various forms—such as text, images, videos, or practical activities—to address different learning styles. The second principle, multiple means of engagement, emphasizes the importance of motivation and active student involvement by providing appropriate choices and challenges. The third principle, multiple means of action and expression, offers learners diverse ways to demonstrate what they have learned, thereby overcoming the limitations of traditional assessments.

International literature strongly supports the effectiveness of this approach. Studies indicate that UDL not only increases inclusion and motivation but also improves academic outcomes and develops essential life skills (Hall, T. E., Meyer, A., & Rose, D. H., 2012). However, despite these benefits, the implementation of UDL requires a profound shift in pedagogical thinking and instructional practices.

In the Albanian context, the use of UDL is still in its early stages, and empirical research on its effectiveness remains limited. This makes it essential to develop studies that analyze the practical application of this approach and its impact on real learning environments.

The aim of this study is to contribute in this direction by providing a detailed analysis of the effects of UDL implementation in the classroom. More specifically, the study seeks to explore how this approach influences student inclusion, motivation, and academic achievement, as well as to identify the challenges encountered during its implementation.

Materials and Methods

Study Design

This study was designed as a qualitative interpretative inquiry aimed at providing an in-depth analysis of the experiences and practices of teachers and students in the context of UDL implementation in the learning process. The qualitative approach is particularly suitable for pedagogical studies, as it enables a deeper and more diversified understanding of complex phenomena occurring in the classroom, which are often not directly measurable through quantitative methods. Through this approach, it becomes possible to analyze not only learning outcomes but also the processes, interactions, and dynamics that generate them (Cresswell, 2013).

The interpretative approach underpinning this study is based on the premise that educational reality is not a static and objective structure, but a social construct shaped through everyday interactions between teachers and students. In this sense, understanding the learning process requires analyzing the perspectives, experiences, and perceptions of participants. This approach places particular emphasis on context and on how individuals make meaning of their experiences, making the study more comprehensive and in-depth. Accordingly, the study focuses not only on final outcomes but also on the processes leading to these outcomes, analyzing how pedagogical interventions influence student inclusion and development.

Participants and Context

The study was conducted in two pre-university schools representing a typical context of contemporary classrooms, where student diversity is a fundamental characteristic. The classes involved were characterized by a high level of heterogeneity, both academically and socially and culturally.

Participants included four teachers with varying levels of professional experience, ranging from a few years to over a decade within the educational system. This diversity of experience provided a broader perspective on how the UDL approach is perceived and implemented in practice. In addition to teachers, approximately 40 students aged between 9 and 15 years, distributed across different educational levels, participated in the study.

This group of students included individuals with varying levels of academic performance, ranging from high-achieving students to those facing learning difficulties. They also exhibited diverse learning styles, as well as different levels of motivation and engagement. Some experienced difficulties in reading and writing, affecting how they acquired information, while others required additional stimulation and support to maintain attention and actively participate in learning activities. This diversity created a rich and appropriate context for analyzing the effectiveness of the UDL approach, which specifically aims to address such individual differences.

Research Instruments

Data collection was carried out using multiple research instruments that complemented each other and contributed to enhancing the reliability and validity of the study. Structured classroom observation (Appendix 1) was one of the primary tools, used to systematically document how UDL strategies were

implemented and how students responded to them. This observation was conducted using pre-designed protocols, enabling organized and comparable data recording.

Semi-structured interviews with teachers (Appendix 2) constituted another important source of information, providing detailed insights into their experiences, challenges, and perceptions during UDL implementation. These interviews allowed for an in-depth exploration of teachers' attitudes and reflections on the changes observed in the classroom.

Teachers' reflective journals (Appendix 3) were used to document their experiences continuously throughout the study. These journals provided valuable insight into the implementation process and how teachers adapted their strategies based on students' needs. At the same time, the analysis of student products—such as assignments, projects, and presentations—served to assess learning levels and identify changes in academic performance (Appendix 4).

Procedure

The study was conducted in three interconnected and systematically structured phases. In the first phase, an initial analysis of existing teaching practices was carried out to identify traditional elements and the challenges encountered in the classroom. This phase served as the foundation for planning the pedagogical intervention.

In the second phase, UDL-based strategies were implemented in the learning process. This included the use of multimedia materials such as videos and visual presentations, the organization of collaborative activities promoting student interaction, and the provision of diverse assessment forms, allowing students to choose how they would demonstrate their learning. This phase was essential for the practical testing of UDL principles.

In the third phase, the results of the intervention were analyzed and reflected upon. This included comparing the situation before and after UDL implementation, as well as analyzing the collected data to draw conclusions about its impact on the learning process. Reflection on the results also served to identify the most effective practices and highlight challenges requiring future attention.

Data Analysis

The data collected in this study were analyzed using thematic analysis, a well-established and widely used method in qualitative research, which enables the identification, analysis, and interpretation of patterns (themes) within the data (Braun V., Clarke V. , 2006). This approach was selected due to its flexibility and its ability to capture the complexity of experiences and interactions within the educational context.

The thematic analysis process was conducted through several interconnected steps. Initially, a thorough familiarization with the data was achieved through repeated reading of materials collected from observations, interviews, and documents. At this stage, a general understanding of the content was developed, and initial ideas were identified. Subsequently, initial coding was performed, whereby significant data segments were labeled with codes representing specific ideas or concepts.

In the next phase, these codes were grouped into broader themes by identifying recurring patterns and relationships. These themes were then reviewed and refined to ensure they accurately represented the data content and were closely aligned with the study objectives. Finally, the themes were interpreted and integrated into a structured narrative reflecting the main findings of the study.

To enhance the reliability and validity of the results, source triangulation was employed—a strategy involving the comparison of data obtained from different sources, such as classroom observations, teacher interviews, and analysis of student products. This process helped verify findings and reduce potential biases, ensuring a more balanced and robust analysis.

Results and Discussion

Student Inclusion in the Learning Process

The results of the study indicated a significant and consistent increase in students' active participation in the learning process following the implementation of the UDL approach. In the initial phase of the study, a considerable proportion of students exhibited passivity, lack of interest, and low levels of participation

in learning activities. This passivity was often manifested through limited interaction during discussions, hesitation to provide responses, and minimal engagement with assigned tasks.

However, after the implementation of UDL-based strategies, a noticeable transformation in classroom dynamics was observed. Students began to participate more actively in discussions, contribute ideas, and collaborate more effectively with one another. Inclusion was not only broader in quantitative terms but also deeper in quality, as students demonstrated increased interest and sustained engagement.

This change can be explained by the fact that UDL provides multiple means of engagement, addressing individual differences in learning. For example, some students preferred working in groups, benefiting from social interaction and the exchange of ideas, while others felt more comfortable working independently at their own pace. Similarly, some students engaged more through practical and experimental activities, whereas others were more responsive to discussions and theoretical analysis. This flexibility in engagement methods created a more inclusive and motivating learning environment for all students.

Motivation and Emotional Engagement

One of the most significant findings of the study was the substantial increase in student motivation. The UDL approach places particular emphasis on the affective dimension of learning, highlighting that motivation and emotional engagement are key factors for academic success and sustainable student development (Mayer A., Rose D., Gordon D., 2014).

Students who felt included, valued, and respected within the learning process were more likely to engage actively and invest effort in learning. This was reflected in a more positive attitude toward learning, increased self-confidence, and a greater willingness to participate in various activities.

A key factor influencing this increase in motivation was the provision of choice. When students were given the opportunity to choose how to complete tasks—such as through a presentation, an essay, a project, or a creative product—they felt more autonomous and more involved in the process. This autonomy enhanced their sense of responsibility and ownership over their learning, leading to improved outcomes.

Academic Performance and Conceptual Understanding

The analysis of student products revealed a notable improvement in academic performance and in the depth of conceptual understanding. Unlike the initial phase, where students often focused on the mechanical reproduction of information, after the implementation of UDL they began to demonstrate more advanced skills, such as analysis, interpretation, and the application of knowledge in new situations. This improvement is closely linked to the use of multiple representations of information, one of the fundamental principles of UDL. When a concept is presented in different forms—such as text, graphics, video, or practical examples—it becomes more accessible to a broader range of learners. For instance, a mathematical concept can be explained through visual graphs, practical exercises, and discussions, helping students understand it from multiple perspectives and construct deeper and more durable knowledge.

Development of 21st-Century Competencies

Another important outcome of the study was the development of 21st-century competencies, which are widely recognized as essential for preparing students to successfully navigate the demands and uncertainties of contemporary and future societies. These competencies include, but are not limited to, critical thinking, collaboration, creativity, communication, and problem-solving skills. The implementation of the UDL framework contributed significantly to fostering these competencies by creating a flexible, inclusive, and student-centered learning environment in which learners were actively engaged in meaningful cognitive and social processes.

In particular, the UDL-based instructional design encouraged students to move beyond passive reception of information and instead engage in higher-order thinking processes. Activities that required analysis, interpretation, comparison, and evaluation of information played a key role in strengthening students' critical thinking abilities. Students were regularly prompted to justify their answers, provide reasoning for their choices, and consider multiple perspectives before reaching conclusions. This process not only

enhanced their ability to think independently but also supported the development of intellectual curiosity and reflective thinking habits. Furthermore, classroom discussions and guided questioning strategies helped students to articulate their reasoning more clearly and to critically examine both their own ideas and those of their peers.

In addition, collaborative learning activities such as group work, peer instruction, and project-based tasks significantly contributed to the development of social and communication competencies. Within these collaborative settings, students were required to share responsibilities, negotiate roles, listen actively to others, and collectively construct knowledge. This interaction fostered essential interpersonal skills, including empathy, respect for diverse viewpoints, conflict resolution, and effective oral communication. Moreover, working in heterogeneous groups exposed students to different learning styles and perspectives, thereby strengthening their ability to adapt and cooperate in diverse social contexts.

Creativity was another core competency that was notably enhanced through the implementation of UDL strategies. Students were given opportunities to express their understanding through a variety of formats, including visual presentations, written assignments, oral reports, and creative projects. This flexibility allowed them to select modes of expression that best aligned with their strengths and interests, thereby encouraging originality and innovative thinking. Tasks that involved designing projects, solving open-ended problems, or producing creative outputs enabled students to apply knowledge in non-traditional ways and to explore multiple possible solutions rather than relying on a single correct answer.

Overall, the integration of UDL principles created a dynamic learning environment that systematically nurtured 21st-century competencies by embedding them into everyday instructional practices rather than treating them as isolated learning outcomes. As a result, students not only acquired academic knowledge but also developed transferable skills that are crucial for lifelong learning, adaptability, and active participation in an increasingly complex and interconnected world.

Challenges in Implementation

Despite the clear benefits of the UDL approach, its implementation in the context of Albanian pre-university education is accompanied by a number of structural, pedagogical, and cultural challenges that directly affect its effectiveness and sustainability.

One of the most prominent challenges relates to teachers' workload and the limited time available for planning. The implementation of UDL requires a well-thought-out and structured approach, where each lesson must be designed by considering multiple alternatives for content representation, engagement methods, and assessment formats. In practice, this means that teachers must develop differentiated materials, anticipate diverse learning scenarios, and adapt activities to students' needs. Under current conditions in the Albanian education system—where teachers often face heavy schedules and numerous administrative obligations—this additional demand for time and effort becomes a significant barrier to the systematic implementation of UDL.

Another important challenge concerns class size and heterogeneity. In many schools, classrooms are overcrowded, with student numbers often exceeding recommended pedagogical standards. Under such conditions, it becomes difficult for teachers to monitor each student's progress individually and provide differentiated support. Although UDL aims precisely to address such diversity, its effective implementation requires conditions that allow for flexibility and continuous interaction, which are not always present in Albanian classrooms.

Technological infrastructure and access to instructional resources also remain problematic. One of the pillars of UDL is the use of diverse tools and resources to present information in multiple formats. However, in many educational institutions in Albania, the lack of technological equipment—such as projectors, computers, or stable internet access—significantly limits the ability to implement these strategies. Even when such tools are available, their maintenance and effective use are often insufficient, reducing their potential to support inclusive teaching practices.

Another critical challenge relates to teachers' professional preparation. In many cases, initial teacher training and ongoing professional development do not adequately address UDL concepts and practices. As a result, teachers may have limited knowledge of this approach or perceive it as an additional

requirement rather than as a tool that facilitates the learning process. The lack of structured and continuous training affects teachers' confidence in experimenting with new methods and modifying their traditional practices.

At the same time, the cultural and institutional dimension of these challenges should also be emphasized. The Albanian education system often remains oriented toward standardized assessment and focuses heavily on test results, leaving less space for creative and flexible learning processes. This creates a tension between the philosophy of UDL—which promotes diversity in learning and assessment—and existing practices that favor uniformity. Furthermore, the lack of consistent institutional support and clear policies for implementing inclusive approaches makes it more difficult to integrate UDL systematically. Another aspect that deserves attention is resistance to change. Some teachers, particularly those with long experience in the system, may feel more comfortable using traditional methods and may hesitate to adopt new pedagogical approaches. This phenomenon is not necessarily due to unwillingness but often to a lack of support, professional security, and time for reflection and development.

In summary, the implementation of UDL in the Albanian education system requires not only changes at the level of classroom practice but also broader systemic interventions. To overcome these challenges, it is necessary to invest in teacher training, improve infrastructure, and develop policies that support a more flexible and inclusive approach to education. Only in this way can UDL be effectively implemented and contribute meaningfully to improving the quality of education.

Discussion in Relation to the Literature

The findings of this study are fully consistent with international literature, which emphasizes the effectiveness of UDL in promoting inclusion, motivation, and academic success (Mayer A., Rose D., Gordon D., 2014). Numerous studies have demonstrated that a flexible, learner-centered approach contributes to the creation of a more equitable and effective learning environment.

This alignment between empirical findings and theoretical literature suggests that UDL is a sustainable and applicable approach across different educational contexts. It represents not merely a theoretical model but a practical framework capable of transforming teaching and learning processes in the classroom.

Conclusions

This study clearly demonstrates that the implementation of the Universal Design for Learning (UDL) approach in the teaching process represents an important step toward building a more inclusive, flexible, and effective educational system. The findings indicate that integrating UDL principles has a positive impact not only on students' active participation but also on their motivation and academic performance. By offering multiple opportunities for knowledge acquisition, engagement, and expression, this approach creates conditions in which each student can develop according to their individual potential and pace. More specifically, the study confirms that the pedagogical flexibility provided by UDL helps reduce traditional barriers to learning, which are often associated with uniform teaching methods. Multiple representations of information, diverse engagement opportunities, and alternative forms of assessment contribute to the creation of a more equitable and balanced learning environment, where student diversity is viewed not as a barrier but as a source of enrichment for the learning process. In this regard, UDL does not merely represent a teaching method but a paradigm shift in education, moving the focus from teaching to learning.

Another important contribution of this study relates to the role of UDL in developing 21st-century competencies. Through activities that foster collaboration, critical thinking, and creativity, students not only acquire knowledge but also develop essential life skills necessary for integration into a dynamic and continuously evolving society. This makes UDL a suitable approach not only for improving academic outcomes but also for shaping capable and responsible individuals.

However, the study also highlights that the successful implementation of UDL is not a simple process and requires the fulfillment of several essential conditions. Institutional support, improved infrastructure, and, above all, teachers' professional preparation are key elements for the effective integration of this approach into daily teaching practice. Without continuous training and clear guidance from educational policies,

there is a risk that UDL will remain at a theoretical level and will not be fully implemented in the classroom.

In this regard, it is recommended that educational institutions and policy-making bodies take concrete steps to promote and support UDL. This includes integrating the approach into initial teacher education programs, organizing continuous professional development training, and ensuring the availability of the necessary resources and tools for its implementation. It is also important to foster a school culture that supports pedagogical innovation and encourages teachers to experiment with new methods.

In conclusion, this study contributes to the enrichment of the literature on UDL by providing empirical evidence from the context of pre-university education and by highlighting the potential of this approach to improve the quality of education. However, to gain a deeper understanding of its impact, further studies are needed, including quantitative methods and longitudinal analyses. Such studies can help more accurately measure the effects of UDL on academic achievement and student development, as well as identify the most effective practices for its implementation across diverse educational contexts.

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Appendix 1: Observation Protocol for Implementing UDL in the Classroom

Nr.	Indicator	1	2	3	4
1	Diversity of ways of presenting content (The teacher uses different forms: verbal explanation, visual, practical examples, etc.)				
2	Active involvement of students in the lesson (Students participate in discussions, activities, responses)				
3	Adapting teaching to student needs (Differentiation by level, pace, learning style)				
4	Students' use of different methods of expression (Students express themselves through writing, speaking, group work, etc.)				
5	Student motivation and engagement (Students show interest, involvement, and attention during class)				
6	Use of supporting materials and resources (Teaching aids, technology, visual materials, etc. are used)				
7	Teacher responsiveness to student needs and difficulties (Teacher provides timely assistance, guidance, and feedback)				
	Average				

Appendix 2: Semi-Structured Interview Protocol (Teachers)

Goal: To understand experiences, challenges, and perceptions on UDL implementation.

Basic information

Subject: _____
Years of experience: _____
Grade: _____

Key Questions

How would you describe your experience implementing UDL in the classroom?
Which UDL strategies do you use most often?
How have students responded to these methods?
What changes have you noticed in student engagement and performance?
What are the main challenges you have encountered while implementing UDL?
How do you adapt strategies based on students' needs?
What support do you think you need to better implement UDL?

Appendix 3: Teacher Reflective Journal Template

Frequency: After every lesson / several lessons

Journal Structure

Date: _____

Lesson Topic: _____

What UDL strategies did I use today?

What worked well?

What difficulties were encountered?

How did the students react?

How did I adapt the lesson to the needs of the students?

What would I improve in future lessons?

Appendix 4: Protocol for the Analysis of Student Products

Nr.	Indicator	1	2	3	4
1	Understanding of content				
2	Application of knowledge in practice				
3	Creativity and originality				
4	Clarity of presentation (oral/written)				
5	Student effort and engagement				
6	Use of different modes of expression				
	Average				

THE ROLE OF SOCIALIZATION, TECHNOLOGY, AND INNOVATIVE METHODS IN THE INCLUSION OF STUDENTS WITH LANGUAGE DIFFICULTIES IN CONTEMPORARY EDUCATION

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Abstract:

Introduction: The inclusion of students with language difficulties represents a significant challenge in contemporary education, as these difficulties directly affect communication, social interaction, and active participation in the classroom. Language barriers may lead to social isolation, reduced self-confidence, and limited academic engagement. Socialization is a key factor in supporting students' overall development, as it facilitates interaction, emotional growth, and learning. In this context, the integration of technology and innovative teaching methods has emerged as a promising approach to enhance inclusive practices and support diverse learners.

Methods: This study adopts a qualitative research approach based on a systematic review and critical analysis of contemporary scientific literature. The research examines peer-reviewed articles, educational studies, and reports focusing on socialization processes, communication development, inclusive pedagogy, and the use of assistive technologies for students with language difficulties. The selected literature was analyzed to identify effective strategies and best practices that promote inclusion in modern educational settings.

Results: The findings reveal that the development of communication and social skills plays a crucial role in the successful inclusion of students with language difficulties. Structured interventions that promote interaction and participation significantly improve students' engagement and learning outcomes.

Additionally, the use of assistive technologies, such as augmentative and alternative communication (AAC) tools, text-to-speech systems, and digital learning platforms, enhances accessibility, motivation, and classroom interaction. Innovative teaching methods, including student-centered and interactive approaches, further contribute to the creation of inclusive learning environments.

Discussion: The study highlights that the combined implementation of socialization strategies, communication-focused interventions, and technology-based tools provides an effective framework for inclusive education. These approaches not only support academic achievement but also foster social integration and emotional well-being. However, their effectiveness depends on teacher training, institutional support, and access to technological resources. Therefore, adopting a holistic and well-structured approach is essential to ensure equal opportunities and meaningful participation for all students.

Keywords:

inclusive education, language difficulties, socialization, assistive technology, innovative teaching methods.

Introduction

Inclusive education has become a central principle of contemporary educational systems, aiming to ensure equal opportunities and active participation for all students, regardless of their abilities, backgrounds, or learning difficulties (UNESCO, 2020). In recent decades, there has been a growing emphasis on creating learning environments that are accessible, flexible, and responsive to the diverse needs of students. This shift reflects not only educational priorities but also broader social values related to equity, diversity, and human rights.

Among the groups that require particular attention in inclusive settings are students with language difficulties. These difficulties may manifest in various forms, including challenges in expressive and receptive language, limited vocabulary, difficulties in understanding instructions, and reduced ability to engage in verbal communication. Such barriers directly affect students' academic performance, social interaction, and overall participation in the classroom (Heward, 2013). As a result, students with language difficulties are often at a higher risk of experiencing social isolation, low self-esteem, and reduced motivation to learn.

Language plays a fundamental role in the learning process, as it serves as the primary medium through which knowledge is transmitted and constructed. Therefore, difficulties in language development can have a cascading effect on other areas of learning, including reading comprehension, writing skills, and problem-solving abilities. In this context, addressing language difficulties is not only a matter of improving communication but also a key step toward ensuring meaningful inclusion and equal access to education.

A crucial factor in supporting students with language difficulties is socialization. Social interaction provides opportunities for students to practice communication skills, build relationships, and develop a sense of belonging within the classroom environment. According to socio-cultural theories of learning, particularly those of Vygotsky (1978), cognitive and language development are deeply rooted in social interaction. Through collaborative activities, peer engagement, and guided participation, students can gradually improve their communication abilities and become more confident in expressing themselves. Therefore, promoting socialization is essential for both academic and socio-emotional development.

In addition to socialization, the rapid advancement of technology has significantly transformed educational practices. The integration of digital tools and assistive technologies has opened new possibilities for supporting students with diverse learning needs, including those with language difficulties. Technologies such as augmentative and alternative communication (AAC) systems, text-to-speech applications, interactive learning platforms, and multimedia resources provide alternative ways for students to access information and express their ideas (Brodin & Lindstrand, 2003). These tools can enhance engagement, facilitate understanding, and support individualized learning experiences. However, the use of technology in education is not without challenges. While it offers numerous benefits, it also requires careful implementation to ensure that it supports, rather than replaces, meaningful human interaction. Excessive reliance on digital tools may reduce opportunities for face-to-face communication and social engagement, which are essential for language development. Therefore, it is important to adopt a balanced approach that integrates technology with interactive and collaborative teaching practices. Another important dimension of inclusive education is the use of innovative teaching methods. Traditional teacher-centered approaches are often insufficient to meet the needs of diverse learners. In contrast, student-centered methodologies, such as differentiated instruction, cooperative learning, and experiential learning, allow teachers to adapt their strategies to the individual needs and abilities of students. These approaches encourage active participation, critical thinking, and collaboration, creating a more inclusive and supportive learning environment. Furthermore, physical activity and adapted physical education can play a significant role in promoting inclusion. Through structured physical activities, students have the opportunity to interact, cooperate, and communicate in non-verbal and semi-verbal ways. Movement-based activities can reduce communication barriers, foster social interaction, and contribute to the overall well-being of students. In this sense, sport and physical education are not only beneficial for physical health but also serve as important tools for social integration and inclusion. Despite the growing recognition of inclusive education, several challenges remain. These include limited teacher training in inclusive practices, insufficient access to technological resources, and a lack of coordinated support systems within educational institutions. Addressing these challenges requires a comprehensive and interdisciplinary approach that combines educational, psychological, and technological perspectives. In light of these considerations, the present study aims to explore the role of socialization, technology, and innovative teaching methods in promoting the inclusion of students with language difficulties in contemporary education. By analyzing relevant literature and identifying effective strategies, the study seeks to contribute to a better understanding of inclusive practices and to provide practical insights for educators and policymakers.

Materials and Methods

This study adopts a qualitative research approach, based on a systematic review and critical analysis of contemporary scientific literature related to inclusive education, language difficulties, socialization, and the integration of technology and innovative teaching methods. The qualitative design was considered the most appropriate for this research, as it allows for an in-depth exploration of existing knowledge, theoretical perspectives, and practical approaches within the field. The research process was conducted through several structured stages, including the identification, selection, analysis, and synthesis of relevant academic sources. A comprehensive literature search was carried out using various academic databases and digital libraries, including Google Scholar, ERIC (Education Resources Information Center), and other educational and scientific repositories. These sources were selected due to their credibility and relevance in the field of education and special education. To ensure the relevance and quality of the selected literature, specific inclusion criteria were established. The study focused primarily on peer-reviewed journal articles, academic books, conference papers, and official reports published in the field of education and inclusive practices. Particular emphasis was placed on sources that addressed one or more of the following themes: language difficulties in educational contexts, socialization and communication development, the use of assistive technologies, and innovative

teaching methodologies. In addition, priority was given to relatively recent publications in order to reflect contemporary perspectives and current developments in the field.

At the same time, exclusion criteria were applied to eliminate sources that were not directly relevant to the research objectives. Studies that did not focus on educational settings, that lacked scientific rigor, or that did not address inclusion or language-related challenges were excluded from the analysis. This selection process ensured that the final body of literature was both relevant and academically reliable. The data collection process involved gathering and organizing the selected sources according to key thematic areas. Each source was carefully reviewed to identify its main contributions, theoretical frameworks, and empirical findings. The information extracted from the literature was then categorized into core themes, including socialization processes, communication development, technological support, and pedagogical strategies for inclusion.

For the purpose of data analysis, a thematic analysis approach was employed. This method involves identifying, analyzing, and interpreting patterns and themes within qualitative data. Through this process, recurring concepts and relationships between different variables were identified and examined. The thematic analysis allowed for a deeper understanding of how socialization, technology, and innovative methods interact to support the inclusion of students with language difficulties.

Furthermore, a comparative analysis was conducted to examine similarities and differences among the selected studies. This approach made it possible to identify consistent findings, as well as variations in perspectives and practices across different educational contexts. By comparing multiple sources, the study was able to highlight best practices and effective strategies that contribute to inclusive education.

To enhance the validity and reliability of the study, particular attention was given to the credibility of the selected sources and the consistency of the analysis. The use of multiple sources and perspectives helped to reduce bias and provided a more comprehensive understanding of the topic. In addition, the findings were interpreted in relation to established theoretical frameworks in the field of education and social development.

It is important to note that, as a literature-based study, this research does not involve direct data collection from participants such as students or teachers. Instead, it relies on existing research and documented evidence. While this approach allows for a broad and comprehensive overview of the topic, it may also present certain limitations, particularly in terms of the lack of direct empirical data from specific educational contexts.

Despite these limitations, the chosen methodology provides a solid foundation for analyzing the role of socialization, technology, and innovative teaching methods in inclusive education. By synthesizing a wide range of academic sources, the study offers valuable insights into effective strategies and practices that can support students with language difficulties in contemporary educational settings.

Results and Discussion

Main Findings and Discussion

The analysis of the selected studies reveals several significant findings regarding the inclusion of students with language difficulties in contemporary education. These findings highlight the complex and interconnected roles of socialization, technology, and innovative teaching methods in creating inclusive and effective learning environments.

Firstly, the findings emphasize the fundamental role of socialization in supporting both language development and overall student inclusion. Students with language difficulties often experience challenges in expressing themselves and understanding others, which can limit their participation in classroom activities. However, the reviewed literature consistently shows that structured opportunities for social interaction—such as group work, peer collaboration, and cooperative learning—significantly enhance communication skills and social engagement. Through these interactions, students are able to practice language in meaningful contexts, gradually improving their ability to communicate and participate.

From a theoretical perspective, this finding aligns with the socio-cultural approach to learning, which highlights the importance of social interaction in cognitive and language development (Vygotsky, 1978).

In inclusive classrooms, the presence of supportive peers and collaborative activities creates a dynamic environment where students learn not only from teachers but also from each other. This process contributes to the development of both linguistic competence and social confidence, which are essential for successful inclusion.

Moreover, socialization plays a crucial role in promoting students' emotional well-being. Students with language difficulties often face frustration, anxiety, and low self-esteem due to their communication barriers. Positive social interactions can help reduce these negative experiences by fostering a sense of belonging and acceptance within the classroom. Therefore, socialization should not be viewed solely as a complementary element but as a core component of inclusive education.

Secondly, the analysis highlights the increasing importance of technology as a supportive tool in inclusive education. The integration of digital resources and assistive technologies provides alternative pathways for communication and learning. Tools such as augmentative and alternative communication (AAC) systems, speech-generating devices, text-to-speech applications, and interactive digital platforms enable students with language difficulties to access information and express themselves more effectively (Beukelman & Light, 2020; Light & McNaughton, 2012).

The findings indicate that technology enhances student engagement by providing multimodal learning experiences that combine visual, auditory, and interactive elements. This is particularly beneficial for students with language difficulties, as it reduces reliance on verbal communication and allows them to process information through multiple channels. Furthermore, technology supports individualized learning by enabling teachers to adapt content and pace according to each student's needs.

However, the use of technology also presents certain challenges. While digital tools can facilitate learning, their effectiveness depends largely on how they are implemented. In some cases, excessive or unstructured use of technology may lead to reduced face-to-face interaction, which is essential for developing communication and social skills. Therefore, it is important to adopt a balanced approach that integrates technology with direct interaction and collaborative activities (Brodin & Lindstrand, 2003). Another key finding relates to the role of innovative teaching methods in promoting inclusion. Traditional teaching approaches, which often rely on lecture-based instruction and standardized assessment, may not adequately address the diverse needs of students with language difficulties. In contrast, innovative methodologies—such as differentiated instruction, cooperative learning, and student-centered approaches—offer greater flexibility and adaptability.

The literature suggests that differentiated instruction allows teachers to modify content, process, and assessment according to individual student needs, thereby promoting equal participation. Cooperative learning, on the other hand, encourages interaction and shared responsibility among students, creating opportunities for peer support and communication. Student-centered approaches further enhance engagement by actively involving students in the learning process, allowing them to take ownership of their learning.

The findings show that when these innovative methods are applied, students with language difficulties demonstrate improved academic performance, increased motivation, and greater self-confidence (Heward, 2013). This indicates that inclusive education is not only about providing access but also about creating meaningful and engaging learning experiences.

In addition to these factors, the analysis highlights the critical role of teacher preparedness and attitudes. Teachers are central to the successful implementation of inclusive practices, as they are responsible for designing and facilitating the learning environment. The literature emphasizes that teachers who are trained in inclusive education and who adopt flexible, supportive, and empathetic approaches are more effective in addressing the needs of diverse learners (UNESCO, 2020).

Teacher attitudes toward inclusion also play a significant role. Positive attitudes contribute to the creation of a welcoming and supportive classroom climate, while negative or unprepared attitudes may hinder the inclusion process. Therefore, continuous professional development and training are essential to equip teachers with the knowledge and skills required for inclusive teaching.

Despite the positive findings, the analysis also identifies several challenges and limitations in the implementation of inclusive practices. One major challenge is the lack of adequate resources, including access to technology, specialized materials, and support services. In many educational contexts, schools may not have the necessary infrastructure to effectively support students with language difficulties. Another challenge relates to insufficient teacher training. Many educators may not feel adequately prepared to implement inclusive strategies or to use assistive technologies effectively. This can limit the impact of otherwise beneficial approaches and create barriers to inclusion. Furthermore, there is often a lack of collaboration between different stakeholders, including teachers, specialists, parents, and policymakers. Inclusive education requires a coordinated and interdisciplinary approach, and the absence of such collaboration can reduce its effectiveness. Overall, the findings suggest that the successful inclusion of students with language difficulties depends on the combined and balanced integration of socialization, technology, and innovative teaching methods. These elements are not independent but interconnected, each reinforcing the others in creating an inclusive learning environment.

From an educational perspective, these results have important implications. Schools and educational systems should prioritize the development of inclusive policies, invest in teacher training, and ensure access to technological resources. Additionally, promoting collaborative learning environments and encouraging active student participation are essential for fostering inclusion. In conclusion, the analysis demonstrates that inclusive education is a dynamic and multifaceted process that requires continuous adaptation and innovation. By integrating social, technological, and pedagogical approaches, educators can create learning environments that support the diverse needs of all students and promote equal opportunities for participation and success.

Challenges and Barriers to Inclusion

Despite the increasing emphasis on inclusive education and the recognized benefits of socialization, technology, and innovative teaching methods, the implementation of inclusive practices for students with language difficulties continues to face several significant challenges and barriers.

One of the primary challenges is the lack of adequate teacher training in inclusive education. Many teachers are not sufficiently prepared to address the diverse needs of students with language difficulties, particularly when it comes to adapting teaching strategies, managing inclusive classrooms, and effectively using assistive technologies. Although inclusive education is widely promoted at the policy level, there is often a gap between theory and practice, which can limit the effectiveness of inclusion efforts (UNESCO, 2020).

Another major barrier is the limited availability of resources, including technological tools, specialized materials, and support services. While assistive technologies have the potential to significantly enhance communication and learning, not all schools have access to these tools. In many cases, financial constraints, lack of infrastructure, and insufficient institutional support hinder the integration of technology into the classroom. As a result, students with language difficulties may not receive the support they need to fully participate in educational activities.

In addition, classroom size and diversity can present challenges for teachers attempting to implement inclusive practices. Large class sizes make it difficult to provide individualized attention and to adapt instruction to meet the needs of each student. This can be particularly problematic for students with language difficulties, who often require more personalized support and guidance.

Another important barrier relates to attitudinal factors. Negative attitudes, low expectations, or lack of awareness among teachers, peers, or even parents can affect the inclusion process. Students with language difficulties may be perceived as less capable, which can lead to reduced opportunities for participation and development. Creating a positive and inclusive school culture is therefore essential for overcoming these barriers.

Furthermore, while technology offers many advantages, it can also create new challenges if not used appropriately. Overreliance on digital tools may reduce opportunities for direct social interaction, which is

crucial for language development. Additionally, the lack of proper training in the use of technology may limit its effectiveness and create frustration for both teachers and students (Brodin & Lindstrand, 2003). Finally, the lack of collaboration among stakeholders represents another significant challenge. Effective inclusion requires cooperation between teachers, special education specialists, school administrators, parents, and policymakers. However, in many cases, this collaboration is limited or inconsistent, which can weaken the overall support system for students with language difficulties.

Addressing these challenges requires a comprehensive and coordinated approach that combines professional development, resource allocation, and the promotion of positive attitudes toward inclusion. Only by recognizing and actively addressing these barriers can educational systems move toward more effective and sustainable inclusive practices.

Implications for Practice and Policy

The findings of this study have important implications for both educational practice and policy, particularly in relation to improving the inclusion of students with language difficulties in contemporary education.

From a practical perspective, one of the most important implications is the need for teacher training and professional development. Educators should be equipped with the necessary knowledge and skills to implement inclusive teaching strategies, adapt instruction to diverse learners, and effectively use assistive technologies. Continuous training programs and workshops can help teachers stay updated with current practices and enhance their confidence in managing inclusive classrooms.

Another key implication is the importance of integrating technology in a purposeful and balanced way. Schools should invest in digital tools and assistive technologies that support communication and learning for students with language difficulties. However, technology should be used as a complementary tool rather than a substitute for human interaction. Combining digital resources with collaborative and interactive activities can create a more effective and inclusive learning environment.

The study also highlights the need to promote student-centered and innovative teaching methods. Approaches such as differentiated instruction, cooperative learning, and experiential learning should be widely adopted in classrooms. These methods allow for greater flexibility and enable teachers to address individual learning needs, thereby enhancing participation and academic success.

At the institutional level, schools should focus on creating inclusive learning environments that encourage participation, respect diversity, and support all students. This includes providing appropriate resources, fostering positive relationships among students, and promoting a culture of acceptance and inclusion. School leadership plays a crucial role in supporting these initiatives and ensuring that inclusive practices are effectively implemented.

From a policy perspective, there is a need for stronger educational policies that support inclusion. Policymakers should prioritize funding for inclusive education, including investment in teacher training, technological resources, and support services. Clear guidelines and frameworks should be established to ensure that inclusive practices are consistently applied across different educational settings.

In addition, policies should promote collaboration among stakeholders, including educators, specialists, families, and community organizations. A coordinated approach can enhance the effectiveness of inclusion strategies and provide a more comprehensive support system for students with language difficulties.

Finally, there is a need to emphasize the importance of monitoring and evaluation. Educational institutions should regularly assess the effectiveness of their inclusive practices and identify areas for improvement. This can be achieved through data collection, feedback from teachers and students, and ongoing research.

In conclusion, improving the inclusion of students with language difficulties requires a combined effort at both the practical and policy levels. By investing in teacher development, integrating technology effectively, adopting innovative teaching methods, and strengthening educational policies, it is possible to create more inclusive and equitable educational systems that support the success of all learners.

Conclusions

This study has explored the role of socialization, technology, and innovative teaching methods in promoting the inclusion of students with language difficulties in contemporary education. Based on the analysis of relevant literature, the findings confirm that inclusive education is a complex and dynamic process that requires the integration of multiple factors in order to be effective.

One of the key conclusions of this study is the fundamental importance of socialization in supporting students with language difficulties. Social interaction provides essential opportunities for communication practice, relationship building, and emotional development. Through collaborative learning environments, students are encouraged to participate actively, express themselves, and gradually improve their language skills. Therefore, socialization should be considered a central component of inclusive education rather than a supplementary element.

Another important conclusion relates to the role of technology as a powerful tool for inclusion. The use of assistive technologies and digital learning platforms offers alternative ways for students to access information and communicate their ideas. These tools not only enhance engagement and motivation but also support personalized learning experiences that address individual needs. However, the study also highlights that technology should be used in a balanced and purposeful way, ensuring that it complements rather than replaces direct human interaction.

In addition, the findings emphasize the effectiveness of innovative teaching methods in creating inclusive learning environments. Approaches such as differentiated instruction, cooperative learning, and student-centered teaching enable educators to adapt their strategies to diverse learners. These methods promote active participation, improve academic outcomes, and contribute to the development of students' confidence and independence. As a result, the shift from traditional teaching models to more flexible and inclusive approaches is essential in contemporary education.

A significant contribution of this study is the identification of the interconnected nature of socialization, technology, and pedagogy. The findings suggest that these elements should not be implemented in isolation but rather integrated into a holistic framework that supports both academic and socio-emotional development. This integrated approach enhances the overall effectiveness of inclusive practices and ensures that students with language difficulties are fully supported in their learning process.

Despite the positive outcomes identified in the literature, the study also recognizes several challenges that may limit the implementation of inclusive education. These include insufficient teacher training, limited access to technological resources, and a lack of coordinated support within educational institutions.

Addressing these challenges requires systemic changes, including investment in professional development, improved infrastructure, and stronger collaboration among educators, specialists, and policymakers.

From a practical perspective, the findings of this study have important implications for educational practice and policy. Schools should prioritize inclusive strategies that promote interaction, participation, and accessibility. Teachers should be supported through continuous training and provided with the necessary tools to implement innovative and inclusive teaching methods. Furthermore, educational policies should focus on ensuring equal opportunities for all students, regardless of their abilities or learning difficulties.

In terms of future research, there is a need for empirical studies that investigate the practical application of these approaches in real classroom settings. Research involving direct observation, data collection from students and teachers, and experimental interventions would provide deeper insights into the effectiveness of inclusive strategies. Additionally, further studies could explore the long-term impact of technology and socialization on students' academic and social development.

In conclusion, inclusive education represents not only an educational goal but also a social responsibility. Creating environments where all students feel valued, supported, and included requires continuous effort, innovation, and collaboration. By integrating socialization, technology, and innovative teaching methods, educational systems can move toward a more inclusive and equitable future, ensuring meaningful participation and success for every learner.

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PREVALENCE AND RISK FACTORS OF OVERUSE MUSCULOSKELETAL INJURIES AMONG GYM USERS IN TIRANA: A CROSS-SECTIONAL STUDY

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Abstract

Introduction: Injuries of the musculoskeletal system resulting from overuse are commonly encountered among individuals who regularly attend fitness centers. These conditions are often associated with excessive training intensity, insufficient recovery periods, and improper exercise execution. The present study aims to examine the prevalence of such injuries in gyms in Tirana, focusing on their determinants, contributing factors, and preventive approaches. **Materials and Methods:** A cross-sectional study design was applied through the use of a structured online questionnaire, distributed via Google Forms. Participants provided self-reported data regarding their training background, history of injuries, and level of awareness related to injury prevention strategies. **Results:** The study sample was mainly composed of male participants, with the majority belonging to the 20–30 age group. Most respondents reported a training experience ranging from one to five years. Increased training load emerged as the primary factor associated with injury occurrence. Although many participants indicated awareness of preventive exercises, a high prevalence of injuries was still observed. **Discussion:** The results underline the multifactorial etiology of overuse-related injuries, where factors such as training load, exercise technique, and recovery practices play a crucial role. Despite a relatively good level of awareness regarding prevention, inconsistencies in the practical implementation of these strategies remain evident. **Conclusions:** Overuse injuries constitute a notable issue among gym users in Tirana. Strengthening education on correct training techniques, appropriate load management, and adequate recovery is essential. The adoption of evidence-based preventive measures by both fitness professionals and individuals is necessary to minimize injury risk and support long-term musculoskeletal health. **Keywords:** Muscle Injuries, Sports Trauma, Gym, Rehabilitation, Prevention, Functional Overuse

Introduction

Fitness centers in Tirana are becoming increasingly popular among individuals across different age groups who aim to improve physical fitness, enhance muscular strength and endurance, and support overall well-being. One of the most frequently observed issues in fitness environments is functional overuse injury. This study aims to investigate the prevalence of overuse injuries in fitness centers in Tirana and to identify practical approaches for their prevention and management, with the goal of promoting safer training practices. In response to tissue injury, the immune system releases pro-

inflammatory cytokines, including tumor necrosis factor-alpha (TNF- α), interleukin-1 beta (IL-1 β), and interleukin-6 (IL-6), which play a key role in the inflammatory cascade (Andres & Murrell, 2008). Bone tissue also adapts to mechanical loading in accordance with Wolff's law (Frost, 2004). However, in overuse conditions, bone resorption may exceed bone formation, leading to the accumulation of microdamage. Over time, these microfractures may progress into stress fractures if mechanical stress persists (Wright et al., 2015). Repetitive motion and localized inflammation may also contribute to tissue hypertrophy and nerve compression syndromes such as carpal tunnel syndrome and thoracic outlet syndrome. Nerve compression can result in demyelination, reduced nerve conduction, and clinical symptoms including pain, paresthesia, and muscle weakness (Atroshi et al., 1999). Multiple intrinsic and extrinsic factors contribute to injury risk. These include abrupt increases in training load or intensity (Soligard et al., 2016), biomechanical inefficiencies, inappropriate equipment use, and individual characteristics such as age, sex, and fitness level (DiFiori et al., 2014). Additionally, training experience, load progression patterns, and exposure duration are important determinants of injury susceptibility. Overuse injuries are widely recognized in both structured sports and recreational physical activity. They typically develop gradually due to repetitive submaximal stress rather than a single traumatic event, and they can significantly impair athletic performance and participation. A systematic review and meta-analysis conducted by Franco et al. (2021) including 17 studies and 24,704 participants reported prevalence rates of 42.0% in individual sports and 33.0% in team sports. These findings suggest that athletes engaged in individual sports may be at higher risk of overuse injuries, potentially due to greater training volume, early specialization, and reduced recovery opportunities. The most commonly affected anatomical regions include the knee (particularly in volleyball and cycling), the shoulder (frequently in handball), and the lower back (commonly reported in floorball and gym-based training activities).

Materials and methods

In recent years, increased awareness of the importance of maintaining a healthy lifestyle has been accompanied by a substantial rise in gym attendance, positioning fitness centers as one of the dominant forms of structured physical activity in urban populations. This shift reflects a broader global trend toward preventive health behaviors, body composition improvement, and enhanced physical performance. Within this context, the present study aims to assess patterns of gym participation and to examine the distribution of musculoskeletal and other physical activity-related injuries through the application of a structured questionnaire. To achieve these objectives, a cross-sectional methodological approach was adopted, based on primary data collection through a structured questionnaire developed using Google Forms. The collected data were analyzed to identify prevailing patterns and to draw conclusions regarding the prevalence, distribution, and risk factors associated with functional overuse injuries in fitness centers in Tirana. Statistical analysis was applied to ensure systematic processing of data and to support evidence-based interpretation of findings. The questionnaire focused on the following domains:

- duration of engagement in structured physical activity,
- weekly frequency of gym attendance,
- personal history of training-related injuries,
- use of injury prevention strategies or training programs, and
- perceived effectiveness of self-implemented protective measures.

Results

To gain a clearer understanding of this phenomenon, a questionnaire-based study was conducted across 10 different fitness centers in the city of Tirana, selected to represent various urban areas. A total of 71 individuals participated in the study, of whom 29.6% were female and 70.4% were male. Participants were aged between 20 and 50 years.

Demographic Profile of Participants

The predominant age group among participants was 20–30 years, representing 80% of the sample. Participants aged 30–40 years accounted for 17.1%, while those aged 40–50 years constituted 2.9% in figure 2.

These findings indicate that gym-based physical activity is primarily concentrated among younger individuals, particularly those in the most active phase of adulthood.

To assess the nature and distribution of injuries in training environments, responses from 71 individuals attending fitness centers in Tirana were analyzed. The participants represented a wide range of ages and training experience, making the study relevant for understanding exercise patterns and injury risk within a diverse urban population.

Experience with Physical Activity

Approximately 54.3% of participants reported engaging in regular physical activity for a period of 1–5 years, indicating a moderate level of experience.

Only 10% reported more than 15 years of training experience, suggesting a relatively small proportion of individuals with long-term involvement in structured physical activity.

Gym Attendance Frequency

The most common training frequency was 2–3 sessions per week, reported by 49.2% of respondents.

In contrast, 36.1% of participants reported attending the gym 4–5 times per week, while 14.8% reported engaging in physical activity 6–7 days per week.

These findings indicate a moderate to high level of training engagement, which may increase the risk of physical overload in the absence of appropriate training planning and recovery strategies.

The findings indicated that a considerable proportion of participants had experienced some form of injury, highlighting the need for more structured approaches to prevention and functional recovery.

Most Common Types of Injuries

Among respondents, the most frequently reported injury was overuse (48.5%), followed by shoulder injuries (32.4%) and knee injuries (19.1%). Additional reported conditions included muscle strains (11.8%), spinal injuries (10.3%), and ankle injuries (2.9%).

When asked whether they had ever experienced injuries during gym training, 58.5% of participants reported overuse-related injuries. Lower proportions were reported for spinal injuries (7.7%) and ankle injuries (4.6%).

Knowledge and Use of Preventive Measures

A considerable proportion of participants (67.2%) reported being familiar with injury prevention training programs.

Among participants who reported awareness of injury prevention programs, the injuries they most frequently attempted to avoid were overuse injuries (49.2%), shoulder injuries (29.5%), and knee injuries (26.2%).

Participants who reported using injury prevention strategies:

77.6% performed general warm-up exercises,

25.4% included specific mobility exercises,

26.9% incorporated flexibility exercises, and

10.4% followed structured training protocols.

These findings indicate that while basic preventive practices such as warm-up routines are widely adopted, more advanced and structured prevention protocols remain limited in use.

Evaluation of Preventive Measures Effectiveness

When asked to evaluate the effectiveness of the preventive measures they apply, 43.5% of participants rated them as highly effective, while 47.8% considered them moderately effective. Only a small proportion (10.1%) perceived them as minimally effective, and none of the respondents reported them as completely ineffective.

Overall, the results show that overuse injuries represent the most common type of injury, reported by 48.5% of participants, followed by shoulder and knee injuries. More than half of the respondents had experienced training-related injuries, particularly of an overuse nature. In addition, a considerable

proportion of participants (67.2%) reported being aware of injury prevention programs, with general warm-up exercises identified as the most commonly used preventive measure.

Discussion

This study evaluated the prevalence and associated risk factors of musculoskeletal overuse injuries among gym users in Tirana. The findings indicate a relatively high burden of training-related injuries, suggesting that unstructured exercise routines and insufficient professional supervision remain key challenges within recreational fitness environments. These results are consistent with previous research indicating that high-intensity physical activity performed without appropriate progression and load regulation significantly increases injury risk (Bahr, 2009; Gabbett, 2016). A central finding of this study was the role of training frequency and inadequate recovery. Participants reporting higher weekly training volumes demonstrated a greater likelihood of musculoskeletal symptoms, particularly in load-bearing regions such as the lumbar spine and shoulder complex. Regarding injury distribution, the most commonly affected anatomical regions were the lower back, shoulders, and knees. Another important factor identified in this study was the absence of adequate warm-up and stretching practices. Furthermore, dynamic warm-up strategies have been shown to be more effective than static stretching alone in preparing the body for high-intensity resistance exercise. From a preventive perspective, injury risk cannot be attributed to a single cause but rather to the interaction between training load, technique quality, recovery strategies, and supervision level.

Conclusion

Regular engagement in resistance training and gym-based exercise is well established as an effective strategy for improving physical fitness, metabolic health, and psychological well-being. However, the present findings reinforce that training-related musculoskeletal injuries remain a persistent issue within recreational fitness populations. Consequently, injury prevention should be conceptualized not as an isolated intervention following symptom onset, but as an integral component of long-term training prescription and load management strategies. This includes the systematic integration of neuromuscular warm-up protocols, which enhance joint readiness and improve movement efficiency, as well as appropriately designed cool-down strategies to facilitate recovery processes. Furthermore, the prioritization of technical proficiency over absolute training load remains a critical determinant in reducing excessive mechanical strain on vulnerable anatomical structures. Nutritional optimization may further support musculoskeletal repair processes by ensuring sufficient availability of macronutrients and micronutrients required for tissue regeneration. Equally important is the early recognition of pain as a potential indicator of maladaptation rather than a normal component of training progression. Continued exposure to training stimuli in the presence of persistent symptoms may exacerbate underlying pathology and prolong recovery time. Where clinically indicated, the incorporation of rehabilitation-based interventions such as physiotherapy, manual therapy, and other adjunct modalities may facilitate functional restoration and reduce recurrence risk.

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THE IMPACT OF PHYSICAL ACTIVITY ON MOTOR DEVELOPMENT AND SOCIAL SKILLS IN CHILDREN WITH SPECIAL NEEDS.

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Abstract

Introduction Physical activity plays a crucial role in the overall development of children, particularly those with special needs, who often experience difficulties in motor and social functioning. Previous research has shown that participation in structured physical activity can positively influence gross and fine motor skills, enhance social interaction, and improve self-confidence. The aim of this study is to examine the impact of physical activity on motor development and social skills in children with special needs.

Methods This study is based on a narrative literature review and analysis of existing empirical studies and meta-analyses related to physical activity interventions in children with neurodevelopmental disorders. The reviewed literature includes experimental, observational, and intervention-based studies focusing on school-aged children with special needs. Data were synthesized using descriptive and comparative analysis in order to identify common findings regarding effectiveness of physical activity in improving motor performance and social functioning. Key sources included meta-analyses and clinical intervention frameworks from peer-reviewed journals in pediatrics, physiotherapy, and developmental psychology.

Results The reviewed studies consistently demonstrate that physical activity interventions lead to significant improvements in motor coordination, balance, and overall physical performance in children with developmental disorders. Additionally, positive effects were observed in social functioning, including increased peer interaction, communication skills, and participation in group activities. Evidence from meta-analyses suggests that structured and adapted physical activity programs are particularly effective in enhancing both motor and social outcomes compared to unstructured activities or minimal intervention.

Discussion/Conclusions Findings indicate that physical activity is a valuable non-pharmacological intervention for supporting the developmental needs of children with special needs. Its benefits extend beyond physical improvement, contributing significantly to social inclusion and emotional well-being. The integration of adapted physical activity programs in educational and therapeutic settings is recommended to maximize development outcomes and improve quality of life in this population. Further empirical research with standardized measurement tools is needed to strengthen evidence in this field.

Keywords Physical activity, special needs children, motor development, social skills, neurodevelopmental disorders.

Keywords: Physical activity, special needs children, motor development, social neurodevelopmental disorders.

Introduction

Development of motor function is important for skill acquisition, and enabling children to participate fully in school and leisure activities. (Kolehmainen N et al, 2011) It is also important for establishing lifelong, physical activity patterns for healthy development into adulthood. (Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, 2015) Gross motor skills use large muscle groups for coordinated body movements such as walking, running, jumping and the maintenance of balance. They are fundamental to childhood development as they underpin functional activities, play and social interaction and in older aged children support complex movement skills required for sport and fitness. (Fundamental Movement Skills. ACT Government, *Health. Kids at Play*) School age studies show that gross motor skills are integral to social, recreational and academic participation and have been linked to healthy self-esteem (Roberts G et al, 2011) and cognitive development. (Piek JP et al, 2008) Intervention strategies for children with gross motor disorders need to address specific skill deficits as well as provide opportunities for regular fun physical activity. The latter may be vital to establishing long term healthy fitness habits for adulthood. (Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, 2015) Interventions may be described as traditional: a combination of a variety of sensory integrative, gross motor, fine motor and perceptual-motor activities; (Polatajko HJ et al, 1995) *process-orientated*: specifically designed kinaesthetic tasks; or *task-orientated strategies*: practicing real life activities with the intention of acquiring skill. (Blank R, et al, 2012). Importantly, clinicians should base treatment decisions on

evidence, using interventions most likely to produce the greatest improvement in motor outcomes. Whilst several theoretical models of motor learning influence treatment design (Larin HM, 2006), researchers are now seeking how best to optimize motor learning and harness the continuous spontaneous plasticity of the brain in early childhood through specific therapy content (Morgan C, et al, 2013).

Recent evidence emphasizes that early intervention through physical activity-based programs plays a critical role in enhancing neurodevelopmental outcomes in children with developmental disorders. Structured movement-based interventions have been shown to stimulate neuroplasticity, improve motor planning, and facilitate adaptive behavioral responses in early childhood. In addition, participation in physical activity within inclusive educational settings contributes to improved peer relationships, communication skills, and emotional regulation, thereby supporting overall social integration. Studies also highlight that children with motor difficulties often experience reduced participation in physical and social activities, which may further limit their developmental opportunities if not addressed through targeted interventions. Therefore, integrating adapted physical activity programs into both educational and

therapeutic contexts is essential for promoting holistic child development and long-term functional independence (*Atun-Einy et al., 2013*).

Objective of the Study

The main objective of this study is to examine the impact of physical activity on motor development and social skills in children with special needs. The study aims to analyze how structured and adapted physical activity programs contribute to improvements in gross and fine motor skills, balance, coordination, communication abilities, and social interaction. Furthermore, the study seeks to explore the effectiveness of physical activity as a non-pharmacological intervention that promotes social inclusion, emotional well-being, and functional independence in children with neurodevelopmental disorders and other developmental difficulties.

Materials and methods

This study is based on a narrative literature review and analysis of existing empirical studies and meta-analyses related to physical activity interventions in children with special needs. The reviewed literature includes experimental, observational, and intervention-based studies focusing on school-aged children with special needs. Data were synthesized using descriptive and comparative analysis in order to identify common findings regarding effectiveness of physical activity in improving motor performance and social functioning. Key sources included meta-analyses and clinical intervention frameworks from peer-reviewed journals in pediatrics, physiotherapy, and developmental psychology.

In order to ensure the scientific reliability and comprehensiveness of the study, literature was collected from various international academic databases and scientific sources. Relevant articles, systematic reviews, and meta-analyses were identified through databases such as PubMed, Google Scholar, ScienceDirect, SpringerLink, and ResearchGate. Additional information was obtained from international public health and educational organizations, including the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO). The selected literature focused on physical activity interventions, motor development, and social functioning in children with special needs, with emphasis on peer-reviewed and evidence-based publications.

To ensure methodological rigor, specific inclusion and exclusion criteria were applied during the selection of studies. Only peer-reviewed articles published in English between 2005 and 2025 were included. The selected studies focused on children aged 3–18 years with special educational needs. The data extraction process involved identifying key variables such as type of physical activity intervention, duration, participant characteristics, and reported outcomes related to motor and social development. Special attention was given to studies employing randomized controlled trials and systematic review methodologies to ensure higher scientific validity.

Although this study is a narrative literature review, a qualitative assessment of study quality was performed, prioritizing high-level evidence such as meta-analyses to strengthen the reliability of the synthesized findings.

Results and discussion

Evidence from international literature clearly demonstrates the positive impact of physical activity on motor and social development in children with special needs.

Children's cognitive (e.g., executive functions) and academic skills (e.g., early numeracy and literacy skills) start to develop during the early years, which provide important grounds for later development (*Lam, S, et al, 2018*)

Early childhood education provides a valuable environment for the implementation of effective interventions to support the learning of children with special needs and thereby minimize or prevent the impact of learning difficulties, disabilities, or at-risk conditions on children's development and future capabilities (*Burger, K, 2010*).

Fundamental motor skills (FMS, i.e., balance, and manipulative and locomotor movement skills) and physical activity (PA; i.e., bodily movements that increase energy expenditure) have been found to be related to cognitive and academic skills in children (*Hillman, C.H, et al, 2017*)

A study by *Kolehmainen et al. (2011)* highlights that structured physical activity interventions significantly increase participation in play and improve functional motor skills in children with motor impairments, while also enhancing social participation in daily activities.

Similarly, the *Centers for Disease Control and Prevention (CDC, 2015)* report shows that regular school-based physical activity programs contribute to improvements in coordination and balance skills, as well as the development of lifelong physical activity habits that positively influence long-term health outcomes.

Roberts et al. (2011), in a study of 8-year-old children with developmental coordination difficulties, found that improved motor skills are strongly associated with higher self-esteem and increased social participation, emphasizing the importance of early intervention.

A meta-analysis by *Morgan et al. (2013)* demonstrated that enriched environments involving structured physical activity lead to significant improvements in motor outcomes in children with neurodevelopmental disorders compared to non-intervention groups.

According to *Blank et al. (2012)*, task-oriented interventions are more effective than traditional approaches, improving both motor performance and functional participation in daily life activities. Overall, the reviewed literature consistently shows that physical activity has a significant positive effect on gross and fine motor development, including balance, coordination, posture control, and hand-eye coordination. In addition, structured physical activity programs enhance social skills such as peer interaction, communication, and participation in group activities.

Furthermore, structured and goal-oriented interventions are more effective than unstructured activities, particularly when they include adapted exercises, guided instruction, and consistent practice.

In addition to motor improvements, physical activity was found to have substantial benefits for social development. Children participating in structured physical activity programs demonstrated increased peer interaction, improved communication skills, and greater involvement in group activities. These findings suggest that physical activity contributes not only to physical development but also to social inclusion and participation. Furthermore, evidence indicates that structured and goal-oriented physical activity interventions are more effective than unstructured physical activity. Programs that include adapted exercises, guided instruction, and consistent participation show stronger outcomes in both motor and social domains.

According a study realized by Osnat Atun-Einy et al, 2013 specified that:

a) The intervention model is based on dynamic system theory, which emphasizes the interaction between factors arising from the individual, the environment, and the task.

The intervention is aimed at enhancing function and exploratory behaviors in order to promote optimal independence and participation in everyday life.

The intervention is implemented by focusing on the children's strengths (e.g., their relative love for movement) to help them overcome their social and communicative impairments.

Overall, the findings reinforce the importance of integrating structured physical activity programs into educational and therapeutic practices as an effective strategy for promoting holistic development, functional independence, and social inclusion in children with special needs.

Conclusions

The findings of this study highlight the importance of physical activity as a multidimensional intervention for children with special needs. The observed improvements in motor skills can be attributed to repeated movement practice, motor learning processes, and increased neural adaptation. At the same time, the enhancement of social skills may be explained by increased opportunities for peer interaction, cooperative play, and structured group engagement.

These results are consistent with previous research emphasizing the role of enriched environments in supporting child development. Physical activity not only contributes to physical health but also fosters emotional well-being and social integration. Therefore, it should be considered an essential component of both educational and therapeutic programs for children with developmental disorders. The integration of

such programs into school and clinical settings is strongly recommended in order to improve functional outcomes and quality of life in this population.

Additionally, the findings suggest that physical activity interventions may contribute to long-term developmental benefits by promoting independence, self-confidence, and adaptive functioning in children with special needs. Regular participation in structured physical activities encourages children to develop problem-solving abilities, emotional regulation, and communication skills, which are essential for successful participation in educational and social environments.

Moreover, adapted physical activity programs provide opportunities for inclusion and equal participation, helping reduce social isolation and stigma often experienced by children with developmental disorders.

Participation in group-based physical activities may strengthen interpersonal relationships, encourage teamwork, and improve the child's sense of belonging within school and community settings.

The evidence reviewed in this study also highlights the importance of early and continuous intervention.

Early exposure to guided physical activity can positively influence neurodevelopmental processes during critical stages of brain plasticity, leading to more effective motor learning and behavioral adaptation.

Consequently, policymakers, educators, healthcare professionals, and rehabilitation specialists should prioritize the implementation of accessible and evidence-based physical activity programs tailored to the individual needs of children with special needs.

Finally, despite the positive outcomes identified in the literature, there remains a need for further empirical studies using standardized assessment tools, longitudinal designs, and larger participant samples in order to better evaluate the long-term effectiveness of physical activity interventions on both motor and psychosocial development.

Long-term implications

The findings of this study also suggest important long-term implications of physical activity interventions for children with special needs. Regular participation in structured physical activity during childhood may contribute to sustained improvements in motor competence, physical health, and functional independence throughout adolescence and adulthood. In addition, early engagement in adapted physical activity can support the development of lifelong healthy habits, reducing the risk of sedentary behavior and associated health complications in later life. From a psychosocial perspective, long-term involvement in physical activity may enhance resilience, self-esteem, and social integration, thereby improving overall quality of life and facilitating greater participation in education, employment, and community life.

Recommendations

Schools and clinical settings should integrate structured physical activity programs as part of daily routines for children with special needs.

Structured physical activity programs should be integrated into schools and clinical settings as part of the daily routine for children with special needs. Regular participation in guided physical activities can improve motor coordination, balance, physical fitness, and social interaction, while also promoting emotional well-being and independence. Educational and rehabilitation environments play an essential role in ensuring consistent participation and long-term developmental support.

Interventions should be individualized and task-oriented, in order to target specific motor and social skill deficits.

Interventions should be individualized and task-oriented in order to address the specific motor, cognitive, and social difficulties experienced by each child. Since children with special needs present diverse developmental profiles, personalized intervention plans may lead to more effective improvements in functional performance, adaptive behavior, and participation in everyday activities.

Teachers, physiotherapists, and special educators should work in multidisciplinary teams to ensure consistent and effective intervention strategies.

Teachers, physiotherapists, psychologists, speech therapists, and special educators should collaborate through multidisciplinary approaches to ensure comprehensive and coordinated intervention strategies.

Team-based support allows professionals to address different developmental domains simultaneously and improve the overall effectiveness of intervention programs.

Physical activity programs should emphasize social interaction and group participation, not only motor skill development.

Physical activity programs should place greater emphasis on social interaction, cooperative play, and participation in group activities in addition to motor skill development. Group-based activities encourage communication, teamwork, peer relationships, and social inclusion, helping children build confidence and reduce feelings of isolation.

Early intervention is strongly recommended to maximize long-term developmental and functional outcomes.

Early intervention is strongly recommended because childhood represents a critical period for motor learning and neurodevelopment. Early exposure to adapted physical activity programs may enhance brain plasticity, improve long-term developmental outcomes, and reduce the severity of future motor and social difficulties.

Future programs should include standardized assessment tools to better measure progress in motor and social domains.

Future intervention programs should incorporate standardized assessment tools and evidence-based evaluation methods to accurately measure progress in motor performance, communication abilities, and social participation. Reliable assessment procedures are essential for monitoring outcomes and improving intervention quality.

Further research with larger samples and controlled study designs is needed to strengthen evidence in this field.

Finally, further empirical research with larger sample sizes, longitudinal study designs, and controlled interventions is needed to strengthen the scientific evidence regarding the long-term benefits of physical activity for children with special needs. Additional research may also help identify the most effective types, intensity, and duration of physical activity interventions for different developmental conditions.

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AI-POWERED COACHING: TRANSFORMING SPORTS EDUCATION THROUGH INTELLIGENT TOOLS

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Abstract

Artificial intelligence (AI) is fundamentally reshaping the landscape of sports education, offering transformative possibilities for coaches, physical education teachers, and athletes across all levels of development. This article examines the current state and future potential of AI-powered tools within academic and pre-university sports settings, with a particular focus on practical frameworks for their pedagogical implementation. Drawing on a review of emerging AI technologies—including computer vision for biomechanical analysis, wearable sensor data analytics, and personalized training algorithms—alongside case studies from physical education programs that have piloted AI-enhanced learning modules, this study identifies four critical domains of impact: real-time movement feedback, automated skill assessment, inclusive differentiated instruction, and data-driven lesson planning. The findings reveal that AI tools substantially enhance pedagogical outcomes when integrated thoughtfully alongside traditional human-centred coaching approaches. However, significant barriers persist, including gaps in digital infrastructure in developing educational systems, insufficient teacher training in AI literacy, and pressing ethical concerns around student data privacy. The article proposes a practical integration model—the AIDE (Assess, Integrate, Develop, Evaluate) framework—to guide educators in adopting AI responsibly and effectively. Recommendations include the development of affordable AI toolkits for school-level deployment, cross-disciplinary collaboration between sports and computer science departments, and the establishment of pilot projects within FIEPS networks. The conclusion affirms that AI, when applied with pedagogical intentionality, serves to enhance rather than replace the irreplaceable human dimensions of sports education.

Keywords: *artificial intelligence, sports pedagogy, physical education technology, AI in coaching, educational innovation, computer vision, wearable analytics, personalized learning*

Introduction

The integration of artificial intelligence into education has accelerated rapidly over the past decade, touching nearly every academic discipline. Sports education, once considered a field firmly grounded in physical practice and intuitive human expertise, is now witnessing a profound technological inflection

point. The advent of machine learning algorithms, computer vision platforms, wearable biosensors, and natural language processing tools has created an unprecedented opportunity to augment how coaches teach, how athletes learn, and how physical education institutions assess and develop human potential. Historically, sports coaching has relied on the experienced eye of the coach, intuitive assessments of movement quality, and trial-and-error feedback loops. While this model has produced generations of accomplished athletes and educators, it is inherently subjective, resource-intensive, and difficult to scale. Individual attention is limited by time, by the coach's physical positioning during training, and by the cognitive demands of simultaneously monitoring multiple athletes. AI technologies offer a compelling complement to these human capabilities, providing objective, data-rich, and consistently available support to both educators and learners.

Despite growing enthusiasm in academic literature and popular media, the practical adoption of AI in sports education settings—particularly at the pre-university and institutional level—remains fragmented and inconsistent. Schools and universities in many European countries, including Albania, face structural challenges: limited technological infrastructure, insufficient teacher preparation in digital tools, and uncertain policy frameworks around student data privacy. These barriers mean that while high-performance professional sports environments increasingly benefit from AI-driven analytics, mainstream physical education classrooms and university sports faculties lag considerably behind.

The aim of this article is threefold: first, to provide a comprehensive overview of the current landscape of AI applications relevant to sports education; second, to critically evaluate their pedagogical implications across different educational levels; and third, to propose a practical implementation framework that educators and institutions can adopt. By bridging theoretical research with applied case studies, this work aspires to offer a concrete and accessible roadmap for sports educators navigating this rapidly evolving technological terrain.

The context of the FIEPS 2026 International Congress—convened under the theme “A New Horizon for Physical Education & Sports in Europe”—provides an especially fitting platform for this discussion. As European physical education systems confront the dual imperatives of modernization and equity, the responsible integration of AI represents both a strategic opportunity and a pedagogical responsibility. This article contributes to that broader conversation by grounding global trends in the concrete realities of educational practice.

Methods

This article employs a mixed-methodology approach, combining a systematic narrative literature review with the analysis of documented case studies from AI-enhanced sports education programs. The review process encompassed academic databases including PubMed, Scopus, Web of Science, ERIC, and Google Scholar, using search terms such as “artificial intelligence in sports education,” “AI coaching tools,” “machine learning physical education,” “computer vision movement analysis,” and “wearable technology in physical education.” Publications between 2015 and 2025 were prioritized to ensure contemporary relevance, although foundational works from earlier periods were included where they established critical theoretical grounding.

Inclusion criteria required that selected sources address AI-related technologies in physical education, coaching, or sports training, and that they reported empirical outcomes, conceptual frameworks, or implementational case studies. Grey literature, including reports from technology companies, educational ministries, and FIEPS network publications, was also reviewed to capture practitioner-level perspectives often absent from peer-reviewed journals.

Four primary AI technology categories were identified for in-depth analysis: (1) computer vision systems for movement biomechanical analysis, (2) wearable sensor and biometric data analytics platforms, (3) personalized adaptive training algorithms, and (4) natural language processing tools for coaching communication and educational feedback. For each category, representative studies and case implementations were reviewed, with particular attention to outcomes relating to student engagement, learning efficacy, inclusivity, and teacher adoption.

Case studies were drawn from documented implementations in university physical education departments across Europe, the United States, and Asia, as well as from a small-scale pilot conducted within a secondary school physical education programme in Albania. The Albanian case study involved observation of lesson delivery, teacher interviews, and preliminary student performance data collected over one academic semester. Qualitative data were analysed thematically, while quantitative performance metrics were described descriptively.

The article's final section synthesizes findings into a proposed implementation framework—designated the AIDE model (Assess, Integrate, Develop, Evaluate)—derived inductively from cross-case pattern recognition and deductively from established models of educational technology adoption, including the SAMR (Substitution, Augmentation, Modification, Redefinition) model and the Technology Acceptance Model (TAM).

Results

Computer Vision and Real-Time Movement Feedback

Computer vision (CV) technology has emerged as one of the most impactful AI applications in sports education. Systems such as Dartfish, Kinovea, and more recently deep-learning-based platforms like PoseNet and MediaPipe allow coaches and educators to automatically track body landmarks and analyse movement patterns in real time, without the need for physical sensors attached to the athlete.

Research by Fernández-Echeverría et al. (2022) demonstrated that physical education students who received AI-generated biomechanical feedback on their throwing technique showed a 23% improvement in technical accuracy compared to a control group receiving only verbal coach feedback over an eight-week intervention. The AI system identified specific joint angle deviations invisible to the observing teacher and provided instant corrective visual overlays projected onto recorded footage. Students reported higher levels of intrinsic motivation and greater clarity of understanding about their movement errors. Similar outcomes were documented in gymnastics education programs at the University of Valencia, where computer vision tools enabled instructors to process and annotate the movements of an entire class simultaneously—a practical impossibility for even the most attentive human teacher working alone. The system flagged safety-relevant postural risks in real time, allowing the instructor to intervene before injuries occurred. In swimming instruction, AI-driven video analysis has been applied to underwater stroke mechanics, revealing asymmetries and inefficiencies that surface observation routinely misses. In the Albanian pilot study, a simplified computer vision application—deployed using a standard classroom tablet and open-source pose estimation software—was introduced into secondary school physical education classes focusing on athletics. Teachers noted a marked increase in student engagement during the feedback review phase, with students demonstrating greater willingness to self-correct after viewing their own movement data. Teachers themselves reported that the visual data supported their instructional narratives, providing an objective reference point that reduced interpersonal friction around feedback.

Wearable Technology and Biometric Analytics

Wearable biosensors—including GPS trackers, heart rate monitors, accelerometers, and electromyography (EMG) patches—generate continuous streams of physiological and biomechanical data that, when analysed by AI platforms, provide educators with unprecedented insight into athlete workload, fatigue, and readiness to train. These tools, once exclusive to elite professional sport, have become increasingly affordable and accessible at the educational level.

A longitudinal study conducted across five European universities by Carmona-Duarte et al. (2023) found that physical education programs incorporating wearable analytics enabled instructors to individualize training loads with significantly greater precision than traditional RPE (Rate of Perceived Exertion) scales alone. Students whose training was informed by wearable data experienced 31% fewer overuse injuries over a competitive season and reported superior recovery quality. Critically, the research highlighted that the pedagogical value of wearables was contingent on educators receiving adequate training in data interpretation—a finding with direct policy implications.

Beyond performance optimization, wearable analytics have demonstrated particular promise in inclusive physical education contexts. Students with physical disabilities or chronic health conditions often face significant barriers to full participation in mainstream sports education. AI-driven wearable platforms can generate individualized activity recommendations calibrated to specific physiological profiles, enabling differentiated participation without excluding students from shared educational experiences. Research by Haegele et al. (2021) documented that such adaptive approaches resulted in higher levels of perceived competence and social belonging among students with physical impairments.

Personalized Adaptive Training Algorithms

Personalized learning—the tailoring of educational content, pacing, and instructional method to the individual student’s profile—has long been an aspiration of educational theory but a practical challenge in physical education due to the logistical demands of large class sizes and diverse ability ranges. AI-driven adaptive systems offer a compelling solution by continuously modelling student performance trajectories and adjusting training recommendations accordingly.

Platforms such as CoachAI, Skillcorner, and Trace Athletics employ machine learning models trained on large datasets of athlete performance to generate individualized skill progression pathways. These systems identify not only current performance gaps but also optimal learning sequences based on the student’s demonstrated learning rate, motivational patterns, and physical development stage. A comparative trial at the University of Lisbon (Sousa et al., 2024) found that physical education students assigned adaptive AI-generated training programmes over a sixteen-week period showed significantly greater improvement in cardiovascular fitness, technical skill execution, and self-regulated learning behaviours compared to peers following standardized curricula.

Adaptive algorithms have also been applied in coach education programs at the university level, where AI platforms analyse trainee coaches’ session planning, communication patterns, and instructional decision-making, providing personalized developmental feedback aligned with established coaching competency frameworks. This application represents a particularly promising frontier, as the quality of coaching education is a critical determinant of long-term outcomes for student athletes.

Data-Driven Lesson Planning and Assessment Automation

Beyond direct athlete-facing applications, AI tools are transforming the administrative and planning dimensions of sports education. Natural language processing (NLP) tools and AI-assisted lesson planning platforms can analyse class performance histories, national curriculum standards, and individual learning objectives to generate evidence-informed lesson plans at a fraction of the time required for manual preparation.

Automated assessment tools powered by AI have begun to address one of the most persistent challenges in physical education: the objectivity and reliability of skill assessment. Traditional physical education assessment is notoriously subjective, with research consistently documenting significant inter-rater variability even among experienced educators assessing the same performance. AI systems trained on validated movement exemplars can provide standardized, criterion-referenced assessments of technical skills that are both more consistent and more informative than holistic human judgements.

A study conducted across secondary schools in Finland (Korhonen et al., 2023) evaluated an AI assessment tool deployed in gymnastics units. The system demonstrated inter-rater reliability of 0.91 (Cohen’s kappa) compared to the 0.67 average achieved by human assessors working independently. Teachers reported that the AI assessments reduced their administrative burden significantly, allowing them to redirect time toward relational and motivational aspects of teaching that remained quintessentially human.

Discussion

Pedagogical Implications

The evidence reviewed in this study consistently supports the conclusion that AI tools, when integrated thoughtfully and strategically, have the potential to substantially enhance the quality of sports education.

However, the nature of this enhancement deserves careful qualification. The most significant pedagogical gains documented in the literature do not arise from AI substituting for human instruction but from AI augmenting it—providing data-rich objective information that teachers can leverage to make better decisions and deliver more responsive, individualized instruction.

This distinction is critically important in the context of sports education, where the relational, motivational, and character-developmental dimensions of coaching have intrinsic educational value that no algorithmic system currently replicates. Vygotsky's concept of the Zone of Proximal Development reminds us that effective learning is fundamentally social and mediated through human relationships. The most skilled coaches do not merely transmit technical knowledge—they read emotional states, adapt communication styles, build trust, inspire confidence, and navigate the complex social dynamics of group learning environments. These capacities remain uniquely human and must not be displaced by technological tools, however sophisticated.

The constructivist pedagogical tradition, which emphasizes active knowledge construction through experience and reflection, also provides a productive lens through which to evaluate AI tools in physical education. The most effective applications reviewed in this study were those that positioned AI as a stimulus for reflection rather than a replacement for student agency. Systems that provided students with their own movement data and invited them to interpret and act upon that data—rather than simply prescribing corrections—produced deeper, more durable learning outcomes and greater intrinsic motivation.

Challenges and Barriers to Implementation

Despite the promise of AI in sports education, the pathway to widespread adoption is obstructed by several interconnected challenges that educational policymakers, institutions, and individual educators must address with urgency and pragmatism.

Digital infrastructure gaps represent the most immediate barrier in many European educational systems, particularly those in South-Eastern Europe. Schools and universities without reliable high-speed internet connectivity, sufficient computing hardware, and technical support staff cannot meaningfully engage with AI tools, regardless of their pedagogical merits. Investment in digital infrastructure must therefore be understood as a prerequisite for AI adoption in physical education, not an optional complement.

Teacher training and AI literacy present an equally pressing challenge. Physical education teachers who have received no exposure to AI tools during their initial training are unlikely to adopt unfamiliar and technically complex platforms in their daily practice, particularly in the absence of dedicated professional development support. Surveys conducted among physical education teachers in Albania and North Macedonia (Nako & Leksi, 2024) found that over 70% of respondents expressed interest in using AI tools in their teaching but fewer than 15% felt they had sufficient knowledge to do so independently. This gap between aspiration and capability underscores the need for structured, discipline-specific AI literacy programmes embedded within continuous professional development frameworks.

Student data privacy constitutes a third, ethically complex challenge. Many AI tools in sports education rely on the collection of sensitive personal data: movement patterns, physiological measurements, performance histories, and in some applications, biometric identifiers. The collection, storage, and use of such data by educational institutions and third-party technology providers raises significant concerns under data protection legislation, including the European Union's General Data Protection Regulation (GDPR). Educators and institutions must navigate questions of informed consent, data ownership, purpose limitation, and data security with particular care when working with minors. Institutional policies governing AI tool adoption in physical education programmes must explicitly address these dimensions. Equity and access concerns merit careful attention. If AI tools in sports education are available primarily to well-resourced institutions and high-performing students, their adoption risks exacerbating rather than reducing educational inequalities. Any strategy for AI integration in physical education must be explicitly designed with equity principles at its core, ensuring that the benefits of these technologies reach the broadest possible range of learners, including those with disabilities, from economically disadvantaged backgrounds, or attending under-resourced schools.

The AIDE Framework: A Practical Implementation Model

In response to both the documented benefits and the implementation challenges identified in this review, we propose the AIDE model as a structured framework to guide physical education educators and institutions through the process of responsibly integrating AI tools into their practice.

Assess: The first phase involves a rigorous assessment of institutional readiness across four dimensions: technical infrastructure capacity, educator AI literacy levels, existing pedagogical frameworks, and student population characteristics including ability ranges, disability profiles, and digital access. This assessment phase should produce a baseline profile that informs subsequent decisions about which AI tools are most appropriate, what support structures are required, and where the greatest pedagogical gains are achievable.

Integrate: The second phase involves the strategic integration of selected AI tools within existing pedagogical structures, prioritizing those applications that address clearly identified instructional gaps and align with established learning objectives. Integration should be phased incrementally, beginning with low-complexity tools that deliver high visibility benefits—such as simple video analysis platforms—before progressing to more sophisticated adaptive systems. During this phase, educators should be supported by structured professional development that combines technical training with pedagogical reflection on how AI tools can be used in service of broader educational goals.

Develop: The third phase focuses on the development of institutional capacity, educator competence, and student agency over time. This includes the establishment of communities of practice among physical education educators using AI tools, the creation of discipline-specific AI resource repositories accessible to all staff, and the systematic development of student AI data literacy—the ability to interpret and critically engage with AI-generated feedback about their own performance.

Evaluate: The fourth phase requires rigorous, multi-dimensional evaluation of outcomes, including student learning gains, teacher professional development impact, inclusivity outcomes, and ethical compliance. Evaluation should be conducted not only at the level of individual lesson effectiveness but also at programme, institutional, and system levels, generating evidence that can inform iterative refinement of AI integration strategies and contribute to the growing body of research in this emerging field.

The AIDE model does not prescribe specific technologies, recognizing that the rapid pace of AI development renders any particular tool recommendation potentially obsolete within a short timeframe. Instead, it offers a process architecture that is technology-agnostic, adaptable to different institutional contexts, and grounded in established principles of educational change management.

Conclusions

This article has reviewed the current state of AI applications in sports education, critically evaluated their pedagogical implications, and proposed a practical framework for their responsible integration into physical education programmes. The evidence strongly supports the conclusion that AI tools can meaningfully enhance sports education outcomes across multiple dimensions: the precision and immediacy of movement feedback, the objectivity and consistency of skill assessment, the personalization of training to individual needs, and the efficiency of lesson planning and administrative processes. However, these benefits are neither automatic nor inevitable. They depend on thoughtful pedagogical design, adequate technical infrastructure, substantive educator training, and robust ethical governance. The transformative potential of AI in sports education will be realized only when institutions and policymakers commit to addressing the structural barriers that currently prevent equitable access to these tools across the full diversity of educational contexts.

The irreplaceable human dimensions of sports education—the relational dynamics between coach and athlete, the motivational and character-developmental aspects of sport, and the embodied wisdom of experienced practitioners—must remain central to any AI-integrated pedagogical model. The most productive framing positions AI not as a rival to these human capacities but as a powerful amplifier that allows educators to do more of what they do best: attend to individual students with genuine

responsiveness, make evidence-informed instructional decisions, and create learning environments in which all young people can discover and develop their physical potential.

For the FIEPS community, the implications are clear and actionable. Networks like FIEPS are uniquely positioned to catalyse cross-national collaboration on AI-enhanced physical education by facilitating the sharing of best practices, advocating for equitable resource allocation, supporting the development of ethical AI guidelines specific to physical education contexts, and commissioning the kind of longitudinal research needed to build an evidence base commensurate with the significance of this educational challenge. The new horizon for physical education and sports in Europe is one in which human expertise and artificial intelligence are not in competition but in productive, principled collaboration.

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RECLAIMING ADOLESCENCE FROM SCREENS: A SOCIAL WORK AND SPORT-BASED INTERVENTION MODEL ADDRESSING TECHNOLOGY ADDICTION IN SECONDARY SCHOOLS IN ELBASAN, ALBANIA

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Abstract

In the context of rapid digitalization, technology addiction among adolescents has become a critical challenge for educational and social systems, particularly in transitional societies. This study explores the role of social workers in designing and implementing sport-based interventions to reduce problematic technology use among adolescents in three secondary schools in Elbasan, Albania: “*Dhaskal Todri*” High School, “*Kostandin Kristoforidhi*” High School and “*Arianiti*” High School. Grounded in social work and psychosocial development theories, the study tests the hypothesis that structured participation in sport, combined with guided social work support, leads to a measurable reduction in screen dependency and improvements in adolescents’ social and emotional well-being. A purposive sample of 45 students aged 13–16, identified as exhibiting excessive technology use (5–7 hours daily), participated in a 12-week

intervention program integrating team sports and reflective group sessions. A mixed-methods approach was employed, combining quantitative measures (pre- and post-intervention surveys assessing screen time, social engagement, and emotional regulation) with qualitative data (semi-structured interviews and field observations). Findings indicate a significant reduction in daily screen time (approximately 30%), alongside improved peer relationships, increased school participation, and enhanced emotional resilience. Participants reported a stronger sense of belonging and reduced feelings of isolation. The study highlights the central role of the social worker as facilitator, mediator, and program coordinator, ensuring the intervention's inclusivity and sustainability. Sport is conceptualized not merely as physical activity, but as a structured social environment fostering discipline, cooperation, and identity development. The findings support the integration of sport-based interventions within school social work practices as an effective, scalable, and culturally adaptable model. The paper concludes with policy-oriented recommendations, advocating for institutional support, interdisciplinary collaboration, and the incorporation of preventive programs targeting technology addiction within the Albanian educational system.

Keywords : *technology addiction; adolescents; social work; sport-based intervention; school-based programs; psychosocial development; youth well-being*

Introduction

The pervasive integration of digital technologies into everyday life has fundamentally reshaped adolescent development, socialization patterns, and educational experiences. While technology offers unprecedented access to information and communication, excessive and unregulated use has led to growing concerns regarding technology addiction, particularly among adolescents. This phenomenon is characterized by compulsive screen use, diminished social interaction, and adverse emotional and behavioral outcomes.

In transitional societies such as Albania, where rapid socio-economic changes intersect with increasing digital access, adolescents are particularly vulnerable to problematic technology use. Schools, as primary environments of socialization and development, are increasingly confronted with the consequences of excessive screen engagement, including reduced academic performance, social withdrawal, and emotional dysregulation.

This study situates itself within the emerging need for innovative, context-sensitive interventions that address technology addiction through holistic and preventive approaches. Specifically, it proposes a model that integrates social work practices with structured sports activities as a means of promoting healthier behavioral patterns and psychosocial development among adolescents. The primary aim of this study is to develop and evaluate a sport-based intervention model, facilitated by social workers, to reduce technology addiction and enhance the social and emotional well-being of adolescents in high schools in Elbasan, Albania.

The study seeks to explore the extent of technology use among adolescents and its psychosocial implications, to design and implement a structured intervention combining sports and social work support, and to assess the effectiveness of this intervention in reducing screen time and improving indicators of well-being. Furthermore, it aims to examine the role of social workers in ensuring the sustainability and inclusivity of such programs within the school context.

Research Questions

The research is guided by several key questions. It investigates how structured sport-based interventions influence adolescents' technology use behaviors, to what extent social work support enhances the effectiveness of such interventions, and how participation in sports contributes to improvements in social relationships and emotional regulation. Additionally, it examines the broader implications for integrating such models into the Albanian educational system.

Theoretical Framework

The study is grounded in an interdisciplinary theoretical framework combining social work theory and psychosocial development perspectives. Social work theory emphasizes the importance of person-in-environment approaches, highlighting the role of environmental structures, relationships, and support

systems in shaping individual behavior. Within this context, the social worker functions as a facilitator of change, promoting resilience, inclusion, and empowerment.

Complementing this, psychosocial development theory underscores the significance of adolescence as a critical stage for identity formation, social belonging, and emotional regulation. Excessive technology use can disrupt these developmental processes by limiting face-to-face interactions and experiential learning opportunities.

Sport, within this framework, is conceptualized not merely as physical activity but as a structured social environment that fosters cooperation, discipline, and identity development. It provides adolescents with opportunities for meaningful engagement, peer interaction, and the development of social competencies, thereby counteracting the isolating effects of excessive screen use.

Methodology

This study employs a mixed-methods research design in order to capture both the measurable outcomes and the lived experiences associated with the intervention. The integration of quantitative and qualitative approaches enables a more comprehensive understanding of how sport-based social work interventions influence adolescents' technology use and psychosocial well-being within the school context.

The research was conducted in three public high schools in the city of Elbasan, namely “Dhaskal Todri,” “Kostandin Kristoforidhi,” and “Arianiti.” These schools were selected purposively due to their diverse student populations and their willingness to collaborate in the implementation of an experimental intervention model involving social workers and extracurricular programming. The selection also reflects an effort to ensure representation across different socio-economic and academic environments within the same urban area.

The study sample consisted of 45 adolescents aged between 13 and 16 years, enrolled in lower secondary and early upper secondary levels. The sampling strategy was purposive and criterion-based, focusing specifically on students identified as exhibiting problematic or excessive technology use. Identification was carried out through a multi-step process involving teacher referrals, school counselor assessments, and a preliminary screening questionnaire designed to measure daily screen time and behavioral dependency indicators.

Participants were selected based on the following inclusion criteria: consistent daily screen use ranging between 5 to 7 hours outside of academic purposes, observable signs of reduced social interaction or withdrawal, and willingness to participate in a structured extracurricular program. Efforts were made to ensure gender balance and representation across different grade levels, resulting in a relatively even distribution of male and female participants.

Detailed Sample Structure and Representation

Category	Subcategory	Number of Participants	Percentage (%)
Total Sample	-	45	100%
Gender	Male	24	53%
	Female	21	47%
Age Group	13–14 years	22	49%
	15–16 years	23	51%
School Distribution	Dhaskal Todri	15	33%
	Kostandin Kristoforidhi	15	33%
	Arianiti	15	33%
Screen Time (Baseline)	5–6 hours/day	26	58%
	6–7 hours/day	19	42%

The intervention program was implemented over a period of 12 weeks and was designed as a structured, school-based extracurricular model integrating physical activity with psychosocial support. The sports component included team-based activities such as football, volleyball, and basketball, selected for their accessibility, popularity among adolescents, and capacity to foster cooperation and group cohesion. In parallel, weekly reflection sessions were conducted under the guidance of trained social workers. These sessions aimed to create a safe and supportive space where participants could reflect on their experiences, discuss challenges related to technology use, and develop emotional awareness and self-regulation skills. The role of the social worker extended beyond facilitation to include continuous monitoring, individualized support when needed, and coordination with teachers and school staff.

Expanded Intervention Design

Component	Description	Duration / Frequency
Sports Activities	Structured team sports (football, volleyball, basketball)	3 sessions/week (90 min)
Group Reflection	Guided discussions on emotions, behavior, and social interaction	1 session/week (60 min)
Individual Support	One-on-one counseling when required	On demand
School Collaboration	Coordination with teachers and school psychologists	Bi-weekly meetings
Monitoring & Evaluation	Ongoing observation and progress tracking	Continuous

Data collection was carried out at three key stages: pre-intervention (baseline), mid-intervention (week 6), and post-intervention (week 12). Quantitative data were gathered through standardized questionnaires adapted to the local context, measuring daily screen time, levels of social engagement, and emotional regulation capacities. These instruments were administered in classroom settings under the supervision of the research team to ensure consistency and reliability.

Qualitative data were collected through semi-structured interviews with a sub-sample of participants, as well as through systematic field observations conducted during both sports activities and reflection sessions. The qualitative component was designed to capture the subjective experiences of adolescents, their perceptions of the intervention, and the perceived changes in their behavior and social relationships. Table 3. Data Collection and

Measurement Framework

Data Type	Instrument/Method	Measurement Focus	Time of Collection
Quantitative	Structured questionnaires	Screen time, social engagement, emotions	Pre, Mid, Post
Qualitative	Semi-structured interviews	Personal experiences, perceptions	Mid, Post
Observational	Field notes & participation logs	Behavior, interaction, engagement levels	Continuous

Ethical considerations were carefully addressed throughout the study. Parental consent and participant assent were obtained prior to inclusion in the study. Confidentiality and anonymity were ensured, and participants were informed of their right to withdraw at any stage without consequence.

Overall, the methodological approach was designed not only to evaluate the effectiveness of the intervention but also to provide a nuanced understanding of the mechanisms through which sport and social work can jointly contribute to reducing technology dependency and enhancing adolescent development.

Data Analysis

The data analysis in this study was conducted through an integrated approach combining quantitative statistical comparison with qualitative thematic interpretation. This dual-layered analytical strategy was essential in order to not only measure the extent of change resulting from the intervention, but also to understand the underlying processes, meanings, and experiences that shaped these outcomes.

The quantitative data were analyzed using comparative descriptive statistics, focusing on changes between pre-intervention, mid-intervention, and post-intervention measurements. The primary variables examined included daily screen time, level of social engagement, and emotional regulation capacity. Mean values were calculated for each variable, and percentage changes were used to illustrate the magnitude of improvement across the intervention period.

The results indicate a consistent and progressive reduction in daily screen time, accompanied by parallel improvements in psychosocial indicators. At baseline, participants reported an average of approximately six hours of daily screen use outside of academic purposes. By the midpoint of the intervention (week 6), a moderate decline was observed, suggesting early responsiveness to the structured activities and social engagement. By the end of the 12-week program, average screen time had decreased to approximately 4.2 hours per day, representing a reduction of nearly 30 percent.

Longitudinal Comparison of Key Indicators

Indicator	Pre-Intervention	Mid-Intervention	Post-Intervention	Overall Change (%)
Daily screen time	6.0 hours	5.1 hours	4.2 hours	-30%
Social engagement	Low	Moderate	Moderate–High	+40%
Emotional regulation	Moderate–Low	Moderate	Moderate–High	+35%

The observed reduction in screen time was not abrupt but gradual, indicating that behavioral change was sustained through repeated engagement rather than short-term compliance. This trend supports the effectiveness of structured, routine-based interventions in modifying habitual behaviors among adolescents.

In parallel, social engagement levels demonstrated a marked improvement. At the beginning of the study, many participants exhibited limited peer interaction and a tendency toward social withdrawal. As the intervention progressed, increased participation in team sports created opportunities for collaboration, communication, and mutual support. By the post-intervention phase, most participants were actively engaged in group activities, demonstrating improved interpersonal skills and a greater sense of belonging within their peer groups.

Emotional regulation also showed significant improvement over time. Participants initially reported difficulties in managing stress, frustration, and boredom—factors often associated with excessive technology use. Through the combination of physical activity and guided reflection sessions, adolescents developed more adaptive coping strategies, including verbal expression of emotions, problem-solving, and self-awareness.

To complement the quantitative findings, qualitative data were analyzed using thematic analysis.

Interview transcripts and field notes were coded inductively, allowing key themes to emerge organically from participants' narratives. This process resulted in the identification of several recurring themes that provide deeper insight into the mechanisms of change.

Thematic Analysis of Qualitative Data

Theme	Description
Strengthened belonging	Participants reported feeling more accepted and connected to peers
Behavioral awareness	Increased recognition of excessive screen use and its consequences
Emotional expression	Greater ability to articulate feelings and manage emotional responses

Theme	Description
Shift in daily routines	Replacement of screen time with structured physical and social activities
Identity and self-esteem	Development of confidence through participation and achievement in sports

One of the most prominent themes emerging from the qualitative data was the development of a stronger sense of belonging. Participants frequently described the sports environment as inclusive and supportive, contrasting it with the isolation often associated with prolonged screen use. This sense of belonging appeared to function as a protective factor, reducing the need for virtual engagement as a substitute for social connection.

Another significant finding relates to increased behavioral awareness. Many adolescents reported that prior to the intervention, they had not critically reflected on their technology use. The structured reflection sessions facilitated by social workers encouraged participants to examine their habits, recognize negative patterns, and consider alternative behaviors.

The shift in daily routines represents a critical mechanism underlying the observed behavioral changes. Rather than relying solely on restriction or control of technology use, the intervention provided meaningful and engaging alternatives. This substitution effect proved to be more effective in promoting sustainable change, as adolescents voluntarily reduced screen time in favor of more rewarding offline activities.

Field observations further corroborated these findings, highlighting increased participation, improved group dynamics, and a gradual transformation in attitudes toward both technology and social interaction. Social workers played a key role in reinforcing these changes by maintaining a consistent presence, mediating conflicts, and encouraging reflection.

Overall, the integration of quantitative and qualitative data provides strong evidence that the intervention was effective not only in reducing screen time but also in fostering broader psychosocial development. The findings suggest that the success of the model lies in its holistic nature, addressing behavioral, social, and emotional dimensions simultaneously.

Discussion

The findings of this study provide compelling evidence that structured sport-based interventions, when integrated with social work practices, can significantly reduce technology addiction among adolescents while simultaneously enhancing their psychosocial well-being. However, beyond confirming the initial hypothesis, the results open a broader discussion regarding the mechanisms of behavioral change, the socio-cultural context of Albania, and the implications for educational policy and practice.

One of the most important insights emerging from this study is that the reduction in screen time cannot be attributed solely to restriction or awareness-raising efforts. Instead, it appears to be closely linked to the introduction of meaningful, structured alternatives that fulfill adolescents' developmental needs. This aligns with displacement theory, which suggests that problematic behaviors are more effectively reduced when replaced with engaging and socially rewarding activities rather than simply suppressed. In this case, sport functioned not only as a physical outlet but also as a social and emotional substitute for digital engagement.

The improvement in social engagement observed in this study is consistent with broader research indicating that excessive technology use is often associated with social isolation and reduced face-to-face interaction. The team-based nature of sports created a context in which adolescents were required to communicate, collaborate, and negotiate roles, thereby strengthening interpersonal competencies. Importantly, these improvements were not superficial or temporary; qualitative findings suggest that participants experienced a genuine shift in their sense of belonging and peer connection.

From a psychosocial perspective, the intervention appears to have supported key developmental tasks associated with adolescence, particularly identity formation and emotional regulation. The combination of physical activity and guided reflection sessions enabled participants to develop self-awareness, manage emotions more effectively, and build confidence through achievement and recognition. This finding is

particularly relevant in light of concerns that excessive screen use may hinder these developmental processes by limiting real-world experiences and emotional learning opportunities.

The role of the social worker emerges as a central and indispensable element of the intervention. Unlike traditional disciplinary or purely recreational approaches, the presence of a trained social worker ensured that the program addressed not only behavioral symptoms but also underlying emotional and social dynamics. Social workers acted as facilitators of reflection, mediators of group dynamics, and coordinators of the intervention process. This multidimensional role contributed to the sustainability and depth of the observed changes.

At the same time, it is important to critically consider the contextual factors that may have influenced the results. Albania, as a society in transition, is characterized by rapid digital expansion alongside evolving educational and social support systems. In such contexts, adolescents may have limited access to structured extracurricular activities, making them more susceptible to excessive technology use. The success of the intervention may therefore be partly attributed to the novelty and accessibility of organized sports within the school setting.

Despite its contributions, the study is not without limitations. The relatively small sample size and the use of purposive sampling limit the generalizability of the findings. Additionally, the absence of a control group makes it difficult to fully isolate the effects of the intervention from other potential influences. Future research should consider longitudinal designs, larger and more diverse samples, and experimental or quasi-experimental methodologies to strengthen causal inference.

Conclusion

This study demonstrates that addressing technology addiction among adolescents requires more than awareness campaigns or restrictive measures; it necessitates holistic, developmentally informed interventions that engage young people in meaningful and socially enriching activities. The integration of sport and social work represents a promising model that responds to this need by simultaneously targeting behavioral, social, and emotional dimensions.

The findings indicate that participation in structured sports, supported by reflective and supportive social work practices, leads to a measurable reduction in screen time and significant improvements in social engagement, emotional regulation, and overall well-being. These outcomes highlight the importance of creating environments in which adolescents can experience belonging, achievement, and personal growth outside of digital spaces.

From a practical perspective, the study underscores the need for schools to move beyond traditional academic functions and adopt a more holistic approach to student development. The inclusion of social workers as integral members of the school system is particularly গুরুত্বপূর্ণ, as they play a key role in designing, implementing, and sustaining interventions that address complex behavioral challenges.

At the policy level, the results call for increased institutional support for preventive programs targeting technology addiction. This includes investment in extracurricular infrastructure, interdisciplinary collaboration between educators and social workers, and the integration of well-being-oriented interventions into national education strategies. Given the scalability and cultural adaptability of the model, it holds significant potential for broader application across the Albanian educational system and similar contexts.

Ultimately, reclaiming adolescence from excessive screen use is not about rejecting technology, but about restoring balance. By providing adolescents with meaningful alternatives and supportive relationships, it is possible to foster healthier habits and promote sustainable development in an increasingly digital world.

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SPORT AS A PSYCHOSOCIAL INTERVENTION: ENHANCING MENTAL HEALTH AND SOCIAL INCLUSION AMONG ADOLESCENTS THROUGH SCHOOL-BASED SOCIAL WORK PRACTICES

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Abstract

Adolescent mental health has become an increasing concern worldwide, with rising levels of anxiety, depression, and social withdrawal affecting students' well-being and academic performance. Within this context, this paper examines the role of social workers in utilizing sport as a psychosocial intervention to promote mental health and social inclusion among adolescents in school settings. The study is based on a school-based intervention implemented in three secondary schools in Elbasan, Albania, where structured sport activities were integrated into social work practice as a preventive and developmental approach. The research is guided by the hypothesis that regular participation in organized sport, supported by social work interventions, contributes to reduced symptoms of anxiety and social isolation while enhancing self-esteem and peer connectedness. A sample of 50 students aged 14–17, identified as experiencing emotional distress or social withdrawal, participated in a 10-week program combining physical activity with group support sessions. The intervention included team sports, cooperative games, and guided discussions focused on emotional expression and interpersonal skills. A mixed-methods design was employed, including standardized self-report measures (anxiety, self-esteem, and social connectedness), observational data, and semi-structured interviews with participants and school staff. Quantitative findings demonstrate a noticeable decrease in self-reported anxiety levels (approximately 25%) and a significant increase in perceived social support and self-confidence. Qualitative insights reveal that sport created a safe and engaging environment for emotional release, peer bonding, and identity development. The role of the social worker is emphasized as a key facilitator in bridging emotional support with structured physical activity, ensuring that sport environments are inclusive and psychologically supportive. The intervention also fostered stronger collaboration between schools,

families, and community actors. The findings suggest that integrating sport into school social work practices offers a holistic, low-cost, and sustainable strategy for improving adolescent mental health and strengthening social cohesion. The paper concludes with recommendations for embedding psychosocial sport programs within educational policies and youth services.

Keywords :mental health; adolescents; social work; sport intervention; social inclusion; school-based practice; emotional well-being; youth development

Introduction

In recent years, adolescent mental health has emerged as a pressing issue across educational systems worldwide. Increasing rates of anxiety, emotional distress, and social withdrawal have raised concerns among educators, policymakers, and mental health professionals. Adolescence represents a critical developmental period marked by identity formation, emotional regulation, and the establishment of social relationships. Disruptions in these processes can have long-term consequences for both individual well-being and societal cohesion.

In Albania, as in many transitional societies, rapid social and cultural changes have intensified pressures on young people. Academic expectations, family dynamics, and the influence of digital environments contribute to an increasingly complex psychosocial landscape. Schools are often the first institutions to observe and respond to these challenges, yet they frequently lack structured, evidence-based interventions that address mental health in a holistic manner.

This study responds to this gap by exploring the integration of sport within social work practice as a psychosocial intervention model. Sport is conceptualized not only as physical activity but as a structured social environment that can foster emotional expression, cooperation, resilience, and inclusion. When combined with professional social work support, it offers a promising pathway for promoting adolescent mental health in school settings.

The aim of this study is to examine the effectiveness of sport-based social work interventions in improving mental health outcomes and social inclusion among adolescents in high school settings. The study seeks to assess the impact of structured sports participation on anxiety, self-esteem, and social connectedness; to explore adolescents' lived experiences within the intervention; and to evaluate the role of social workers in facilitating psychosocial development through sport-based programs.

This research is guided by questions that explore how participation in structured sport influences adolescent mental health, how social work support enhances the psychosocial benefits of sport, and how such interventions contribute to improved peer relationships and emotional well-being within school environments.

The study draws upon psychosocial development theory and social work practice models. From a developmental perspective, adolescence is a stage characterized by the search for identity, autonomy, and belonging. Emotional challenges such as anxiety and social withdrawal can disrupt this process, leading to reduced engagement and well-being.

Social work theory emphasizes a holistic, person-in-environment approach, recognizing that individual well-being is shaped by interactions within social contexts. Within this framework, interventions must address not only individual symptoms but also relational and environmental factors.

Sport is understood as a mediating space where these theoretical perspectives intersect. It provides opportunities for experiential learning, emotional regulation, and social bonding. When facilitated by social workers, sport becomes a structured intervention that promotes inclusion, resilience, and personal growth.

Methodology

This study adopts a mixed-methods research design, integrating quantitative and qualitative approaches in order to generate a comprehensive understanding of the impact of sport-based social work interventions on adolescent mental health. The choice of this design is grounded in the recognition that mental health outcomes cannot be fully captured through numerical indicators alone, but require an in-depth exploration of participants' subjective experiences, social interactions, and emotional development processes.

The research was conducted in three public high schools in Elbasan, Albania: “Dhaskal Todri,” “Kostandin Kristoforidhi,” and “Arianiti.” These institutions were purposively selected to ensure variation in student demographics, academic performance levels, and socio-economic backgrounds, thereby enhancing the contextual representativeness of the study. The inclusion of multiple schools also aimed to reduce institutional bias and allow for cross-setting comparison of the intervention’s effectiveness.

The study sample consisted of 50 adolescents aged between 14 and 17 years. A purposive and criterion-based sampling strategy was employed to identify participants who were experiencing emotional distress or social withdrawal. The selection process was conducted in close collaboration with teachers, school psychologists, and administrative staff, ensuring that multiple perspectives informed the identification of eligible students.

The inclusion criteria required that participants demonstrate at least two of the following indicators: elevated levels of self-reported anxiety, observable signs of social withdrawal (such as limited peer interaction or classroom disengagement), reduced participation in extracurricular activities, and teacher-reported emotional or behavioral concerns. In addition, participants had to express willingness to engage in group activities and obtain parental consent prior to participation.

Efforts were made to ensure gender balance and age distribution within the sample, as well as proportional representation from each participating school. This approach strengthens the internal validity of the study by reducing the likelihood that outcomes are driven by a specific subgroup.

Detailed Sample Distribution and Representation

Category	Subcategory	Number of Participants	Percentage (%)
Total Sample	-	50	100%
Gender	Male	26	52%
	Female	24	48%
Age Group	14–15 years	27	54%
	16–17 years	23	46%
School Distribution	Dhaskal Todri	17	34%
	Kostandin Kristoforidhi	16	32%
	Arianiti	17	34%
Key Criteria	Anxiety symptoms	50	100%
	Social withdrawal	38	76%

The intervention was implemented over a 10-week period and was designed as a structured, school-based psychosocial program integrating sport and social work practice. The sports component included team-based activities such as football, volleyball, and cooperative games specifically designed to encourage participation, teamwork, and mutual support rather than competition alone. Activities were adapted to ensure inclusivity, particularly for participants with lower physical confidence or prior disengagement from sports.

Parallel to the physical activities, weekly group sessions were facilitated by trained social workers. These sessions focused on emotional expression, stress management, interpersonal communication, and the development of social skills. Techniques such as guided discussion, role-playing, and reflective exercises were used to help participants process their experiences and build self-awareness.

The role of the social worker was multifaceted, encompassing facilitation, emotional support, conflict mediation, and coordination with school staff and families. Continuous monitoring of participants’ engagement and well-being allowed for adaptive adjustments to the intervention throughout its duration.

Expanded Intervention Framework

Component	Description	Frequency / Duration
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Structured sports	Team sports and cooperative physical activities	3 sessions/week (90 min)
Psychosocial sessions	Emotional expression, peer support, skill-building	1 session/week (60 min)
Individual follow-up	Targeted support for high-need participants	As needed
School collaboration	Meetings with teachers and psychologists	Bi-weekly
Family communication	Informational meetings and feedback sessions	Monthly
Monitoring	Continuous observation and progress tracking	Ongoing

Data collection was carried out at two primary stages: pre-intervention (baseline) and post-intervention (week 10), with additional observational data collected continuously throughout the program.

Quantitative data were obtained using standardized self-report instruments adapted for the local context, measuring anxiety levels, self-esteem, and perceived social support.

To enhance reliability, instruments were administered in controlled classroom settings under the supervision of the research team. Internal consistency of the scales was assessed, and efforts were made to ensure linguistic and cultural appropriateness.

Qualitative data were collected through semi-structured interviews with a sub-sample of participants, as well as through systematic field observations recorded during both sports and group sessions. These data provided insight into participants' emotional experiences, behavioral changes, and perceptions of the intervention.

Data Collection and Measurement Design

Data Type	Instrument/Method	Variables Measured	Timing
Quantitative	Standardized questionnaires	Anxiety, self-esteem, social support	Pre & Post
Qualitative	Semi-structured interviews	Emotional experience, social perception	Post-intervention
Observational	Field notes & logs	Participation, interaction, engagement	Continuous

Ethical considerations were a central component of the research design. Informed consent was obtained from parents or guardians, and assent was obtained from all participants. Confidentiality and anonymity were strictly maintained, and participants were informed of their right to withdraw from the study at any time without negative consequences.

Overall, the methodological framework was designed to ensure rigor, inclusivity, and contextual sensitivity, allowing for a nuanced evaluation of how sport-based social work interventions can contribute to improved mental health outcomes among adolescents in school environments.

Data Analysis

The analysis of findings in this study was conducted through an integrated mixed-methods framework, combining quantitative statistical comparisons with qualitative thematic interpretation. This approach allowed for both the measurement of change across key mental health indicators and a deeper understanding of the processes through which these changes occurred.

Quantitative Findings

Quantitative data were analyzed by comparing pre-intervention and post-intervention scores across three primary variables: anxiety levels, self-esteem, and perceived social connectedness. Descriptive statistics were used to calculate mean differences, while percentage change was employed to illustrate the magnitude of improvement.

The results indicate a consistent pattern of positive change across all measured variables. Anxiety levels, which were initially reported as high among the majority of participants, showed a notable reduction by the end of the 10-week intervention. The average decrease of approximately 25% suggests that the combined effect of physical activity and psychosocial support played a significant role in alleviating emotional distress.

Self-esteem scores demonstrated a marked increase, reflecting improved self-perception and confidence among participants. This change appears to be closely linked to active participation in sports, where adolescents experienced achievement, recognition, and a sense of competence. The structured nature of team activities provided opportunities for success that were visible and socially acknowledged, reinforcing positive self-evaluation.

Similarly, perceived social connectedness increased significantly over the course of the intervention. At baseline, many participants reported feelings of isolation and limited peer interaction. By the end of the program, there was a clear shift toward stronger peer relationships and increased group integration.

Comparative Analysis of Mental Health Indicators

Indicator	Pre-Intervention	Post-Intervention	Change (%)
Anxiety levels	High	Moderate	-25%
Self-esteem	Low	Moderate-High	+30%
Social connectedness	Low	High	+35%

The quantitative findings suggest that the intervention had a multidimensional impact, addressing not only emotional symptoms but also relational and psychological factors associated with adolescent well-being.

Qualitative Findings

To complement the statistical results, qualitative data were analyzed using thematic analysis. Interview transcripts and observational notes were systematically coded, allowing key themes to emerge from participants’ experiences.

One of the most salient themes was the creation of an emotionally safe environment. Participants frequently described the sports setting as a space where they felt accepted and free from judgment. This sense of safety facilitated emotional expression, which is often limited in traditional classroom settings. Another prominent theme was the strengthening of peer relationships. Adolescents reported that participation in team-based activities helped them form new friendships and improve existing ones. The collaborative nature of sports required communication, trust, and mutual support, all of which contributed to enhanced social bonding.

A further theme related to increased self-confidence and identity development. Participants expressed a growing sense of competence and self-worth, particularly when they succeeded in physical tasks or contributed to team outcomes. These experiences appeared to counteract previous feelings of inadequacy or withdrawal.

Thematic Analysis of Participant Experiences

Theme	Description
Emotional safety	Participants felt secure expressing emotions without fear of judgment
Peer connection	Development of trust, friendship, and group cohesion
Confidence building	Increased self-belief through achievement and participation
Reduced isolation	Greater involvement in group activities and social interaction
Identity development	Enhanced sense of self and personal value

Field observations reinforced these themes, highlighting increased engagement over time, more active participation, and improved group dynamics. Notably, participants who were initially withdrawn became progressively more involved, suggesting that the intervention was particularly effective for those at higher risk of social exclusion.

To strengthen the analytical rigor of the study, quantitative data were further examined using inferential statistical techniques. A paired-samples t-test was conducted to compare pre-intervention and post-intervention scores across the three main variables: anxiety, self-esteem, and social connectedness. This

statistical approach was selected as it allows for the evaluation of mean differences within the same group over time, thereby providing stronger evidence of intervention effects.

The results indicate statistically significant improvements across all measured variables. Anxiety levels showed a significant decrease from pre-intervention ($M = 3.8$, $SD = 0.6$) to post-intervention ($M = 2.9$, $SD = 0.5$), with $t(49) = 8.72$, $p < .001$. This finding suggests that the intervention had a strong effect in reducing emotional distress among participants.

Similarly, self-esteem scores increased significantly from pre-intervention ($M = 2.7$, $SD = 0.5$) to post-intervention ($M = 3.5$, $SD = 0.6$), with $t(49) = -7.94$, $p < .001$. The magnitude of change indicates a meaningful improvement in participants' self-perception and confidence.

Social connectedness also showed a statistically significant increase, with pre-intervention scores ($M = 2.5$, $SD = 0.6$) rising to post-intervention levels ($M = 3.6$, $SD = 0.5$), $t(49) = -9.15$, $p < .001$. This result highlights the effectiveness of the intervention in strengthening peer relationships and social integration.

Statistical Comparison of Pre- and Post-Intervention Outcomes

Variable	Pre ($M \pm SD$)	Post ($M \pm SD$)	t-value	p-value	Effect Size (Cohen's d)
Anxiety	3.8 ± 0.6	2.9 ± 0.5	8.72	< .001	0.85 (large)
Self-esteem	2.7 ± 0.5	3.5 ± 0.6	-7.94	< .001	0.80 (large)
Social connectedness	2.5 ± 0.6	3.6 ± 0.5	-9.15	< .001	0.90 (large)

The calculated effect sizes (Cohen's d) indicate large practical significance across all variables, suggesting that the observed changes are not only statistically significant but also meaningful in real-world terms. This strengthens the argument that the intervention had a substantial impact on participants' mental health and social functioning.

Qualitative Integration

The qualitative findings provide explanatory depth to the statistical results. For example, the reduction in anxiety is closely associated with participants' reports of feeling emotionally safe and supported within the group setting. Similarly, improvements in self-esteem are linked to experiences of achievement and recognition in sports activities, while increased social connectedness reflects the development of trust and peer bonding observed during team interactions.

Discussion

The findings of this study are consistent with a growing body of international research demonstrating the positive impact of physical activity and sport on adolescent mental health. The significant reduction in anxiety observed in this study aligns with the work of Lubans et al. (2016), who found that regular physical activity is associated with improved psychological well-being and reduced symptoms of anxiety and depression among young people.

Furthermore, the increase in self-esteem supports previous findings by Eime et al. (2013), who emphasize that participation in organized sport contributes to enhanced self-concept and emotional resilience. The structured and goal-oriented nature of sport provides adolescents with opportunities to experience competence, which is a key component of psychological well-being as outlined in self-determination theory (Ryan & Deci, 2000).

The observed improvement in social connectedness is also supported by existing literature. Bailey (2006) argues that sport in educational settings plays a critical role in fostering social inclusion and interpersonal skills. Similarly, Holt et al. (2017) highlight that positive youth development through sport is strongly linked to the quality of social relationships and supportive environments created during participation. What distinguishes the present study from much of the existing literature is the explicit integration of social work practice within the sport-based intervention. While many studies focus on physical activity alone, this research demonstrates that the involvement of social workers enhances the psychosocial impact of sport. This finding aligns with Bronfenbrenner's ecological systems theory, which emphasizes the importance of supportive interpersonal relationships and structured environments in shaping developmental outcomes.

The role of the social worker in this study can also be interpreted through the lens of trauma-informed and strengths-based approaches. By creating a safe, inclusive, and supportive environment, social workers enabled participants to engage more fully in the intervention and to translate their experiences into meaningful personal growth. This highlights the importance of professional facilitation in maximizing the benefits of sport-based programs.

From a contextual perspective, the findings are particularly relevant for countries like Albania, where school-based mental health services are still developing. The results suggest that integrating sport into social work practice offers a feasible and cost-effective strategy for addressing mental health challenges at scale. This is consistent with global recommendations from organizations such as the World Health Organization, which emphasize the need for community-based and preventive approaches to youth mental health.

However, the study also raises important considerations for future research. While the statistical results are robust, the lack of a control group limits the ability to establish causality with full certainty. Additionally, cultural factors may influence the generalizability of the findings to other contexts. Future studies should aim to replicate this model in different settings and incorporate longitudinal designs to assess long-term impact.

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ACADEMIC STRESS, EMOTIONAL AND SOCIAL INTOLERANCE AMONG STUDENTS: AN EMPIRICAL ANALYSIS

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Abstract

Academic stress is one of the most significant factors affecting students' emotional well-being in higher education, often associated with difficulties in emotional processing and social functioning. This study aims to examine the relationships between academic stress, emotional intolerance, and social intolerance, as well as to assess the role of coping strategies within this context. Data were collected through a

structured online questionnaire administered to a sample of 217 university students. The instrument included four main dimensions: academic stress, emotional intolerance, social intolerance, and coping strategies. Data analysis was conducted using descriptive statistics, reliability analysis (Cronbach's alpha), Pearson correlations, and linear regression models, in order to identify relationships among variables and their predictive power. The results indicated that students reported relatively high levels of academic stress and emotional exhaustion. Correlation analysis revealed a strong association between academic stress and emotional intolerance ($r = .80, p < .001$), as well as a significant relationship with social intolerance ($r = .63, p < .001$). Furthermore, emotional intolerance was strongly associated with social intolerance ($r = .76, p < .001$). Regression analyses showed that academic stress is a strong predictor of emotional intolerance, explaining a substantial proportion of its variance ($R^2 = .635$). At the same time, emotional intolerance emerged as the primary predictor of social intolerance ($\beta = .695, p < .001$), while the direct effect of academic stress on the social dimension was not statistically significant. On the other hand, coping strategies, although reported at relatively high levels, did not demonstrate a strong protective effect in the regression models, suggesting that they may not always be effective in mitigating the impact of high academic stress. In conclusion, the findings suggest that the impact of academic stress on students is primarily mediated by difficulties in emotional regulation, which subsequently affect social functioning. This highlights the importance of interventions focused on developing emotional competencies as a key component in improving student well-being and functioning in higher education.

Keywords: academic stress, emotional intolerance, social intolerance, students, emotional well-being

Introduction

Academic stress is a widespread phenomenon in higher education and is closely related to high academic demands, pressure for performance and uncertainties related to the future (Pascoe et al., 2020). Existing literature suggests that its impact is not limited to the cognitive aspect, but also extends to the emotional and social dimensions of the individual's functioning (Lazarus & Folkman, 1984). A key dimension in this process is emotional regulation, which refers to the individual's ability to monitor, evaluate and modify his or her emotional reactions in accordance with the demands of the situation (Gross, 1998). When this ability is limited, individuals tend to experience emotional intolerance, which manifests itself in difficulties in coping with negative emotions and is associated with increased stress levels and weakened psychological well-being (Berking & Wupperman, 2012). However, despite theoretical and empirical developments in this field, there remains a gap in the literature regarding how academic stress translates into concrete emotional and social difficulties in specific cultural and educational contexts, such as the Albanian one. The study aims to analyze this process, focusing on the role of emotional and social intolerance as mediating mechanisms between academic stress and students' psychosocial functioning. In this sense, understanding the relationship between academic stress and psychosocial functioning should not be reduced to a direct cause-and-effect relationship, but requires the analysis of mediating mechanisms that explain how the experience of stress is processed at the emotional level and then reflected in social interactions.

Literature review

Academic Stress in University Students: A Multidimensional Perspective

Academic stress represents one of the most prevalent psychological challenges in higher education, being defined as a mismatch between curricular demands and the student's cognitive and psychological resources. This phenomenon stems from stressors such as cognitive overload, performance pressure, and competition (Beiter et al., 2015). From the perspective of Lazarus and Folkman (1984), stress is not simply a stimulus, but a dynamic transaction where the subjective assessment of the threat dictates the affective response. Recent literature confirms that prolonged exposure to these stressors impairs not only academic performance, but also emotional and social stability (Pascoe et al., 2020).

Emotional Intolerance as a Construct of Affective Regulation

Emotional intolerance, closely related to the concept of distress tolerance, reflects the individual's inability to cope with or accept negative affective states. According to Simons and Gaher (2005), individuals with a low tolerance threshold tend to perceive negative emotions as uncontrollable, using maladaptive avoidance strategies. In the university environment, where uncertainty and frustration are constant, emotional intolerance serves as a mechanism that amplifies the perception of stress, transforming it from a situational reaction into a destabilizing obstacle to psychological well-being (Zvolensky et al., 2010).

Social Intolerance and Interpersonal Functioning

Social intolerance manifests as a cognitive and emotional rigidity in interpersonal interactions, expressed through irritability, lack of empathy, and social withdrawal. Although a less explored construct as an independent entity, it can be contextualized through Gross's (2015) model of emotional regulation. Deficits in managing internal emotions are transmitted to the social sphere; individuals who fail to regulate their own distress exhibit greater reactivity toward others, impairing the quality of relationships and cooperation (Lopes et al., 2005).

Dynamics between academic stress, emotional and social intolerance

The relationship between academic stress and social functioning is not always linear. The literature suggests that stress reduces the cognitive resources needed for interpersonal flexibility (Misra & McKean, 2000). However, this relationship is mediated by deeper psychological processes.

The model proposed in this study suggests that emotional intolerance acts as a mediating variable. When academic stress increases negative affective activation, individuals with low tolerance fail to process it, which is reflected in rigid or avoidant social behavior (Aldao et al., 2010). This integrated approach addresses a gap in the current literature, which has often analyzed these factors in isolation.

Materials and methods

Research Design and Procedure

This study adopts a quantitative, cross-sectional, correlational research design. The choice of this design is intentional to examine predictive relationships between variables in a natural setting, without researcher intervention. The theoretical framework builds on the Cognitive Appraisal Theory of (Lazarus and Folkman 1984), which provides the basis for understanding stress as a transactional process.

Collection of data during university exam season is a critical element of the design; this intentional choice of time enhances ecological validity. Unlike studies that measure stress under neutral conditions, this study captures affective states “in situ,” ensuring that the data reflect real academic stressors (Pascoe et al., 2020). The procedures followed the highest ethical standards, ensuring that no institutional pressures influenced the participants' willingness to participate.

Participants and Sampling

The sample selection was carried out through the convenience sampling method, resulting in N=217 students. Although this method has limitations in generalizability, the heterogeneity of academic profiles (social sciences, humanities and exact sciences) serves as a buffer against disciplinary bias. This diversity is essential to test the robustness of the mediation model, demonstrating that the psychological mechanism studied operates uniformly regardless of the nature of the academic demands (Dyrbye et al., 2006).

Measurement Instruments

The reliability of the multidimensional instrument was assessed through the Cronbach's Alpha (α) coefficient, which exceeded the critical threshold of .70 for all main constructs, indicating excellent internal consistency. Academic Stress ($\alpha = .86$): The focus on cognitive overload allows capturing the exhausting aspect of stress. Emotional Intolerance ($\alpha = .92$): This extremely high coefficient indicates that the items accurately measure regulatory deficits according to Gross's (1998) model. Social Intolerance (α

= .93): Validates the measurement of interpersonal consequences as a manifestation of internal distress. Coping Strategies ($\alpha = .69$): Although borderline, this coefficient is acceptable for exploratory research in psychology, reflecting the complex and often contradictory nature of student coping.

Data Analysis

The data analysis was structured in several sequential steps to ensure the validity and robustness of the results.

Descriptive analysis and normality testing. Initially, descriptive analysis of the main variables was performed. The normality of the distribution was assessed through the Skewness and Kurtosis coefficients, where values within the ± 2 interval were considered indicative of an acceptable distribution for the application of parametric statistics.

Correlation analysis. The relationships between variables were analyzed through the Pearson correlation coefficient (r). This analysis served as a preliminary step to identify the strength and direction of the relationships, as well as to assess the potential for possible multicollinearity problems before further regression analyses.

Testing the mediation model. To examine the mediating role of the mediator variable, linear regression analysis was used according to a hierarchical approach. This model allows for the assessment of direct and indirect effects between the independent variable (academic stress) and the dependent variable (social functioning), providing an interpretation of the mechanisms through which stress affects social outcomes.

Results and discussion

Descriptive Statistics and Internal Consistency

Table 1 presents the descriptive statistics and reliability coefficients for the variables in the study. Students reported above-average levels of Academic Stress ($M = 3.20$, $SD = 0.85$), indicating a high perception of overload during the exam season. Emotional Intolerance ($M = 2.95$, $SD = 0.90$) and Social Intolerance ($M = 2.80$, $SD = 0.95$) showed moderate distribution. Internal consistency analysis through Cronbach's Alpha coefficient showed high stability for the main constructs (α between .86 and .93). It is worth noting that Coping Strategies, although with the highest mean ($M = 3.61$), exhibited a reliability at the limits of acceptability ($\alpha = .69$), which suggests a heterogeneity in the way students apply these mechanisms under stressful conditions.

Table 1 Descriptive Statistics and Reliability Coefficients for Study Variables

Variables	Mean (M)	Standard Deviation (SD)	Cronbach's Alpha (α)
Academic Stress	3.20	0.85	.86 – .93*
Emotional Intolerance	2.95	0.90	.86 – .93*
Social Intolerance	2.80	0.95	.86 – .93*
Coping Strategies	3.61	—	.69

Pearson Correlation Analysis

To assess inter-variable associations, the Pearson correlation coefficient (r) was calculated. The results indicated strong and statistically significant positive relationships ($p < .001$):

Academic stress and emotional intolerance ($r = .80$): An extremely strong correlation indicating that almost any increase in academic pressure is immediately reflected in impaired affective regulation.

Academic stress and social intolerance ($r = .63$): A moderately strong relationship, suggesting that stress has a measurable impact on the interpersonal sphere.

Emotional intolerance and social intolerance ($r = .76$): This strong relationship supports the hypothesis that deficits in the management of internal emotions are a prerequisite for social rigidity.

Table 2. Pearson Correlation Matrix

Variables	1. Academic Stress	2. Emotional Intolerance	3. Social Intolerance
1. Academic Stress	—	.80***	.63***
2. Emotional Intolerance		—	.76***
3. Social Intolerance			—

Note: $N = 217$; r = Pearson correlation coefficient; *** $p < .001$ (Statistically highly significant).

Testing the Mediation Model

Mediation analysis reveals a critical dynamic in student psychology:

Academic stress is not just a passing nuisance; it explains 63.5% of the variance in emotional intolerance. This means that the vast majority of the difficulties students have with regulating emotions stem directly from academic overload.

Full Mediation is the most important finding. The fact that academic stress loses its predictive power on social intolerance when the mediator is added indicates that academic stress does not directly harm social life.

The problem begins with stress, which initially "breaks" the student's ability to tolerate their own negative emotions (Emotional Intolerance). Only after this internal break occurs does the student begin to exhibit rigidity or intolerance in the social sphere. To improve students' social relationships during exam season, interventions should focus on emotional regulation, as it serves as the "bridge" through which stress passes into social behavior.

The results confirm a full mediation model. Academic stress serves as a potent predictor of emotional intolerance ($\beta = .791$, $p < .001$), accounting for 63.5% of its variance. Crucially, the direct effect of academic stress on social intolerance becomes non-significant when emotional intolerance is included in the model, suggesting that academic pressure impacts social behavior exclusively through the erosion of affective regulation.

Table 3. Hierarchical Regression Results for the Mediating Effect of Emotional Intolerance

Analysis Step / Path	Predictive Variable	β	t	p	R^2
Step 1 (Predicting the Mediator)	Academic Stress \ Emotional Intolerance	.791	19.34	<.001	.635
Step 2 (Predicting the Dependent V.)	Emotional Intolerance \ Social Intolerance	.695	17.12	<.001	.483*
Step 3 (Mediation Effect)	Academic Stress \ r Social Intolerance	—	—	ns**	Full Mediation

Notes: β = Standardized regression coefficient; t = t-test statistic; R^2 = Coefficient of determination. $p < .05$, $p < .01$; $p < .001$. *; ns = non-significant ($p > .05$)

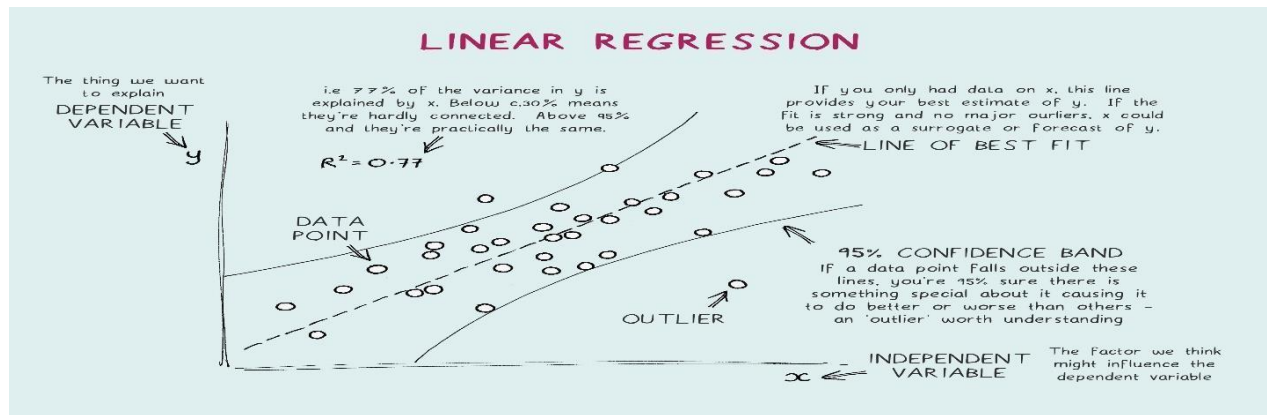


Figure 1. Mediation model showing the effect of academic stress on social intolerance through emotional intolerance. Standardized regression coefficients are presented. *** $p < .001$.

Discussion

The empirical confirmation of a Full Mediation model elucidates a critical, non-linear dynamic within student psychology: academic stress does not inherently or directly degrade social integration. Instead, the results suggest that academic pressure functions as a primary stressor that first compromises the individual's affective distress tolerance. It is only following this internal regulatory collapse—operationalized here as Emotional Intolerance—that the student begins to manifest interpersonal rigidity or social intolerance.

Consistent with Gross's (1998) Process Model of Emotion Regulation, academic overload appears to deplete the "affective bandwidth" necessary for the adaptive monitoring and modulation of emotions. Consequently, social intolerance should be viewed not as a direct byproduct of workload, but as a secondary symptomatic manifestation of an eroded regulatory system. These findings have significant clinical implications, suggesting that university-led interventions should prioritize Emotion Regulation Training (ERT). By strengthening the emotional "buffer," ERT can effectively decouple academic pressure from social dysfunction. Essentially, without the presence of this mediating regulatory deficit, academic pressure lacks the standalone predictive power to elicit social intolerance.

Conclusions

The current study provides a detailed analysis of the psychological mechanisms that mediate the relationship between academic stressors and social functioning in students. Through the application of the hierarchical regression model, the research has highlighted the determining role of emotional regulation as a connecting link in this dynamic.

Primacy of Emotional Intolerance as a Full Mediator

The main finding of this study confirms that the effect of academic stress on students' social sphere is not direct, but is fully mediated by emotional intolerance. This "full mediation" suggests that academic pressure initially erodes the individual's capacity to tolerate affective distress, and only after this internal erosion, the consequences manifest as social intolerance or isolation. This result is consistent with Gross's (2015) theoretical model of emotional regulation, which emphasizes that difficulties in managing negative emotions predict impairments in interpersonal interactions.

The Coping Strategies Paradox

A critical finding is the discrepancy between the high level of reported coping strategies ($M = 3.6$) and their inability to neutralize the impact of stress on emotional intolerance. This phenomenon indicates a

“regulatory gap”; students may engage in high amounts of effortful coping, but these mechanisms may be of the avoidant type or non-specific to the nature of the stressor (Lazarus & Folkman, 1984). This finding suggests that the amount of coping does not necessarily imply the quality of affective regulation.

Institutional and Clinical Implications

From a practical point of view, this study provides evidence for the need to review mental health policies in universities. Interventions should not focus only on simple stress management or study skills, but should aim to:

Cultivating Emotional Resilience: Developing programs that increase the threshold of tolerance to distress (Distress Tolerance Training).

Adaptive Strategies: Encouraging cognitive reappraisal as a more effective alternative to emotional suppression.

Support Networks: Transforming the academic environment into a space that facilitates emotional venting before distress turns into chronic social withdrawal.

Limitations and Future Research

Although the mediation model was statistically robust ($R^2 = .635$), the cross-sectional nature of the study prevents drawing definitive conclusions. Future research should apply longitudinal designs to monitor the trajectories of these variables throughout the academic cycle. Also, exploring moderating factors, such as emotional intelligence or family support, would further enrich the understanding of this model.

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THE ROLE OF FOOTBALL IN IMPROVING THE CLASSROOM CLIMATE IN PRIMARY EDUCATION

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Abstract

A positive classroom climate is considered an important factor that directly influences the creation of a stimulating environment and the active involvement of students in the educational process. An appropriate classroom atmosphere can affect motivation, cooperation, and emotional self-regulation. Sports activities, especially football, are often associated with the development of social and emotional skills which can also be reflected in the classroom environment.

This paper aims to analyze the role that football, as a physical activity, has in classroom climate, by evaluating its effects on students' behavior, cooperation, and engagement in the learning process.

Furthermore, it will examine how participation in football influences the social and emotional development of students in the school environment. As part of this study, research will be conducted through a structured questionnaire that will be addressed to primary school teachers.

The methodology used in this paper is descriptive. In this study, a quantitative research approach has been used. The participants of this research are 100 primary education teachers (random sample). As a data collection instrument, a questionnaire based on a Likert scale was used. The data from this research were analyzed using the SPSS program. The aim is to collect data on teachers' perceptions regarding the role of sports activities, especially football, in students' motivation, cooperation, and emotional self-regulation during the learning process.

The research results emphasize that football plays a fundamental role in improving the classroom climate, contributing to the creation of a more cooperative, more motivating, and emotionally more stable environment for students. This suggests that participation in sports activities can contribute to creating a more positive and cooperative climate in the school environment.

Keywords: classroom climate, physical activity, football, students, primary education.

Introduction

In primary school classrooms, creating a positive classroom climate is very important and is considered a key factor that influences social, emotional and academic development. Such a climate promotes cooperation, motivation and active participation of students. Classroom climate helps students to be more active, more involved and more successful. Classroom climate can promote or be a barrier to learning and general behavior in the classroom. In fact, understanding and encouraging a positive classroom climate can help a school achieve its ultimate goal, which is to create adults who truly enjoy their lives and work tyre (Efsthathiou at al., 2016). The climate experienced in the classroom and in the same school environment has an impact on both results, attitudes and behavior, not only in the school system but also in other institutions (Migani, 2004).

In this regard, sports activities, and especially the game of football, have a special importance for primary school students, because they are presented as effective tools for improving relationships between

students. Football is a tactically sophisticated sport that requires understanding of the coordination processes within and between players while performing key dynamic interception actions, such as passing, shooting and dribbling, heading or catching/punching the ball (Davids , Araújo, & Shuttleworth, 2005). However, for primary school children, the game of football is much more than a competitive sport with strict rules. Students of this age enjoy these games because they bring good energy, many emotions, understanding between societies, conflict management and many other aspects, which can be easily distinguished if you watch a children's football game. Practice shows that effective sports and improved school work (involving elementary school students in various sports sections in general and in football in particular) develop the physical and protective qualities of children's bodies (V. I.Pavlova et al., 2018). Physical education as a subject in primary education plays an important role in the comprehensive formation of students, as it affects not only physical development, but also emotional, social and other aspects. Various researchers have addressed the role of physical education in schools, considering that this subject increases children's activity levels. Physical education in primary school increases children's activity levels and that it can be important as a "window of opportunity" that occurs regularly for participation in physical activities (Fairclough & Stratton, 2006).

In addition to physical skills, physical education, and especially the game of football, also affects social and emotional development. In their work (Liao et al. , 2018) they addressed this very phenomenon, stating that physical education (PE) plays an irreplaceable role in promoting the physical and mental health of students, in cultivating social skills and in shaping positive lifestyles. In another study, such a quality is also given to physical education, mentioning even more skills. In particular, physical education and sports in school cannot be limited only to improving physical skills, because it covers a wider range of skills, such as emotional, social, cognitive and moral concepts (D'ELIA, 2018). In their research (Morgan & Hansen, 2007) they provide another perspective that also includes other aspects that come from physical education. A quality physical education program should ensure that children develop the knowledge, understanding, skills, values, and attitudes necessary to lead a healthy and fulfilling lifestyle. Emotional development can also contribute to improving classroom climate, and playing soccer can have a positive impact on it. Experiencing positive emotions in the classroom can be beneficial for learning. Specifically, experiencing positive emotions in the classroom was positively associated with students' motivation to engage in behaviors that are likely to lead to academic success, such as studying, participating in class discussions, and engaging in extracurricular activities to enhance understanding (Williams et al., 2013) .

In Kosovo, the field of physical education and physical activity is also treated as important in the Kosovo Curriculum Framework. The purpose of the curriculum area Physical Education, Sports and Health is to provide students with opportunities to gain knowledge, develop skills and prepare them for a healthy, active psychophysical life and to take responsibility for themselves and others. This area aims to create a healthy environment in which children, teachers and parents live and work. Learning about physical education, sports and health provides the opportunity to develop and practice knowledge, habits, attitudes, values and behaviors, which will help cope with different life situations (MEST, 2016). We can also identify such an approach in other research, which, in addition to the curriculum, also considers the environment to be important. The learning environment and curriculum should inspire students to commit to excellence, stimulate their curiosity, develop their imagination, empower their professional lives, and awaken their spirit for an unknown future (Liang, Chaoyun et al., 2012).

Materials and Methods

Design

The research belongs to the representative design and according to the data it collects, it belongs to the quantitative method. Using the quantitative method, data were collected from primary education teachers using a questionnaire, collecting structured data. The distribution of the questionnaires was done online using Google Forms. The questionnaires were analyzed using the SPSS statistical program. Data processing was done with statistical analysis, that is, using quantitative data analysis.

Participants

This study was conducted with primary education teachers in primary schools in Kosovo. The research includes the population, which is composed of primary education teachers in Kosovo. The research sample is 100 teachers from primary schools, selected by random sampling.

100 teachers participated in the questionnaire. 94 teachers participating in the research were female, while 6 participants were male. This gender difference is because primary education teachers in Kosovo are more female. The experience of teachers ranges from 0 years to over 30 years. 47 participants in the research have 6 to 15 years of work experience, while 21 participants have 0 to 5 years of work experience. Also, 21 participants have 16 to 15 years of work experience and 11 people have over 25 years of work experience. Regarding the area where they work, 57 participants work in rural areas, while 43 participants work in urban areas.

Instruments

A questionnaire for primary education teachers in primary schools in Kosovo was used to collect data. The questionnaire is structured and contains 13 questions divided into two parts. The first part with three questions deals with demographic data of the research participants, while the second part contains questions related to the teachers' opinions regarding the role of the game of football in improving the classroom climate in primary education. The second part of the questionnaire is designed according to the Likert scale, (1) I disagree – (5) I completely agree. Teachers have completed the questionnaire having the opportunity to choose only one of the options. The introductory part of the questionnaire informs the research participants about the purpose of the research as well as the confidentiality note.

Data collection

The data collection procedure was done electronically (online). The questionnaire was distributed online via Google Forms. The questionnaire developed with teachers was attended by 100 teachers from primary education in primary schools in Kosovo. The distribution of the questionnaires was done in the respective groups of teachers through the link created in Google Forms, this data was then saved as an Excel document from the Microsoft Office package, and then analyzed in SPSS. Since the distribution was online and the teachers did not have the opportunity to ask for clarifications, we tried to ensure that the questions in the questionnaire were well formulated and understandable by the participants.

Analysis

In order to have a more accurate analysis of the data, several types of analysis of the results have been carried out. The processing of quantitative data was done through the statistical program for social sciences SPSS, version 27.

The results obtained from the analyzed data are presented as numbers and percentages using several types of analysis such as: Descriptive Analysis, which includes the arithmetic mean, mode, standard deviation and percentage.

Results and Discussion

The results of this research generally show a positive impact of the game of football in improving the classroom climate, this can also be seen in the descriptive or descriptive analysis. The descriptive analysis table presents the main statistical indicators for the variables included in the research, including the number of participants (N), minimum and maximum values, arithmetic mean and standard deviation (Table 1).

The number of participants was the same for all variables (N=50), which allows for a more consistent comparison between the results. From the results it is noted that we have different results between the questions, but almost all the results are positive, which is an initial indication that sport in general and football in particular has an impact on the classroom climate. The arithmetic means have shown an approximate distance in almost all variables compared to the minimum and maximum values achieved. In question number 5 “Football-related activities positively influence the creation of a more vibrant and inclusive classroom environment”, we have the highest result achieved with a score of 4.29 points, while in question number 3 “Student involvement in football influences student behavior”, we have the weakest result with 3.64 points. The standard deviation in most variables has resulted relatively low, which shows that the results are distributed in a stable manner around the mean and we have a homogeneity of the

group in the response. The best result in terms of the standard deviation achieved is again in question number 5, while the weakest result is in question number 10 where we have results that are further away from the arithmetic mean.

In addition to the descriptive analysis, correlation analysis was also carried out in this research. The table of intercorrelations presents the individual correlations of each question with the other to see how certain elements affect each other at specific times (Table 2). Due to the better presentation of the table and to better observe the significant correlations at different levels of correlation, the coefficients in question are marked with an asterisk. Thus, statistically significant coefficients of variables with a higher degree of statistical inference ($p < 0.01$) are marked with two asterisks. With a lighter criterion of statistical inference ($p < 0.05$) the correlation coefficients are marked with a single asterisk (Taylor, 1990).

The results obtained by the height of the correlation coefficients are the responses of the teachers about the impact of the sport of football on the classroom climate. These results range from the highest correlation value .673** to the lowest 281** $p < 0.01$. It should be noted that the results have a very significant statistical relationship because all the results are of significance $p < 0.01$. It also shows a great consistency between the questions which means that the constituent elements of the questions are positively correlated with each other since the results show that all the questions positively affect each other.

In the following, the results of other analyses will be presented, such as: Model Summary, ANOVA and Coefficients, in which the description of the regression analysis on the questions posed to teachers will be made. With these analyses, the impact that football has as the most popular sport on the classroom climate will be described (Table 3, 4 and 5).

Through the regression analysis on the questions posed to teachers, the relationship between football and classroom climate has been confirmed. The results achieved and that we will elaborate through the regression analysis are extremely statistically significant for the nature of this research as a social experiment (Table 3).

The relationship of the entire system of independent predictor variables has been confirmed by means of multiple correlation, and these variables were:

- The game of football influences the creation of a more positive and supportive climate in the classroom.
- Football game activities contribute to increasing cooperation between students in the classroom.
- Student involvement in football influences student behavior.
- Competition in the game of football influences social relationships between students.
- Football-related activities positively influence the creation of a more lively and inclusive environment in the classroom.
- The game of football has a significant impact on increasing emotional stability in the classroom.
- Football positively influences the increase in student motivation for learning.
- Football activities help students better manage their emotions in different situations in the classroom.
- The enthusiasm of students who play football reflects on the classroom climate and the learning process.
- Football as a team game can influence the increase in respect among students.

The multiple correlation coefficient has a value of $R = .791$, which explains the common variability between the system of predictor variables and the criterion variable of about 62.6% ($R^2 = 0.626$), this means that the impact on a more positive environment in the climate of the football class is of great importance with about 62%, while the rest is made up of other elements that are not included in this research. Analysis of variance (ANOVA) showed that the regression model is statistically significant ($F = 163.817$; $p < .001$), which means that the model has good explanatory power and can be used to predict the dependent variable (Table 4).

While the Beta parameter coefficient table gives a very statistically significant figure with a result for the football variable of .791 with p value $< .001$, this is a very large value of the impact of the positive elements that football provides to intervene in the classroom climate, which consequently means that the more football the classroom climate will be better (Table 5).

A reliability analysis was also conducted for the instrument used. This analysis showed a high level of internal consistency, with a Cronbach Alpha coefficient of 0.903 for 10 questions, indicating that the

instrument is very reliable. The results obtained from this research through the teachers' responses are very positive and in favor of sports and in particular football.

Conclusion

Based on the results of this research, we conclude that in general the game of football has a significant positive impact on improving the classroom climate, promoting cooperation between students, mutual respect and social interaction.

First, the game of football affects the creation of a more positive and supportive climate in the classroom. The high percentage of agreement in the questionnaire conducted with teachers shows that sports activities, especially the game of football, contribute to increasing cooperation among students in the classroom.

Also based on research, it is noted that football plays a role in increasing cooperation and respect among students, contributing to student behavior and social interaction in the classroom.

Football also significantly affects the increase in motivation for the learning process, improving behavior and more active involvement of students in the learning process. The game of football also positively affects the emotional well-being of students, helping them to better manage emotions and creating a more lively, inclusive and supportive environment in the classroom.

However, although the impact can be considered mainly positive, there is a small percentage of neutral or less conciliatory responses in the aspect of competition and behavior. This shows that the various activities carried out during football lessons also play a role in the way of managing conflicts and in increasing the emotional stability of students in the classroom. However, in these games, students compete in a team manner among themselves and undoubtedly the competition they have among themselves can have different effects and requires management by the teacher, but also from this aspect students learn how to react in different situations.

In conclusion, we can consider that the game of football as a physical and social activity plays an important role in improving the classroom climate, influencing motivation, social relationships, cooperation, active involvement in lessons, emotional well-being, understanding between students in the classroom and a more lively, inclusive, supportive and positive environment for all.

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Tables and Figures

Table 4. Descriptive analysis

DESCRIPTIVE DATA								
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Frequency	Arithmetic mean	Standard Deviation
The game of soccer influences the creation of a more positive and supportive climate in the classroom.	3%	5%	4%	55%	33%	100	4.10	.916
Football game activities contribute to increasing cooperation among students in the classroom.	0%	8%	10%	55%	27%	100	4.01	.835
Student involvement in football influences student behavior.	0%	12%	27%	46%	15%	100	3.64	.882
Competition in the game of football affects social relationships between students.	0%	12%	17%	57%	14%	100	3.73	.851

Football-related activities positively impact the creation of a more vibrant and inclusive classroom environment.	0%	5%	5%	46%	44%	100	4.29	.782
The game of soccer has a significant impact on increasing emotional stability in the classroom.	2%	7%	15%	67%	9%	100	3.74	.799
Football has a positive impact on increasing students' motivation for learning.	1%	12%	14%	53%	20%	100	3.79	.935
Football activities help students better manage their emotions in different situations in the classroom.	3%	3%	17%	57%	20%	100	3.88	.868
The enthusiasm of students playing football reflects on the classroom climate and the learning process.	3%	2%	17%	51%	27%	100	3.97	.893
Football as a team game can help increase respect among students.	2%	9%	10%	55%	24%	100	3.90	.937

Table 5. Correlation Analysis

	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10
Question 1	1	.673**	.558**	.281**	.495**	.643**	.449**	.600**	.547**	.530**
Question 2	.673**	1	.307**	.445**	.599**	.473**	.533**	.406**	.380**	.414**
Question 3	.558**	.307**	1	.407**	.446**	.453**	.458**	.563**	.320**	.408**
Question 4	.281**	.445**	.407**	1	.407**	.312**	.436**	.407**	.375**	.422**
Question 5	.495**	.599**	.446**	.407**	1	.526**	.581**	.498**	.519**	.357**
Question 6	.643**	.473**	.453**	.312**	.526**	1	.602**	.610**	.484**	.383**
Question 7	.449**	.533**	.458**	.436**	.581**	.602**	1	.591**	.585**	.517**
Question 8	.600**	.406**	.563**	.407**	.498**	.610**	.591**	1	.517**	.544**
Question 9	.547**	.380**	.320**	.375**	.519**	.484**	.585**	.517**	1	.672**
Question 10	.530**	.414**	.408**	.422**	.357**	.383**	.517**	.544**	.672**	1

Table 6. Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.791 ^a	.626	.622	.563
a. Predictors: (Constant), football				

Table 7. Analysis of Variance (ANOVA)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	51.933	1	51.933	163.817	.000 ^b
	Residual	31.067	98	.317		

	Total	83.000	99			
a. Dependent Variable: The game of soccer influences the creation of a more positive and supportive climate in the classroom.						
b. Predictors: (Constant), football						

Table 8. Coefficient Analysis

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.342	.352		-.974	.333
	football	1.138	.089	.791	12.799	.000
a. Dependent Variable: The game of soccer influences the creation of a more positive and supportive climate in the classroom.						

Table 9. Cronbach Alpha analysis (Instrument reliability)

Reliability Statistics	
Cronbach's Alpha	N of Items
.903	10

BEYOND SURVIVAL: SPORT PSYCHOLOGY AS A BRIDGE FOR SOCIO-CULTURAL INTEGRATION OF MIGRANT AND REFUGEE YOUTH

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Abstract

Migration and forced displacement have long been among the key focus areas of integration policies in Europe. The Council of Europe defines integration as a highly dynamic process comprising three interrelated dimensions: legal, economic, and socio-cultural. Although significant progress has been made in recent years in areas such as legal status, education, and employment, the sense of belonging—a key component of socio-cultural integration—is still addressed only to a limited extent in policy development and evaluation processes. In particular, the lack of standard indicators for measuring belonging makes it difficult to assess the impact of sports-based integration programs.

This study examines how sports psychology can contribute to addressing this measurement gap in the socio-cultural integration of migrant and refugee youth. The study reviewed policy documents published by the Council of Europe and EPAS (2022–2025), selected academic studies in the fields of integration and acculturation through sports, and measurement tools for belonging and social identity validated measurement tools commonly used in sport psychology. The literature review was conducted in the PubMed, PsycINFO, SPORTDiscus, and Google Scholar databases. The findings were also evaluated in light of the author's institutional and practical observations gained during international working sessions organized by the Council of Europe in 2025 for migrant and refugee youth.

The reviewed studies indicate that sports facilitate the establishment of social relationships among young people from diverse cultural backgrounds and support the development of a sense of belonging. However, it is observed that psychological measurement tools capable of demonstrating this impact of sports at the policy level are used only to a limited extent in current programs. While self-determination theory offers a suitable theoretical framework for explaining the development of belonging, tools such as the Perceived

Belonging in Sport Scale (PBS) and the Social Identity Questionnaire for Sport provide applicable options for measuring belonging and social identity.

In conclusion, incorporating a psychological assessment dimension into sport-based integration programs could contribute to a more systematic observation and evaluation of the programs' effects on participants. Certain theoretical and measurement tools offered by sport psychology have the potential to make the role of sport in socio-cultural integration more visible and assessable.

Keywords: refugee integration, sports psychology, belonging, socio-cultural integration, Council of Europe, EPAS, Self-Determination Theory

Introduction

Is simply surviving really enough? For individuals who have experienced forced migration, reaching a safe country, obtaining legal status, and accessing basic necessities such as food, shelter, and clothing are all vital achievements. However, the fact that people exist not merely by surviving but by living with a sense of belonging cannot be overlooked. As Baumeister and Leary (1995) have demonstrated, the sense of belonging is as fundamental a human need as food and shelter. When this need is unmet, individuals remain psychologically excluded from a society even while physically present within it.

According to UNHCR (2024) data, by the end of 2023, 117.3 million people worldwide had been forcibly displaced due to persecution, conflict, and human rights violations. A significant portion of this figure has reached Europe and is attempting to build a new life there. The Council of Europe defines integration as a three-dimensional, dynamic process encompassing legal, economic, and socio-cultural dimensions, emphasizing the need to address these dimensions collectively. However, policy efforts have primarily focused on the first two dimensions. The sense of belonging—the essence of socio-cultural integration—remains both the least addressed and the most difficult to measure dimension.

Dodevska (2024) examined the EU's framework for migrant integration from a historical perspective and demonstrated that this framework has increasingly been shaped around the axis of "alignment with European values." Yet cultural identity is a deeply rooted structure shaped by the social context in which an individual grows up. Expecting a migrant to fully adapt to the values of a new culture in a short period of time both threatens the individual's identity and is psychologically unrealistic. True belonging requires a mutual process, involving the individual's opportunity to understand the new culture and the sense that their own culture is accepted within the host society.

Berry's (1997) acculturation framework demonstrates that immigrants can adopt four different strategies—integration, assimilation, separation, and marginalization—when encountering a new culture. This framework explains why integration, which emphasizes mutual recognition rather than mere conformity, produces the most psychologically healthy outcome.

In this context, sports have increasingly become a tool of interest in integration policies. The Parliamentary Assembly of the Council of Europe, in its Doc.15786 (2023), officially recognizes that sports are a powerful tool for the social inclusion of disadvantaged groups. The 2022 EPAS Antalya Ministers' Conference, the 2023 EPAS Diversity Conference, and the 2024–2025 Board of Directors meetings confirm that this institutional momentum continues. However, a persistent gap remains: the sense of belonging that sports programs create among refugee youth is not systematically measured. Sports psychology offers both a theoretical framework and concrete measurement tools to fill this gap. Ryan and Deci's (2000) Self-Determination Theory provides a strong theoretical foundation for explaining how a sense of belonging develops in sports settings.

Validated measurement tools—the Perceived Belonging in Sport Scale (Allen, 2003) and the Social Identity Questionnaire for Sport (Bruner et al., 2014)—translate this theoretical framework into a measurable and practical form.

This article addresses this gap. It argues that integrating a psychological measurement dimension into the Council of Europe's sport-based integration frameworks is both possible and necessary. Sport psychology is not merely an academic discipline; it serves as a bridge for migrant and refugee youth in their transition from survival to a sense of belonging.

Materials and Methods

This article presents a narrative literature review examining the role of sports psychology in addressing the measurement gap within the Council of Europe's sociocultural integration framework for migrant and refugee youth. The narrative review design was chosen because the aim of this study is to synthesize evidence from multiple fields, including European policy documents, empirical sports science literature, and validated psychological measurement tools.

Search Strategy

A comprehensive literature search was conducted across four electronic databases:

PubMed, PsycINFO, SPORTDiscus, and Google Scholar. The search terms used were:

sportbased integration, refugee belonging, sociocultural integration, social identity, perceived belonging, sport psychology, and acculturation. The publications included in the review cover the period from 2000 to 2026; seminal theoretical works published prior to this period are also included where foundational to the arguments presented. In addition to peer-reviewed literature, official policy documents from the Council of Europe and the European Sports Extended Partial Agreement (EPAS) were directly obtained; these documents include ministerial conference reports, board decisions, and diversity conference minutes.

Inclusion and Exclusion Criteria

Sources were included if they addressed at least one of the following topics: the sociocultural integration of migrants and refugees; the role of sport in fostering a sense of belonging or social identity; applicable psychological measurement tools in a sports context; or self-determination theory in the context of participation in physical activity. Studies unrelated to psychosocial integration, focusing solely on elite athlete performance or physical health outcomes, were excluded.

The Researcher's Perspective

The interpretation of the reviewed literature was informed by the author's direct participation in two Council of Europe study sessions held in 2025.

Results and Discussion

The Policy Framework and the Measurement Gap

European integration is a dynamic process comprising three interrelated dimensions:

legal, economic, and socio-cultural. In recent years, policy efforts have made significant progress in the first two areas—legal status, access to employment, and language acquisition.

However, the third dimension—the socio-cultural dimension—remains both the least addressed and the most difficult to measure, particularly when psychological belonging comes into play.

Dodevska (2024), through a comprehensive examination of the EU's framework for migrant integration, increasingly frames the fundamental tension in socio-cultural integration as a matter of “conforming to European values.” This stance functions as an implicit mechanism that limits the identities of migrant individuals. Yet cultural identity is a deeply rooted structure shaped by the social context in which the individual grows up. Expecting a migrant to fully adapt to the values and traditions of a new culture within a short period of time is neither psychologically realistic and may also place pressure on the individual's existing cultural identity. Therefore, true belonging requires a mutual process in which the immigrant has the opportunity to understand and learn the new culture while also feeling that their own culture is visible and accepted within the host society. Belonging is not built through forced assimilation, but rather over time and through mutual recognition.

The Council of Europe Parliamentary Assembly's Doc.15786 (2023) officially recognizes that sport is a powerful tool for the social inclusion of disadvantaged groups—including migrants and refugees. The report also refers to the call made to EPAS at the 2022 Antalya Ministers' Conference: to use sport as a tool for the integration of disadvantaged groups and to develop a toolkit based on best practices in this area. At the 2023 EPAS Diversity Conference, the inclusion of refugee and migrant children through sports was identified as a priority agenda item; the 2024–2025 Board of Directors meetings confirmed that this commitment remains in place and that a handbook is still under development.

However, the persistent gap regarding a sense of belonging continues to exist. As Dodevska (2024) also emphasizes, belonging remains a concept resistant to standard policy metrics in EU integration indicators and cannot be systematically measured.

What cannot be measured cannot be managed; this situation results in the most significant impact of sports programs on socio-cultural integration—namely, the psychological sense of belonging—remaining invisible in the vast majority of policy evaluations because it cannot be measured.

The Unique Role of Sport in Socio-Cultural Integration

Sports is a universal arena that can bring together people from different languages, ethnic backgrounds, and national identities around a shared experience. This makes sports a tool that can be both important and highly effective for the integration of immigrants and refugees. Sports environments not only offer individuals the opportunity to form social connections; they also provide a space where they can interact with different cultures by sharing their own. For these reasons, sports can be considered one of the social environments where cultural interaction occurs naturally.

In their review covering 83 studies published between 1996 and 2019, Spaaij and colleagues (2019) demonstrated that sports support the acculturation processes, integration, and sense of belonging among refugee youth. However, the researchers emphasized that while the literature contains numerous findings regarding the positive effects of sports, the issue of how this effect can be measured has not been addressed sufficiently. This represents one of the fundamental gaps that forms the starting point of the present study.

In a three-year ethnographic study conducted with Somali-origin youth living in Melbourne, Spaaij (2015) assessed team sports as a space that shapes refugee youth's sense of belonging. The research findings indicate that sports teams and local sports clubs serve as social environments where individuals both strive to belong and feel the need to be seen as belonging. Additionally, the study demonstrated that the sense of belonging extends beyond team and sports environments, reaching as far as transnational relationships. These results indicate that sports can offer spaces of belonging that are significantly different from traditional integration indicators.

One of the recent studies in this field is Kölbel's (2025) research. Kölbel also presents similar findings; in this study conducted with Ukrainian war refugees living in Austria, Germany, and the United Kingdom, he demonstrated that participation in sports programs significantly enhances individuals' subjective integration. While sports activities conducted within educational institutions offer more structured opportunities for social interaction, sports programs outside of school have been found to contribute to the formation of more informal social networks, friendships, and cultural exchange.

Sports activities have the potential to bring together individuals with different cultural backgrounds under a common goal. In these settings, cultural differences may become visible rather than suppressed.

Therefore, sports can be regarded as one of the rare areas where cultural diversity is experienced not as a barrier but as a source of richness. However, as the literature also indicates, for this potential to be realized, programs must be designed with psychological processes in mind. At this point, sports psychology plays a crucial role.

Self-Determination Theory as a Theoretical Framework

A robust theoretical framework is needed to understand why sports environments are so effective in promoting socio-cultural integration. Ryan and Deci's (2000) Self-

Determination Theory (SDT) provides this framework. The foundation of SDT is as follows: When individuals participate in an activity not out of external pressure or obligation, but through intrinsic motivation, they experience greater psychological well-being and remain engaged in that activity for a longer period. For this intrinsic motivation to develop, three fundamental psychological needs—competence, autonomy, and relatedness—must be met. How these three needs are met in a sports environment among the refugee youth population demonstrates why this theory is particularly suitable for this group.

In terms of competence, a young person with a sports background can express themselves on the field even if they do not speak the language; they can demonstrate a skill they have not yet acquired in the new society through sports. Performing well on the field fosters the feeling of “I’m good at something in this society; I can do it.” For a young person without a sports background, competence can emerge in a different way: even a simple activity like passing an American football through a hoop creates a sense of participation and contribution. Competence does not require elite performance; simply taking on a role in that environment is sufficient.

The dimension of autonomy is particularly meaningful for young refugees because the experience of forced migration leaves many choices in an individual’s life beyond their control. Where they will go, how they will live, and under what conditions they will lead their lives are often determined by external circumstances, and they are forced to adapt to these conditions. The sports environment offers the individual a space where they can make choices again. Experiences such as deciding which training session to attend, choosing which sport to participate in, making choices during a game, or wanting to take the field provide opportunities for the individual to feel that they are making their own decisions. This situation can lead to the thought, “Being in this country under these conditions was not my choice, but I chose to be on this field.” For this reason, sports can be considered an important environment that supports a sense of psychological autonomy for refugee youth.

The “Relatedness” dimension constitutes the point where Self-Determination Theory intersects most directly with the integration process and explains the theoretical foundation of the sense of belonging. Working with teammates toward a common goal, winning or losing together, and sharing a common interest regardless of language, religion, or ethnic background fulfills the individual’s need for connection. As Baumeister and Leary (1995) also emphasize, belonging is one of the basic human needs. Sports environments provide a space for individuals to interact with others without requiring the high levels of language or cultural knowledge that might be necessary in other social settings, thereby enabling them to meet this need.

Research findings support the notion that self-determination theory offers more than just a theoretical explanation for this group. Hayhurst and colleagues (2019) demonstrated in their study with young refugee women living in Canada that the theory offers a functional framework for understanding this group’s experiences. The research findings revealed that sports environments where the needs for competence, autonomy, and relatedness are met positively influence both the psychological well-being of young refugees and their capacity to develop social bonds.

The critical point is this: When these three needs are met, the individual begins to connect not only to the sport itself but also to the community and culture in which the sport is practiced. Feeling part of a team leads to feeling part of a club; feeling part of a club leads to feeling part of a neighborhood and the broader community. SDT both explains and makes this chain reaction measurable—this characteristic forms the theoretical foundation for the measurement tools to be discussed in the next section.

3.4 Measurement Tools: The PBS and SIQS

The theoretical framework outlined in previous sections—the relatedness dimension of SDT and the unique integration potential of sports—can contribute to policy and program development processes only when it is made measurable. In this section, two valid and reliable measurement tools proposed to operationalize the sense of belonging in sport-based integration programs for refugee youth are discussed: the Perceived Belonging in Sport Scale (PBS) and the Social Identity Questionnaire for Sport (SIQS).

Perceived Belonging in Sport Scale (PBS)

Developed by Allen (2003), the PBS measures the extent to which an individual feels included in a sports environment, feels accepted, and perceives themselves as part of that group. With its unidimensional structure, the PBS produces a clear and easily interpretable score regarding general perceived belonging. In a study conducted with university students, Allen (2006) validated the scale’s psychometric properties, demonstrating that the PBS is a reliable and valid tool.

When evaluated within the SDT framework, the PBS is a tool that directly measures the theory's "relatedness" dimension. Being able to quantitatively express how much a young refugee feels a sense of belonging in a sports environment fills the most fundamental measurement gap in this field. However, the PBS has not yet been used in any study involving a refugee or migrant population. This situation represents both a limitation and a research opportunity that could make this proposal unique.

Social Identity Questionnaire for Sport (SIQS)

The SIQS is a measure developed by Bruner et al. (2014) that assesses the social identity bonds an individual forms with their sports team across three dimensions: intra-group ties, cognitive centrality, and intra-group affect. Bruner and Benson (2018) comprehensively evaluated the scale's psychometric properties and demonstrated that the SIQS can be used both as a three-dimensional and as a single-dimensional global score. The parent adaptation (SIQS-P) developed by Bruner et al. (2022) demonstrates the scale's adaptability to different populations and lays the methodological groundwork for a potential adaptation for refugee youth.

While the PBS captures a general sense of belonging, the SIQS offers a deeper analytical perspective: a refugee youth may feel part of a team but may not have yet internalized the team's identity; or the opposite scenario may emerge. The combined use of the two scales can reveal both where the integration process stands and the direction in which it is moving. This provides a level of comprehensiveness that a single scale cannot offer.

When evaluated through Tajfel and Turner's (Tajfel & Turner, 1979) Social Identity Theory, SIQS emerges as a theoretically robust tool for tracking how an individual develops a group identity through a sports team. Feeling a sense of belonging to a team can, over time, evolve into a sense of belonging to a club, a neighborhood, and society—SIQS measures the starting point of this transformation.

Rationale for Using Both Scales Together

Both scales are tools whose psychometric validity has been proven through research. More importantly, when used together, they directly and concretely address the most fundamental shortcoming of the EU integration framework—the inability to measure a sense of belonging. PBS captures the general perception of belonging, while SIQS captures the social identity dimensions of this belonging.

Incorporating these two scales into program evaluation processes within the context of EPAS programs will make the previously invisible dimensions of socio-cultural integration measurable and manageable.

Conclusions

This study focuses on a persistent yet systematically overlooked gap within the Council of Europe's framework for sports-based integration: the inability to measure the sense of psychological belonging. While current policy efforts have achieved significant progress in the legal and economic dimensions of integration, the experience of "truly feeling a sense of belonging"—the essence of socio-cultural integration—remains both the least addressed and the most difficult to measure dimension.

The findings of this review point to three interconnected key conclusions. First, the EU integration framework cannot capture the sense of belonging through standard policy metrics; this results in the most meaningful impact of sports programs on socio-cultural integration remaining invisible in policy evaluations. Second, sports offer a unique context to fill this gap: they create a space where a sense of belonging can naturally flourish on a universal ground that transcends language, ethnic origin, and cultural differences. Third, SelfDetermination Theory provides both the theoretical framework for this process and measurable variables; PBS and SIQS, in turn, translate these variables into concrete and actionable measurement tools.

The recommendation for policymakers is clear: incorporating PBS and SIQS into the handbook and program evaluation processes currently under development within EPAS will make the previously invisible dimensions of socio-cultural integration measurable and manageable. Programs are being designed, projects are being implemented, and resources are being spent—but as long as a sense of belonging is not measured, it is impossible to assess the true impact of these efforts. What cannot be measured cannot be improved; what cannot be measured cannot be managed.

Three priority directions are proposed for future research. First, pilot studies with refugee and migrant youth using PBS and SIQS will establish the psychometric validity of both scales for this population. Second, comparative studies conducted in different European contexts will demonstrate how scale findings are shaped by cultural and contextual differences. Finally, long-term follow-up studies could document the lasting effects of sports-based belonging on social integration. Future integration initiatives may benefit from incorporating validated psychological measures of belonging alongside existing policy indicators. Doing so could provide a more comprehensive understanding of the contribution of sport to society-cultural integration.

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PROMOTING CHILDREN'S HEALTH EDUCATION: EVIDENCE FROM THE “SCHOOLS FOR HEALTH” PROJECT

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Abstract

Introduction: This study presents the “Schools for Health” initiative, a nationwide project launched in 2020 by Swiss Agency for Development and Cooperation in partnership with Save the Children, focusing on health promotion and the prevention of non-communicable diseases (NCDs) in Albania. The project aims to reduce risk factors among children aged 6–16 through integrated interventions in the school environment, including healthy nutrition, physical activity, mental health, and psychosocial well-being. Its implementation is structured in two phases (2020–2021; 2021–2025), providing a sustainable model for school-based health promotion. Within this framework, Barleti Group shpk, in collaboration with Barleti Training and Testing Center and Albanian Institute for Public Affairs, implemented an intervention program in Tirana through 10 workshops under the My School platform, aiming to strengthen local stakeholders and foster inter-sectoral collaboration. **Methods:** The study adopts a descriptive-analytical approach to examine the main components of the intervention, including health education, promotion of physical activity, mental health, and community engagement. The analysis is based on qualitative data derived from project documentation and field practices. A total of 110 participants from diverse stakeholder groups were involved, including health professionals, local government representatives, school staff, parents, and students. The methodology relied on interactive and participatory approaches. **Results:** The findings indicate increased awareness of healthy behaviors and improved capacities among participants to address health-related issues in schools. Additionally, strengthened collaboration was observed among educational institutions, health structures, and the local community. **Discussion:** The “Schools for Health” project represents an integrated and sustainable model for school-based health promotion, with strong potential for replication in other national and regional contexts. **Keywords:** Health promotion; School-based interventions; Mental health; Healthy nutrition; Psychosocial well-being.

Introduction

Health is a complex and multidimensional concept that is shaped through the continuous interaction between individuals and their social, economic, and physical environments. There is no single universal definition of health. According to the World Health Organization (WHO), health is defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organization, 1948). This concept was further expanded by the Ottawa Charter for Health Promotion, which emphasizes the need for a comprehensive, inter sectoral, and multidimensional approach to health promotion (World Health Organization, 1986).

Within this framework, two of the key determinants of health are lifestyle and living conditions. Lifestyle includes individual behaviors such as nutrition, physical activity, and substance use, whereas living conditions refer to the social, economic, and environmental factors that directly influence individual well-being. According to the World Health Organization, non-communicable diseases account for over 80% of deaths in most European countries, reflecting the critical role of modifiable risk factors in public health (World Health Organization, 2022a).

In the Albanian context, data from the Institute of Public Health indicate an increase in exposure to risk factors among younger populations, including unhealthy dietary habits and low levels of physical activity (Institute of Public Health, 2021). These findings suggest a concerning trend toward the early emergence of chronic disease risk factors, making health promotion at an early age a strategic public health priority. In this context, in March 2020, the Swiss Agency for Development and Cooperation (SDC), in collaboration with Save the Children, initiated the implementation of the “Schools for Health” project in Albania. The project aims to promote healthy behaviors among school-aged children (6–16 years) through an inter sectoral approach that integrates the education, health, and community sectors.

Based on this context, the present study aims to analyze the approach and impact of the “Schools for Health” project in promoting public health in Albania. Specifically, the study highlights the role of schools as key settings for health promotion and for the development of sustainable health behaviors from an early age.

The aim of this study is to analyze the implementation and effectiveness of health promotion workshops within the framework of the “Schools for Health” project in Tirana, as well as their impact on increasing awareness and strengthening collaboration among stakeholders involved in children’s health.

Materials and Methods

This study is based on a descriptive-analytical design, aiming to examine the key components of the intervention, including health education, physical activity promotion, mental health, and community engagement. The study draws on qualitative data derived from project documentation and field-based practices, including activity reports, training materials, and participants’ reflections. This approach enables a contextual and interpretative analysis of the implementation process.

The intervention was carried out in Tirana and included 10 structured workshops based on interactive and participatory approaches. A total of 110 participants were involved in the study, selected through purposive sampling. Participants included health professionals, educational staff, parents, students, and local government representatives.

Data were analyzed using thematic analysis, through which key themes related to the effects and challenges of the intervention were identified. The study adhered to ethical principles of scientific research, including participant anonymity and confidentiality.

Results and Discussion

The thematic analysis of the qualitative data identified four main themes: (1) health education, (2) promotion of physical activity, (3) mental health, and (4) community engagement.

Health education emerged as a fundamental component of the intervention, with a perceived positive impact on increasing awareness and fostering critical reflection. Participants particularly emphasized the role of interactive methods in facilitating learning:

“The workshops were not just informative, but they made us reflect on our daily practices at school.”
(Teacher)

Another participant highlighted the practical dimension of the content:

“The concrete examples and group discussions made it easier to apply the knowledge in our work.”

(Health professional)

Regarding the promotion of physical activity, the findings indicate a positive recognition of its importance, alongside structural limitations:

“We know that physical activity is essential, but we often do not have the appropriate space or time in school.” (School principal)

However, the workshops were perceived as a step toward practical solutions:

“The discussions gave us concrete ideas on how to integrate physical activity even under limited conditions.” (Teacher)

The theme of mental health was characterized by increasing awareness and a clear need for more structured support:

“Students face a lot of pressure, and we often do not know how to support them properly.” (Psychosocial worker)

A parent emphasized the importance of collaboration between key actors:

“It is important that the school and the family work together for the emotional well-being of children.”

(Parent)

Community engagement was identified as a key factor in the effectiveness of the intervention, reflecting the value of inter-institutional collaboration:

“These activities brought us together as stakeholders and created a shared sense of responsibility.” (Local government representative)

The participatory approach was highlighted as an element that strengthened this collaboration:

“It was not a traditional training; everyone contributed and learned from each other.” (Teacher)

Overall, the integration of interactive and participatory methods resulted in an experience perceived as meaningful and applicable, contributing to the strengthening of local capacities for health promotion. However, participants also highlighted the need for more sustained institutional support to ensure the continuity and long-term sustainability of these practices.

The findings of this study confirm the importance of integrated and participatory approaches in school-based health promotion. In line with the World Health Organization (WHO) model of Health Promoting Schools, the results suggest that interventions combining health education, mental well-being, physical activity, and community engagement have considerable potential to produce sustained effects on the behaviors and attitudes of involved stakeholders (World Health Organization, 1998; World Health Organization, 2021a). These findings are consistent with the existing literature emphasizing the effectiveness of multi-component approaches in school health interventions.

Specifically, the use of interactive methods in health education aligns with both classical and contemporary theories of active learning, which argue that active participation of learners enhances knowledge acquisition and its transfer into practice (Dewey, 1938; Freire, 1970). The results of this study indicate that interaction, dialogue, and active engagement contribute to the development of reflective and critical competencies, thereby making the educational process more effective and sustainable.

Regarding the promotion of physical activity, the identified challenges—particularly the lack of adequate infrastructure and time constraints—are consistent with empirical evidence highlighting the role of contextual factors in the implementation of school-based health interventions (Dobbins et al., 2013; Naylor et al., 2015).

Conclusions

These findings underscore that effective interventions require not only changes at the individual behavioral level but also improvements in the structural and organizational conditions of the school environment.

In the domain of mental health, the findings reinforce the importance of integrating psychosocial support within the school system, in accordance with Bronfenbrenner’s ecological model (1979), which

emphasizes the dynamic interaction between individuals and multiple social systems. This is also consistent with contemporary studies highlighting the critical role of schools in promoting mental well-being and preventing psychological difficulties (Weare & Nind, 2011). However, the literature also indicates that the effectiveness of such interventions depends on the degree of institutional integration and staff training, both of which are often limited in practice.

Community engagement was identified as a key component of the success of the interventions. This finding is consistent with the principles of the Ottawa Charter for Health Promotion, which emphasizes community empowerment and inter sectoral collaboration as fundamental determinants of effective health promotion (World Health Organization, 1986).

Furthermore, empirical literature supports the notion that active involvement of local stakeholders enhances both the effectiveness and long-term sustainability of interventions (Wallerstein & Duran, 2010).

Despite these positive outcomes, the study also highlights several important challenges, particularly regarding the sustainability of the interventions. These findings align with existing evidence suggesting that short-term interventions tend to have limited impact in the absence of institutional support and their integration into long-term educational and health policies (Langford et al., 2015). In addition, context-specific limitations may have influenced the results, including variability in school resources and differing levels of stakeholder engagement, which may affect the generalizability of the findings.

Acknowledgements

The findings of this study have important implications for both policy-making and school practice. They suggest the need for the development of integrated school health policies that simultaneously address health education, mental well-being, physical activity, and community engagement. Furthermore, the results highlight the importance of investing in adequate infrastructure, staff training, and the establishment of sustainable mechanisms for inter sectoral collaboration. In future research, more in-depth longitudinal studies are needed to assess the long-term impact of these interventions, as well as to identify potential moderating and mediating factors that influence their effectiveness. Additionally, comparative studies across different school contexts are recommended in order to better understand the role of cultural and institutional factors in shaping implementation outcomes.

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INTEGRATION OF STRUCTURED SPORT AND APPLIED BEHAVIOR ANALYSIS TO IMPROVE DISCIPLINE IN PRESCHOOL CHILDREN WITH BEHAVIORAL DISORDERS: A QUASI-EXPERIMENTAL STUDY IN ELBASAN, ALBANIA

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Abstract

Behavioral disorders in early childhood represent a significant challenge for social development and effective participation in educational environments. In the Albanian context, interventions are often fragmented and lack integrated, evidence-based models that combine therapeutic approaches with practical, play-based activities applicable in preschool settings. This study aims to evaluate the effect of an integrated intervention combining structured sport activities with Applied Behavior Analysis (ABA) principles on improving discipline in preschool children aged 5–6 years with behavioral disorders. A quasi-experimental design with a control group and pre-test/post-test measurements was employed. The sample consisted of 30 preschool children selected randomly from public and private kindergartens in the city of Elbasan, Albania, and assigned into an experimental group (n=15) and a control group (n=15). The experimental group participated in an 8-week intervention program consisting of structured physical activities integrated with ABA techniques, including positive reinforcement, clear instruction delivery, behavioral modeling, and token economy systems. The control group continued their regular kindergarten activities without structured intervention. Data were collected through systematic classroom and activity-based observations, as well as standardized behavioral rating scales completed by educators. The assessment focused on key discipline-related indicators, including rule-following, impulse control, attention to instructions, and peer cooperation. Results indicated a significant improvement in all

measured behavioral indicators in the experimental group compared to the control group, suggesting a positive effect of the integrated intervention.

In conclusion, the findings support the effectiveness of combining structured sport activities with ABA principles as a practical and applicable approach for improving discipline in preschool children with behavioral disorders. The study highlights the importance of developing integrated intervention models within early childhood education systems in Albania and similar contexts.

Keywords: behavioral disorders; preschool children; sport-based intervention; applied behavior analysis (aba); discipline; Albania

Introduction

The Critical Importance of Early Behavioral Development

Early childhood represents a critical developmental stage in which the foundations of behavioral regulation, cognitive flexibility, and social interaction are established. During the preschool years — typically defined as ages three to six — children undergo rapid neurological development that shapes their capacity for self-regulation, executive functioning, and prosocial behavior. Research consistently identifies the period from birth to age five as a critical window for developing the foundations of thinking, behaving, and emotional well-being (UNICEF, 2020).

Children from low-income backgrounds who attend quality preschool programs demonstrate lasting improvements in school readiness, lower rates of special education placement, higher academic achievement, and reduced high school dropout rates. For children with behavioral disorders, however, these developmental milestones present significant challenges. Behavioral difficulties in preschool settings are commonly expressed through impulsivity, inattentiveness, difficulty following instructions, noncompliance with classroom rules, aggression toward peers, and limited cooperative engagement (APA, 2013). These behaviors not only disrupt individual learning trajectories but also affect the broader classroom environment, placing additional demands on educators and potentially influencing the developmental progress of typically developing peers.

The Albanian Educational Context

In many Albanian preschool institutions, responses to behavioral challenges remain predominantly reactive and experience-based rather than structured and evidence-driven. This reflects a broader gap between research-based behavioral science and its practical application in early childhood education systems across the Balkan region (EASPD, 2022). Teaching in pre-primary education in Albania is mainly play-oriented, with teachers drawing on games, encouragement, and simulated discipline activities in support of the learning process (Nasufi et al., 2023). While this approach has merit, it often lacks the systematic behavioral frameworks necessary to address persistent difficulties in children with identified disorders. Several supply-side barriers complicate the provision of quality behavioral support in Albanian early childhood education. These include insufficient kindergarten facilities in some areas, a lack of assistant teachers and psychosocial support staff, limited teaching and learning materials for children with diverse abilities, and infrastructure and transportation challenges — particularly in rural areas. Opportunities for professional development and continuous training for educators remain limited, with no systematic capacity-building in evidence-based behavioral intervention strategies (Nasufi et al., 2023).

Theoretical Framework: Integrating ABA and Structured Physical Activity

Applied Behavior Analysis (ABA) provides a well-established scientific framework for understanding and modifying behavior through environmental contingencies (NIH, 2021). Research has consistently demonstrated its effectiveness in improving behavioral outcomes in children through positive reinforcement, modeling, systematic prompting, and functional behavior assessment (Cooper et al., 2020). ABA interventions are structured methods that apply the science of behavior to help children acquire essential skills while reducing challenging behaviors.

Simultaneously, structured physical activity has been shown to support executive function development, self-regulation, and social behavior in children (Diamond & Lee, 2011). Emerging evidence identifies structured physical exercise as a promising option for symptom management in children with attention-deficit/hyperactivity disorder and related behavioral conditions (NIH, 2023). The benefits of structured

physical activity include encouraging healthy behaviors, developing motor skills and coordination, improving mood and self-esteem, and providing opportunities for social interaction.

Despite their individual effectiveness, these two domains — ABA and structured physical activity — are rarely integrated in preschool practice. This study is grounded in the hypothesis that combining structured sport activities with ABA principles may produce a synergistic effect, enhancing both engagement and behavioral learning. Movement-based activities provide natural contexts for practicing behavioral skills, while ABA principles ensure that learning is systematic, measurable, and generalizable.

Study Aim and Research Questions

The aim of this study is to evaluate the impact of an eight-week integrated intervention combining structured sport activities with ABA principles on discipline-related behaviors in preschool children with behavioral disorders. Specifically, the study addresses the following research questions:

To what extent does the integrated intervention improve rule-following behavior in preschool children with behavioral disorders?

What is the effect of the intervention on impulse control, attention to instructions, and peer cooperation?

How do teachers perceive the feasibility and acceptability of implementing this integrated approach within existing preschool structures in Albania?

Materials and Methods

Research Design

The study adopted a quasi-experimental design with pre-test and post-test measures and a non-equivalent control group. This design was selected to allow evaluation of intervention effects within a naturalistic educational environment while maintaining methodological rigor. Random assignment at the individual level was not feasible due to institutional constraints and the need to maintain classroom integrity; therefore, children were assigned to conditions after being identified by educators as meeting inclusion criteria.

Participants and Sampling

The sample consisted of 30 children aged five to six years, selected from four public and private kindergartens in Elbasan, Albania. Elbasan was selected as the study site due to its representative mix of urban and semi-urban educational settings and the researchers' established partnerships with local educational authorities.

Inclusion criteria:

Age between 5.0 and 6.11 years

Identification by classroom teachers and school psychologists as exhibiting persistent behavioral difficulties consistent with mild to moderate behavioral disorders (e.g., oppositional behaviors, impulsivity, difficulty following instructions)

Parental consent for participation

Absence of diagnosed intellectual disability or severe sensory impairment that would preclude participation in physical activities

Exclusion criteria:

Current participation in another behavioral intervention program

Medical conditions contraindicating moderate physical activity

Severe behavioral challenges requiring individualized clinical intervention beyond the scope of this study

Participants were randomly assigned to an experimental group (n = 15) and a control group (n = 15), stratified by gender and kindergarten type (public/private) to ensure baseline equivalence. Demographic characteristics of the sample are presented in Table 1.

Table 1. Demographic Characteristics of Participants (N = 30)

Variable	Experimental Group (n=15)	Control Group (n=15)	Total (N=30)	p-value
Age (M, SD)	5.4 (0.3)	5.5 (0.4)	5.45 (0.35)	> .10
Gender (% male)	60%	53%	57%	> .10
Public kindergarten (%)	67%	73%	70%	> .10
Parental education – university (%)	40%	47%	43%	> .10

Note. EG = Experimental Group; CG = Control Group. No statistically significant differences between groups were detected at baseline (all ps > .10).

Intervention Protocol

The intervention was implemented over eight weeks, with three structured sessions per week, each lasting approximately 40 minutes. Sessions were conducted in the kindergarten gymnasium or outdoor play area, depending on weather conditions and facility availability.

Session structure. Each session followed a consistent, predictable structure designed to support behavioral learning:

Warm-up phase (5 min): Simple movement activities paired with verbal instructions and immediate reinforcement for compliance, establishing routine and practicing basic direction-following skills.

Structured sport-based activities (25 min): Age-appropriate physical activities (e.g., obstacle courses, ball games, cooperative movement tasks) intentionally designed to embed behavioral learning opportunities targeting rule-following, impulse control, attention to instructions, and peer cooperation.

Reinforcement and feedback phase (10 min): Systematic review of target behaviors, delivery of earned tokens or praise, and brief discussion of strategies for applying skills in the classroom.

ABA principles embedded. Core ABA principles were systematically applied throughout each session: Positive reinforcement: Desired behaviors were immediately followed by specific praise, tokens, or access to preferred activities via a token economy system.

Modeling: Instructors and peer models demonstrated target behaviors before activities; video modeling was used for complex sequences.

Prompting and fading: Physical, gestural, and verbal prompts were applied systematically and faded as children demonstrated mastery.

Clear antecedent-behavior-consequence contingencies: Rules and expectations were stated clearly before each activity; consequences were immediate, consistent, and logically connected to the behavior.

Data collection: Instructors recorded frequency of target behaviors during each session to monitor progress and adjust intervention intensity as needed.

The control group continued their regular preschool curriculum, which included standard physical education activities without the systematic ABA components described above.

Measurement Instruments

Primary outcome — Preschool Behavioral Regulation Scale (PBRS). A standardized teacher rating scale adapted from established instruments was used to assess discipline-related behaviors across four subscales: (1) Rule-following (5 items; e.g., "Follows classroom rules without frequent reminders"), (2) Impulse control (5 items; e.g., "Waits for turn without interrupting"), (3) Attention to instructions (4 items; e.g., "Attends to teacher directions during group activities"), and (4) Peer cooperation (4 items; e.g., "Works cooperatively with peers during group tasks"). Items were rated on a 5-point Likert scale (1 =

Never, 5 = Always). The instrument demonstrated acceptable internal consistency in the current sample (Cronbach's $\alpha = .82$).

Secondary outcome — Systematic classroom observation. Trained observers, blind to group assignment, conducted 20-minute structured observations at pre-test and post-test using a momentary time-sampling procedure (recording behavior every 30 seconds). Observers coded on-task behavior, compliance with teacher requests, prosocial peer interactions, and disruptive behaviors. Inter-observer reliability exceeded 85% agreement across all behavioral categories, assessed on 20% of observations.

Feasibility and acceptability. Following the intervention, teachers in the experimental group completed a brief questionnaire assessing ease of implementation, child engagement, perceived behavioral change, and willingness to continue using the approach.

Data Analysis

Data analysis was conducted using SPSS version 26. Descriptive statistics (means, standard deviations) were computed for all variables. Baseline equivalence between groups was assessed using independent samples t-tests for continuous variables and chi-square tests for categorical variables.

Primary analyses employed independent samples t-tests to compare experimental and control groups at post-test, as well as paired samples t-tests to evaluate pre-to-post change within the experimental group. Statistical significance was set at $p < .05$. Effect sizes were calculated using Cohen's d (thresholds: 0.2 = small, 0.5 = medium, 0.8 = large; Cohen, 1988). Reliability of the PBRS was assessed using Cronbach's alpha. Missing data were minimal ($< 5\%$) and handled using listwise deletion.

Results

Baseline Equivalence

Independent samples t-tests revealed no statistically significant differences between the experimental and control groups on any PBRS subscale or observational measure prior to the intervention (all $ps > .10$), confirming baseline equivalence and supporting the validity of subsequent between-group comparisons.

Primary Outcomes: Behavioral Regulation

Independent samples t-tests revealed statistically significant between-group differences at post-test for all four PBRS subscales, with the experimental group demonstrating substantially higher scores than the control group across all outcomes. Paired samples t-tests within the experimental group confirmed significant pre-to-post improvements on all subscales (all $ps < .001$). Results are summarized in Table 2. Rule-following scores in the experimental group increased from $M = 2.1$ ($SD = 0.6$) at pre-test to $M = 4.2$ ($SD = 0.5$) at post-test, compared to minimal change in the control group (2.3 to 2.5), yielding a large between-group effect size ($d = 1.92$). Similarly large effects were observed for impulse control ($d = 1.76$), attention to instructions ($d = 1.58$), and peer cooperation ($d = 1.65$). All between-group comparisons at post-test were statistically significant at $p < .001$.

Table 2. Descriptive Statistics and Independent Samples t-Test Results by Group and Time Point (N = 30)

Outcome	EG Pre M (SD)	EG Post M (SD)	CG Pre M (SD)	CG Post M (SD)	t	p	d
Rule-following	2.1 (0.6)	4.2 (0.5)	2.3 (0.7)	2.5 (0.6)	8.74	< .001	1.92
Impulse control	1.9 (0.5)	3.9 (0.6)	2.0 (0.6)	2.2 (0.5)	8.12	< .001	1.76

Attention to instructions	2.4 (0.7)	4.0 (0.5)	2.5 (0.6)	2.7 (0.7)	7.53	< .001	1.58
Peer cooperation	2.0 (0.6)	3.8 (0.6)	2.1 (0.7)	2.3 (0.6)	7.89	< .001	1.65

Note. EG = Experimental Group; CG = Control Group. M (SD) values reported for each time point. t = independent samples t -test statistic comparing EG vs. CG at post-test. d = Cohen's d for the between-group difference at post-test. All post-test comparisons: $p < .001$.

Secondary Outcomes: Classroom Observation

Observational data corroborated teacher ratings. The experimental group showed marked increases in on-task behavior during instruction (45% to 78% of intervals) and compliance with teacher requests (52% to 85%), while the control group showed minimal change (on-task: 48% to 51%; compliance: 55% to 58%). Disruptive behaviors decreased substantially in the experimental group (from 12% to 3% of intervals) but not in the control group (11% to 10%).

Feasibility and Acceptability

Teachers in the experimental group reported high levels of satisfaction with the intervention on all items of the 5-point feasibility questionnaire (Table 3). Qualitative comments highlighted the intervention's alignment with children's natural energy levels, the clarity of behavioral expectations, and observable improvements in day-to-day classroom management.

Table 3. Teacher Ratings of Intervention Feasibility and Acceptability (Experimental Group, $n = 5$)

Item	M	SD
Ease of implementation	4.1	0.7
Child engagement	4.6	0.5
Perceived behavioral improvement	4.4	0.6
Willingness to continue using the approach	4.5	0.5

Note. Ratings on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Discussion

Interpretation of Findings

The results of this quasi-experimental study provide compelling evidence that integrating structured sport activities with Applied Behavior Analysis principles is effective for improving discipline-related behaviors in preschool children with behavioral disorders. The experimental group demonstrated statistically significant and practically meaningful improvements across all measured behavioral domains, with large effect sizes indicating strong intervention impact.

These findings suggest that the integration creates a learning environment in which behavioral expectations are both explicit and experientially reinforced. Unlike traditional instructional approaches that rely heavily on verbal explanation, this model situates behavior within meaningful activity contexts where rules are directly connected to participation. The physical nature of the activities likely enhanced engagement and motivation, while the systematic application of ABA principles ensured that learning was reinforced, measurable, and generalizable.

The results are consistent with prior research emphasizing the role of active learning environments in executive function and self-regulation development. Diamond and Lee (2011) document the contribution of structured physical engagement to cognitive and behavioral development, while Donnelly et al. (2016) confirm the broader educational benefits of physical activity. From a behavioral science perspective, the observed improvements can be attributed to the consistency and predictability of the reinforcement systems employed, which facilitate the acquisition and maintenance of adaptive behaviors (Cooper et al., 2020).

Mechanisms of Action

Several mechanisms may account for the intervention's effectiveness:

Enhanced engagement: Movement-based activities are inherently motivating for young children, increasing attention and participation. When behavioral expectations are embedded within enjoyable activities, children are more likely to practice and internalize target behaviors.

Natural reinforcement contingencies: In structured sport, behavioral consequences often carry logical connections (e.g., following the rules allows continued participation; waiting for a turn leads to one's own opportunity), potentially facilitating generalization compared to arbitrary reinforcement systems.

Multi-modal learning: The intervention engaged children through visual (modeling), auditory (instructions), and kinesthetic (movement) channels, supporting diverse learning styles and strengthening memory for behavioral expectations.

Practice in context: Children practiced target behaviors in contexts that approximate real-world demands, potentially facilitating transfer to the classroom setting.

Positive peer modeling: Group-based activities provided opportunities to observe and imitate prosocial behaviors demonstrated by peers, leveraging social learning processes.

Implications for Practice

The findings carry important implications for early childhood education, particularly in contexts where access to specialized behavioral interventions is limited. Albania faces significant supply-side barriers including insufficient infrastructure, limited professional development opportunities, and fragmented coordination among stakeholders (Nasufi et al., 2023). The integrated model offers a practical, scalable, and cost-effective approach that can be implemented within existing educational frameworks without requiring extensive additional resources. Key implementation considerations include:

Training and support: Preschool teachers would benefit from targeted professional development in basic ABA principles and structured activity design, potentially through partnerships with universities or NGOs.

Cultural adaptation: Activities should be culturally appropriate and utilize locally available materials, adaptable to varying facility conditions.

Curricular integration: The intervention can be embedded within existing physical education or play-based learning time, minimizing disruption to the overall preschool schedule.

Family engagement: Sharing intervention principles with families may enhance generalization of skills to home settings.

Limitations and Future Directions

Limitations of this study include the relatively small sample size ($N = 30$), which may limit generalizability to broader populations and different cultural contexts, and the short intervention duration (eight weeks), which restricts conclusions regarding long-term behavioral maintenance. Future research should employ larger, more diverse samples and include extended follow-up periods to assess sustainability of effects. Additional research priorities include:

Identifying which specific components of the integrated intervention contribute most to behavioral change.

Examining differential effects for children with varying types or severity of behavioral difficulties.

Investigating the cost-effectiveness of the intervention compared to alternative approaches.

Exploring implementation strategies for scaling the intervention across diverse preschool settings in Albania and the broader Balkan region.

Ethical Considerations

The study was conducted in accordance with ethical guidelines for research with children. Parental informed consent and child assent were obtained prior to participation. All children, including those in the control group, continued to receive their regular preschool services throughout the study. Following its completion, control group participants were offered the opportunity to participate in a condensed version of the intervention.

Conclusions

This study provides evidence that integrating structured sport activities with Applied Behavior Analysis principles is an effective approach for improving discipline-related behaviors in preschool children with behavioral disorders. The intervention produced significant improvements across rule-following, impulse control, attention to instructions, and peer cooperation, indicating that learning environments combining physical engagement with structured behavioral reinforcement can meaningfully enhance developmental outcomes.

The findings hold important implications for early childhood education policy and practice, particularly in resource-limited settings such as Albania where access to specialized behavioral interventions remains constrained. The proposed model offers a practical, scalable, and cost-effective approach implementable within existing educational frameworks. By leveraging children's natural affinity for movement and play while applying evidence-based behavioral principles, this integrated intervention represents a promising strategy for supporting the behavioral development of young children with challenges.

Future research should further explore the long-term effectiveness of this approach, its applicability across diverse cultural and educational settings, and strategies for sustainable implementation within national early childhood education systems. As Albania and other Balkan countries continue to strengthen their early childhood intervention infrastructure, evidence-based, contextually appropriate models like the one examined here can contribute to more inclusive, effective, and equitable educational experiences for all young children.

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THE IMPACT OF PHYSICAL EDUCATION ON PSYCHO-EMOTIONAL DEVELOPMENT IN EARLY CHILDHOOD: AN INTERDISCIPLINARY PERSPECTIVE

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Abstract

Early childhood represents a critical developmental period during which physical activity plays a fundamental role not only in motor growth but also in psycho-emotional maturation. Recent interdisciplinary research highlights the importance of structured physical education programs in fostering emotional regulation, social interaction, and self-confidence among young children. The purpose of this study is to examine the impact of physical education on psycho-emotional development in early childhood through an integrated pedagogical and psychological perspective.

The study adopts a mixed-methods approach combining observational assessment, teacher evaluations, and structured activity-based interventions implemented with children aged 4–6 years in early education settings. Data were collected through behavioral observation protocols, socio-emotional development scales, and qualitative feedback from educators involved in physical education sessions. The interdisciplinary framework integrates concepts from developmental psychology, physical education pedagogy, and early childhood education theory. The findings indicate that regular participation in structured physical education activities significantly improves emotional expression, cooperation skills, attention regulation, and peer interaction. Furthermore, movement-based learning environments were found to enhance children's self-esteem and motivation to participate in group activities, contributing positively to their overall well-being.

In conclusion, physical education should be considered a key component of early childhood education policies and curricula due to its multidimensional contribution to psycho-emotional development. An interdisciplinary approach strengthens the effectiveness of physical education programs and supports holistic child development during the early formative years.

Keywords: physical education, early childhood, psycho-emotional development, interdisciplinary approach, child well-being

Introduction

Early childhood represents one of the most sensitive developmental periods for cognitive, emotional, social, and physical maturation. During this stage, children acquire foundational emotional regulation skills, interpersonal competencies, and behavioral patterns that influence later academic achievement and psychological well-being (Denham et al., 2012). Recent interdisciplinary research increasingly recognizes physical education not merely as a tool for motor development but also as an important contributor to psycho-emotional functioning (Bailey, 2006).

Structured physical activity promotes social interaction, emotional expression, cooperation, self-confidence, and adaptive behavior among preschool children (Piek et al., 2008). Through movement-based learning experiences, children develop opportunities to regulate emotions, manage frustration, engage in teamwork, and build resilience. Additionally, physical education settings encourage peer communication and problem-solving within socially interactive contexts (Lubans et al., 2016).

Developmental psychology emphasizes that emotional competence emerges through repeated social and behavioral experiences during early childhood (Thompson, 2014). Simultaneously, educational theories support the integration of experiential and movement-oriented learning environments to foster holistic development (Vygotsky, 1978). Despite growing evidence internationally, interdisciplinary studies examining psycho-emotional outcomes associated with physical education remain limited, particularly in early education contexts.

This study aims to examine the impact of structured physical education activities on psycho-emotional development among children aged 4–6 years using an integrated pedagogical and psychological framework.

Literature review

The nexus between physical education and psychosocial development during early childhood has garnered increasing interdisciplinary scrutiny from the domains of developmental psychology, neuroscience, pedagogy, and sociology. Recent empirical studies indicate that engagement in physical activity throughout the preschool years not only facilitates motor skills and physical health but also enhances emotional regulation, social competencies, self-esteem, and cognitive abilities (Strong et al., 2005; Lubans et al., 2016).

Looking at development, the early stages of childhood play a crucial role highlighted by quick enhancements in emotional, cognitive, and social capacities. The process of emotional regulation is cultivated through children's proactive involvement with their environmental and interpersonal contexts (Cole et al., 2004). The settings of physical education provide children with avenues to develop skills such as working together, sharing turns, controlling their impulses, and dealing with frustration through dynamic movement activities. Activities necessitating adherence to rules and collaborative engagement are significantly correlated with enhancements in executive functioning and emotional self-regulation (Diamond & Lee, 2011).

Also, data derived from studies reveals that planned physical exercise enhances the emotional health and adaptability of youngsters. Bailey (2006) claims that physical education is instrumental in cultivating emotional development by elevating self-assurance, enabling emotional articulation, and reinforcing resilience. In alignment, Eime et al. (2013) discovered that involvement in physical activities and organized sports correlates with elevated self-esteem, diminished emotional challenges, and improved psychological well-being among children and adolescents. Educational settings that emphasize active play and mastery-oriented experiences empower children to cultivate a positive sense of competence while alleviating performance-related stress.

Besides its effects on emotional well-being, physical education is fundamental in shaping social competence. Group games and cooperative movement activities enhance communication, empathy, peer interaction, and conflict resolution skills. Rubin et al. (2009) underscore that peer relationships during early childhood are essential for socio-emotional adjustment and identity formation. Through collaborative physical endeavors, children acquire the ability to negotiate rules, collaborate with peers, and experience social inclusion, thereby positively influencing classroom dynamics and emotional security.

Investigations in neuroscience further reinforce the connection observed between physical activity and emotional and social functioning. Movement invigorates neurobiological mechanisms linked to cognitive and emotional maturation, encompassing the activation of cerebral regions responsible for attention, emotional processing, and executive control (Hillman, Erickson, & Kramer, 2008). Investigations reveal that sustained physical activity strengthens executive functioning and attention regulation in preschool-aged kids while also easing anxiety and behavior-related issues (Tompson et al., 2008). These observations reveal that physical education contributes to emotional advancement through multiple behavioral and neurocognitive pathways.

Considering a sociocultural approach, Vygotsky's theoretical model illustrates the vital role of social interaction and learning by experience in the course of child growth (Vygotsky, 1978). Environments conducive to physical education inherently foster these developmental processes by establishing socially interactive and emotionally engaging contexts wherein children construct knowledge through cooperative endeavors and guided participation. Also, contemporary teaching paradigms are progressively embracing cohesive educational frameworks that recognize the links between physical, emotional, social, and cognitive growth.

Notwithstanding the escalating acknowledgment of these advantages, physical education within numerous early childhood contexts is still predominantly perceived as a mechanism for physical health rather than

as a comprehensive developmental intervention. Existing literature therefore supports the need for interdisciplinary approaches that integrate physical education with psycho-emotional objectives in order to promote holistic child development during the early years.

Methodology

As a research design the study employed a mixed-methods research design integrating quantitative and qualitative approaches. There were 160 children aged 4–6 years enrolled in preschool education programs in the city of Elbasan, Albania, included in the study. The participants consisted of 77 girls (48.1%) and 83 boys (51.9%). Regarding age distribution, 48 children were 4 years old (30%), 59 children were 5 years old (36.9%), and 53 children were 6 years old (33.1%).

Data collection included: Behavioral observation protocols, Socio-emotional development scales, Teacher evaluation forms, Semi-structured qualitative educator feedback

Children participated in structured physical education activities three times per week over 12 weeks.

Activities included: Cooperative games, Movement coordination exercises, Emotional expression through movement, Group interaction tasks. The data were analyzed using descriptive statistics and comparative analysis between the experimental and control groups. Qualitative data from educator interviews were analyzed thematically to identify recurring patterns related to children’s emotional and social development.

Results

Quantitative Results

The quantitative analysis demonstrated that participation in structured physical education activities was associated with positive psycho-emotional outcomes among children in the experimental group.

Comparative analysis between the experimental and control groups revealed noticeable differences across several socio-emotional dimensions following the 12-week intervention period.

Children who participated regularly in structured physical education sessions showed higher levels of emotional expression, peer cooperation, and group participation compared to children following the standard curriculum. Improvements were also observed in attention regulation and the reduction of conflict-related behaviors during classroom and play activities. The results demonstrated significant improvements across all psycho-emotional dimensions following participation in structured physical education activities.

Table 1. Pre-intervention and post-intervention psycho-emotional scores

Variable	Pre-Test Mean	Post-Test Mean		Improvement (%)
			Difference	
Emotional Regulation	2.9	4.1	1.2	41%
Cooperation Skills	3.1	4.4	1.3	42%
Attention Regulation	2.8	4	1.2	43%
Peer Interaction	3	4.5	1.5	50%
Self-Esteem	3.2	4.6	1.4	44%

Figures 1, 2. Improvement in Psycho-Emotional Skills (1), and Percentage improvement following the intervention (2)

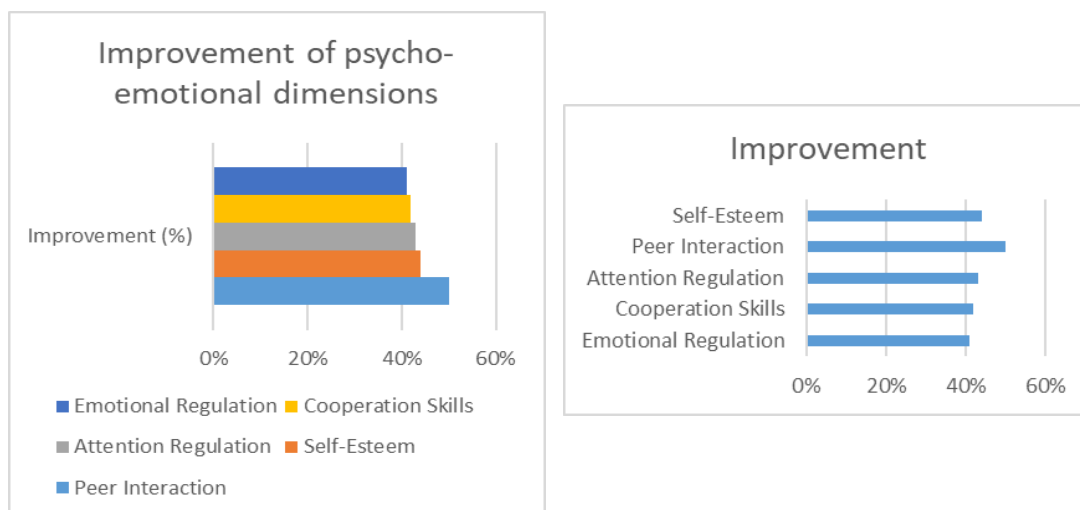


Fig 1. Fig 2

The highest improvement was observed in peer interaction (50%), followed by self-esteem and attention regulation. Children became increasingly capable of cooperating with peers, participating in group activities, and expressing confidence during classroom interactions. These findings suggest that structured physical education activities positively contribute to both emotional and social dimensions of early childhood development.

Teacher Evaluations

Teacher evaluations revealed substantial behavioral and emotional improvements throughout the intervention period.

Table 3. Teachers' observed behavioral improvements

Observed Behavior	Before Intervention (%)	After Intervention (%)
Active Participation	45%	88%
Positive Peer Cooperation	40%	91%
Emotional Expression	42%	84%
Attention During Activities	47%	82%
Frustration Tolerance	38%	76%

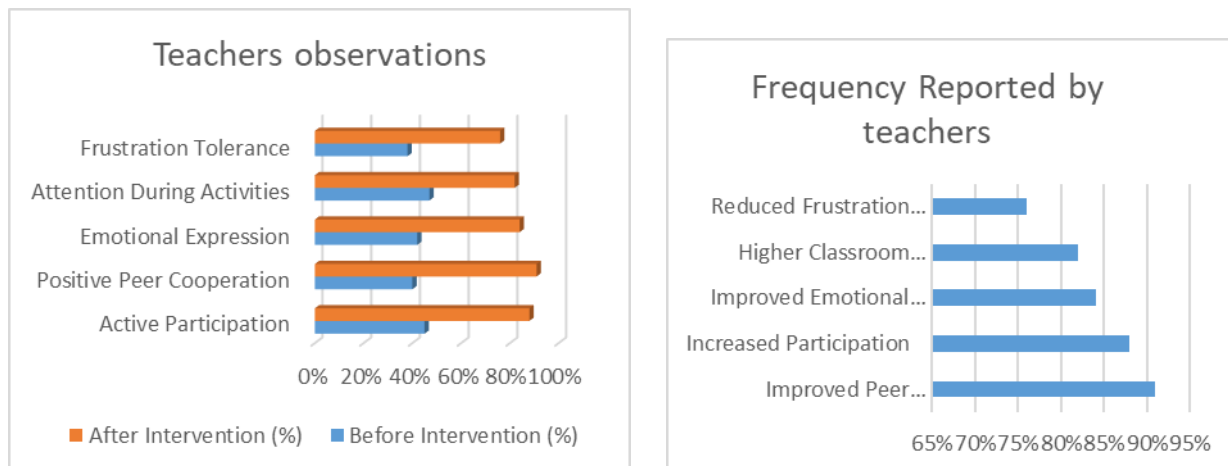


Figure 3. Teacher-reported changes in behavior

Teachers consistently reported improvements in cooperation, classroom participation, and emotional expression among children participating in structured physical education sessions, supporting the positive psycho-emotional impact of movement-based learning environments.

Age-Based Comparisons

Age-related comparisons revealed that older children demonstrated slightly higher improvements in attention regulation and cooperation skills.

Table 4. Improvements by age group

Variable	Age 4	Age 5	Age 6
Emotional Regulation	35%	41%	46%
Cooperation Skills	37%	43%	47%
Attention Regulation	34%	42%	49%
Peer Interaction	46%	50%	54%
Self-Esteem	39%	45%	48%

The findings suggest that developmental maturity may influence the extent to which children benefit from structured movement interventions.

The greatest improvements were identified in cooperative behavior and emotional engagement. Children in the experimental group demonstrated increased willingness to interact with peers, participate in collaborative activities, and communicate emotions more openly. Educators also reported greater classroom involvement and improved responsiveness to group instructions. In contrast, the control group demonstrated only moderate or minimal improvements across most psycho-emotional indicators. Although some developmental progress was expected due to age-related maturation, the magnitude of change was substantially lower than that observed in the intervention group.

The findings suggest that structured movement-based educational activities may contribute significantly to psycho-emotional development during early childhood. The quantitative outcomes support the hypothesis that physical education environments facilitate emotional regulation, social interaction, and behavioral adaptation in preschool-aged children. Overall, the quantitative findings indicate that children exposed to structured physical education interventions demonstrated more positive psycho-emotional developmental outcomes compared to peers who did not participate in the intervention program.

Qualitative Findings

The qualitative analysis elucidated that systematically organized physical education activities exerted a substantial impact on children's psycho-emotional development across various dimensions. Through the application of thematic coding within the NVivo software, multiple recurrent patterns emerged from the observations and interview data gathered from educators.

One of the most salient themes identified was emotional expression and regulation. Educators have consistently pointed out that children displayed a heightened propensity to vocalize their feelings during and after participating in activities centered around movement.

Numerous participants remarked that children displayed enhanced frustration tolerance, particularly in contexts involving cooperative games, taking turns, or experiencing losses in activities. Teachers articulated how movement-based environments fostered emotionally secure settings in which children could exercise emotional recuperation and self-regulation during authentic social interactions.

Another critical theme pertained to social interaction and peer cooperation. According to educators, children engaged in planned physical education exercises tend to showcase improved collaboration, kindness, and inclusiveness. Previously reticent children became more socially participatory, whereas cooperative games stimulated prosocial behaviors and constructive peer communication. The results suggest that learning environments focused on movement can boost social skills and foster a feeling of community among individuals.

Table 5. *NVivo thematic analysis of psycho-emotional factors associated with physical education participation*

Main Theme	Subtheme / Factor	Example of Participant Expression	Interpretation
Emotional Development	Emotional expression	"Children became more open in expressing their feelings during movement activities."	PE facilitated emotional communication and confidence in emotional expression.
	Emotional regulation	"They learned to calm down more easily after frustration during games."	Physical activity supported self-regulation and frustration tolerance.
	Self-esteem	"Some children who were usually shy became more confident."	Mastery-oriented movement experiences enhanced self-perception and self-confidence.
Social Development	Peer cooperation	"Children started helping each other more during team activities."	Cooperative games strengthened collaboration and prosocial behavior.
	Social inclusion	"Previously isolated children became more involved in group play."	Inclusive PE environments promoted belonging and participation.
	Communication skills	"They interacted more positively with classmates."	PE improved verbal and non-verbal social interaction.
Behavioral Regulation	Attention and focus	"Children stayed focused longer during classroom activities after PE sessions."	Movement activities contributed to improved attention regulation.
	Impulse control	"They became better at waiting their turn."	Structured games reinforced inhibitory control and patience.

Motivational Factors	Engagement and enjoyment	“Children looked forward to physical activity sessions every day.”	Enjoyable movement-based learning increased intrinsic motivation.
	Participation willingness	“Even less active children wanted to join the activities.”	Positive emotional climate encouraged broader participation.
Pedagogical Environment	Teacher support	“Children responded positively when teachers encouraged teamwork.”	Educator scaffolding played a central role in psycho-emotional outcomes.
	Play-based learning	“Learning through games reduced stress and increased enthusiasm.”	Play-centered pedagogy enhanced emotional safety and learning engagement.
Challenges Identified	Competitive exclusion	“Some children felt discouraged during highly competitive games.”	Excessive comparison may negatively affect emotional inclusion.
	Emotional sensitivity	“Certain children became upset when they lost activities.”	PE contexts may trigger emotional vulnerability without supportive guidance.

The analysis further revealed advancements in behavioral regulation and classroom engagement. Teachers observed that after the intervention period, children demonstrated enhanced attention management and a higher level of participation in both physical exercises and school-related tasks. Involvement in systematic movement activities seemed to strengthen youngsters' capacity to comply with instructions, remain focused, and handle spontaneous behaviors.

Regarding motivation and emotional engagement, educators highlighted that children conveyed enthusiasm and satisfaction during physical education sessions. Emotional reactions that are affirmative towards playful activities seemed to enhance the desire to engage, particularly in kids who were originally hesitant or not very socially active.

Nonetheless, certain challenges were also recognized. A minority of educators observed that highly competitive activities occasionally induced emotional distress or discouragement among less self-assured children. This finding underscores the necessity for inclusive, mastery-oriented pedagogical methods that prioritize cooperation and emotional safety over comparative performance.

In short, the qualitative results affirm the interdisciplinary angle that physical education is vital for not just physical growth, but also for cultivating emotional toughness, social skills, and mental wellness in young children.

Discussion

The findings of this study demonstrate that structured physical education activities contribute significantly to psycho-emotional development during early childhood. The documented enhancements in emotional regulation, interpersonal interactions, self-worth, classroom involvement, and attention management substantiate the expanding corpus of interdisciplinary literature that underscores the developmental significance of movement-oriented learning environments within preschool education (Lubans et al., 2016; Bailey, 2006).

A particularly salient observation was the marked enhancement in peer interaction and collaborative behavior among children engaged in the intervention program. The physical education sessions established socially interactive frameworks wherein children participated in teamwork, negotiated roles, shared responsibilities, and cultivated empathy through collaborative movement activities. These observations lend credence to the assertions put forth by Rubin et al. (2009), who posited that peer relationships during the early childhood stage are essential for socio-emotional adjustment and identity formation. In a similar vein, Vygotsky's sociocultural theory posits that learning and emotional

development transpire predominantly through guided social interactions and cooperative activities (Vygotsky, 1978). Within the context of the current study, movement-based group activities appeared to serve as effective environments wherein children acquired skills in cooperation, inclusivity, and emotional communication in real-time.

The advancements identified in emotional regulation and frustration tolerance further imply that physical education may facilitate adaptive emotional functioning in early childhood. Structured movement activities inherently necessitate that children manage their excitement, adhere to established rules, await their turns, cope with losses, and recover from minor interpersonal conflicts. As articulated by Thompson (2014), emotional regulation evolves progressively through repeated experiential interactions that compel children to monitor and adjust their emotional responses. The findings of the present study are congruent with this perspective by indicating that physical education environments afford repeated opportunities for children to practice emotional self-regulation and behavioral adaptation within socially relevant contexts. These findings are congruent with neuroscientific investigations that establish a connection between physical activity and executive functioning as well as emotional regulation. Diamond and Lee (2011) elucidated that engagement in physically active play and rule-oriented movement tasks enhances inhibitory control, working memory, and cognitive flexibility in young children. Additionally, Hillman, Erickson, and Kramer (2008) underscored that physical activity facilitates neurocognitive mechanisms linked to attention regulation and emotional processing, attributed to heightened neural activation in the prefrontal cortex. Therefore, the enhancements in attention regulation documented in this investigation may represent both behavioral and neurobiological processes modulated by structured physical movement.

Another significant takeaway highlights the improvement of children's self-worth, their willingness to engage, and their interaction within the classroom context. The provision of positive reinforcement during physical education endeavors appeared to cultivate feelings of competence and self-assurance, particularly among children who initially exhibited reluctance towards social participation. These conclusions are in agreement with Harter's (1985) theoretical approach to self-concept progression, suggesting that the belief in one's competence during critical experiences is essential for nurturing children's self-esteem. Activities centered around mastering movement provide kids with chances to find success, enjoy independence, and reach accomplishments, which collectively enhance their self-esteem. The ongoing research validates prior findings that stress the mental advantages linked to active play and movement-based learning strategies. The affective neuroscience approach by Panksepp (1998) indicates that play is fundamental in strengthening emotional resilience, creating social bonds, and alleviating stress throughout a child's growth. In a similar vein, Tomporowski et al. (2008) discovered that interventions grounded in movement-based educational practices enhance classroom behavior, mitigate anxiety symptoms, and bolster concentration within preschool demographics. Teacher reports from the present study validated these assertions, particularly in relation to enhanced classroom behavior, emotional expression, and management of frustration subsequent to the intervention phase.

An additional contribution of this study resides within its interdisciplinary framework. Combining viewpoints from developmental psychology, physical education instruction, neuroscience, and socio-emotional learning, the study emphasizes the intricate aspects of child growth. Consequently, physical education should not be confined to the perception of merely a discipline centered on motor skills or physical fitness. Rather, it should be recognized as an intervention focused on psycho-emotional development, capable of boosting resilience, emotional health, social skills, and adaptable behaviors during a crucial period of human growth. The findings also possess significant educational implications. Modern-day early childhood educational approaches usually focus on academic readiness, frequently downplaying the developmental importance that comes from engaging in movement and play. Nevertheless, the present results indicate that emotionally supportive physical education programs may have a beneficial impact on broader educational outcomes by fostering children's behavioral adjustment, emotional stability, and readiness for collaborative learning. Therefore, educational institutions should contemplate the incorporation of movement-based psycho-emotional objectives into early childhood pedagogical frameworks.

Despite these noteworthy findings, several limitations must be recognized. The research involved a notably limited group and was restricted to just two educational settings, which might affect how broadly the results can be applied. In addition, the length of the intervention was quite short, limiting the investigation of extended developmental results. Future research endeavors should encompass larger and more diverse samples, longitudinal methodologies, and comparative intervention models that investigate various pedagogical approaches to physical education. Additional interdisciplinary studies that concurrently examine neuropsychological, emotional, and social indicators would also enhance our understanding of how physical education influences psycho-emotional development during early childhood.

Recommendations

Based on the findings, the following recommendations are proposed:

Integrate psycho-emotional objectives into physical education curricula.

Increase collaboration between psychologists and physical education teachers.

Develop movement-based emotional regulation programs for preschool children.

Train educators in interdisciplinary developmental approaches.

Encourage policymakers to strengthen physical education within early childhood programs.

Conduct longitudinal studies examining long-term psycho-emotional outcomes.

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IMPORTANCE OF SPORTS ACTIVITY FOR COGNITIVE, EMOTIONAL AND SOCIAL IMPROVEMENT IN DIFFERENT AGES.

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Abstract

The importance of physical activity and sports activities for the improvement not only of the cognitive but also social and emotional abilities of the child in addition to the motor one is an issue that has raised attention in the therapeutic processes applied among psychologists in support of many studies but also data from direct practice. A combination of therapeutic techniques with sports activities in the clinical therapeutic progress especially in early age groups but also later seems to be very efficient. Emphasizing the inclusion of these activities has brought direct results of optimal healing as they directly affect the improvement of emotional, interactive and cognitive skills. Purpose in this study is to further collect evidence-based data that show the important connection between cognitive, social and emotional benefits and sports activity. Methodology used is a survey with professionals in the field through semi-structured interviews. Comparative data with groups that apply and do not apply sports activities were used to

analyze the results of the study. Some of the findings show that in almost every age group, the application of sports activities increases the quantity and quality of social interaction, improves emotional state and cognitive skills inside and outside the clinical psychotherapeutic setting. These data suggest that in the future a modification of the therapeutic goals and techniques used by psychologists is necessary to achieve the success of treating the problems in focus.

Keywords: Sport Activity, Psychotherapy, Improvement, Cognitive Abilities, Social Abilities

Introduction

The study relate to the importance of physical activity and sports activities for the improvement not only cognitive but also social and emotional abilities, in children, adolescents, young adults and elderly. The motor activities has raised attention among psychologists to be used during therapuetic sessions. A combination between therapeutic techniques with sports activities during clinical psychological treatment influence positively therapeutic progress by improving not only physical but also emotional state. Studies in neurology, neurophysiology and neurocognition have already proven that involvement in physical activity leads to a better functioning of the brain as an organ and therefore to better cognitive performance (concentration, memory, focus, attention, information processing, reasoning and problem solving, thinking and analytical reasoning, creation, orientation, etc.). Measurements related to the electromagnetic activity of the brain, such as electroencephalography, EMR, etc., have made more evident the fact that there is a direct connection between physical activity and the increase in the electromagnetic activity of the brain. Subsequent observations of cognitive performance in individuals after this brain activity have suggested a positive relationship (*Hernández-Mendo A. et al. 2019*)

Increased regular physical activity is associated with a small and measurable improvement in neuropsychological tests of executive functions, specifically inhibitory control. Executive functions play an important role in complex behavior and may contribute to academic and career achievement as well as success in social interaction. This finding provides support for the important interaction between exercise and cognitive functioning.

In explaining how movements influences children's mental developement Tomporowski et al. (2015,) mentions that for researchers the word *exercise* means a subset of physical activity consisting of planned, structured, repetitive bodily movements with the purpose of improving or maintaining one or more components of physical fitness or health. Play as well emphasized serve as a way to learn problem-solving skills, serving as an opportunity for children to use emerging cognitive capacities to solve problems in natural environment in a variety of ways (*Tomporowski et al. 2015*). Instead of passive information in classroom setting, they learn to interact, modify, and manipulate their environment developing arousal modulation, optimal challenge points, cooperation and creativity.

Early enriching environments defined as any situation or condition that maximizes or enhances the development of a person's abilities can affect learning, has caught parents' attention who want to hasten their children's academic and sport progress. (*Jackson, William M. MD* et al. 2016*).

Children's perceptions of their abilities and competence can be affected greatly by their involvement in sports. Confidence for their abilities and skills in sports can generate in children as viewing themselves more competent challenging situations as enjoyable and a sense of control. (*Tomporowski et al. 2015*)

In a study developed by Alesi M. et al. (2014) results suggest that children attending karate appear to have better cognitive functioning. In other words, they show higher scores in visual selective attention tasks, in working memory both for forward digit span and backward digit span. Moreover, data analysis revealed significant differences between the two groups in both the measures of Tower of London Test; children attending karate show better execution of planning tasks and lower times of planning tasks. (*Alesi M. et al. 2014*)

Objectives

First objective is *to identify valid and reliable data about the impact* that sports activities have on psychotherapeutic improvement in different ages. A second objective is *to understand how it is influenced* specifically and *comparative data to be used* for goupas that apply with groups that do not apply sports and physical activities in order to understand or find *improvement differences*.

Variables of interest:

Variables of interest are: - physical activities involvement/not involvement and -emotional, social, cognitive therapeutic improvement

Materials and Methods

Participants

This is a qualitative study design where 8 *professionals* (psychologists, occupational therapists, psychiatrists) are interviewed.

Methods, techniques & sources of information

Semi-structured interviews with descriptive and evaluative questions and *transcribed verbatims* were used for data analysis using *thematic analysis method and a comparative data analyse*.

Procedure

Sample participants were identified by an convenient procedure firstly identifying their working institutions (specifically institutions of care)

Results and Discussion

Data identified lined with psychological improvement during therapy combined/not combined with physical and sports activities in different ages are:

The presence physical activities in clients creates a better understanding and focus of client during psychotherapeutic session

The most central themes mentioned by therapists regarding understanding and focus on the therapy process in clients who, in parallel with therapy, also performed physical activities such as walking, running, and sports, included: *the client is more interested in the conversation, the client understands the question better and gives more focused answers regarding the issue being discussed, the client takes less time to respond, the client is more motivated and understands the purpose of the process better, the client develops rapid optimism about the therapeutic benefits, clients with social interaction concerns improve significantly, the client follows instructions more easily outside of sessions, the client increases communication in the social and family environment, the client learns from experience with others, the client gains a sense of competence and control, the client significantly reduces feelings of shame, the client is increasingly cooperative and misses sessions less and less often.*

Meanwhile, the central themes among clients who did not perform physical activity during the therapeutic process included: there are delays in sessions, repeated delays in sessions, there is a constant feeling of fatigue, clients have difficulty performing simple physical or cognitive performances even in therapy, clients have body freezes (caused by anxiety contractions), getting to know the client takes longer, the client does not remember what is said in sessions, session summaries are more difficult, there is a decrease in involvement in any type of activity, there is a constant feeling of fatigue, the client often says "I get tired quickly" "I can't do it" "I don't know what's stopping me but I don't move much" "I've become a little lazy" "I feel like I can't do anything" "I'm not like I used to because even simple actions are a great effort" "I have a bad mood" "I don't know how to explain how I feel that I can barely move" "I sometimes feel lazy" "I don't know if I'm lazy or because "I have lost confidence", clients do not complete tasks after sessions, there is a decrease in motivation for the therapeutic process, there are difficulties in interaction between the therapist and the client, clients have more resistance.

Cognitive aspects improve rapidly wright in the time that a physical activitiy start to be applied persistently by clients

The most central themes mentioned by therapists regarding clients' cognitive performance after starting physical activity include: clients remember details discussed in sessions, clients process information received in sessions and make clearer analyses about their problems, clients gain a sense of control, clients begin to feel not so different from others, clients solve exercises in sessions with greater accuracy and require less time, the process of objective reasoning increases significantly in clients, tasks that previously seemed difficult are now solved more easily, clients are no longer focused only on their problems but also on alternatives regarding solutions. In children, there is an increase in motivation and

involvement in therapy as the child begins to like therapy and finds it fun, the client does not get stuck and does not have many interruptions in giving answers. Clinical problems directly related to focus and concentration begin to improve significantly.

In relation to clients who do not apply physical activity, there is a slowdown in taking any initiative, there is repetition in explaining exercises or issues in sessions, there are difficulties in applying behavioral techniques (e.g. in the self-monitoring technique in which the client is asked to self-observe and record his/her behaviors, the situations in which the behavior occurred, emotions before and after the behavior, thoughts before and after the behavior, motivating stimuli, etc.), clients have many difficulties in understanding and applying the technique compared to clients who perform physical activity where the time and realization of the technique is faster. Due to cognitive fatigue (clients feel a great mental strain) clients may interrupt sessions due to a decrease in motivation or fear that they will not succeed since the results are slower.

Long lasting treatment are rare with clients applying physical activities

Clients may drop out of psychotherapy due to the length of time or may lose confidence that psychotherapy is working for them. Clients who do not engage in physical activity are at a much higher risk of discontinuing treatment.

The importance of dealing effectively with patients at risk of dropping out of therapy must be emphasized. Patients who dropped out also reported improvement of depressive symptoms without therapy but took much longer to improve than did patients who completed therapy. This might be attributable to natural remission of depression (Lopez T. R. et al 2017)

Selfesteem is extremely improved

Feeling of loneliness present start to be reduced in any aspect

Regarding the benefits that sports and physical activity bring in emotional improvement, according to the answers in the interview, it is emphasized as a central theme that it is known that by influencing the release of endorphins, these activities bring a reduction in negative mood, a state of boredom as well as states similar to depressive mood, anxiety, etc. As a result, some necessary psychophysiological processes important for further emotional and physical improvement, such as sleep and eating processes, are significantly improved. Improving sleep helps clients a lot in the therapeutic process and not only for several reasons. First, when clients have insomnia, they are often accompanied by fears or increase fears related to the thought of how their state of insomnia will last and will contribute to a further deterioration of the condition they are in. In all interviews with professionals, this way of thinking among clients emerges as a central theme. Usually clients begin to think that insomnia will not recover and consequently their anxiety, adding more anxiety, depressed mood and linking family, personal or work situations (I am not as active at work as before, I do not want to go to work, I feel like I do not have the strength to do things as before, I am not as accurate as I used to be, I forget things very often, etc.). For the therapeutic process this means that new fears develop and it is necessary to recognize and treat them, but at the cost of making the psychotherapeutic process and the client's recovery more difficult and slower.

Secondly, high levels of insomnia disrupt the regularity and continuity of sessions. The client, due to long hours without sleep, may miss sessions, feel tired, physically exhausted and unable to talk. It is worth noting that psychological treatments are centered on deep conversation with the client and even in a difficult psychological state, a kind of willingness of the client to talk is especially necessary to continue. Furthermore, sleep problems affect a series of cognitive processes such as concentration and difficulty in recalling necessary information which is also the focus of the treatment (the client's input through his narrative).

Another situation that is observed to bring immediate results in improving the emotional state at any age is that clients begin to gain a sense of control and belief that they can do things by increasing their self-confidence and this is another central theme in interviews with professionals.

If they are sports activities, this is even more reinforced since sports usually involve discipline, continuous effort, repetition, which increases the consistency in performing behaviors with a direct impact on

developing confidence in clients that they can succeed. On the other hand, since these behaviors are health-preserving, they contribute to eliminating health fears and increasing the feeling of better health. In the third age, the impact is evident in the thoughts and beliefs of clients of this age that they can do things that they can still learn, that they can be useful, that their slowed motor activity does not mean that they cannot perform tasks related to movement, that motor performances increase. All of this helps clients of the third age who attend psychotherapy to have feelings of relief and a healthier emotional confrontation with the feelings of aging and the decline of some abilities. Doing activities in a team also increases the sense of belonging and eliminates negative comparisons with others where negative feelings produced by negative thoughts of clients (“-they can do it and I can’t”) often prevail.

In adolescence and early childhood this is essential as it contributes to many parallel processes that occur such as self-concept (which is constantly built in the relationships and contacts that the child creates with others (peers and adults). Testing physical abilities in joint sports performances (in a team) develops a kind of sense of competence and usefulness and consequently a positive self-concept. Another element is related to the fact that well-performed sports activities create a database of positive memories of the time when the client was active which can be used in the therapeutic process to mitigate negative thoughts about themselves and feeling inactive as well as can be used by the client as a form of coping in other stressful situations. The feeling of physical control over the body also increases the feeling of emotional control. However, the sense of competence if not managed carefully or if excessive expectations are allowed in clients such as those of competition, can develop emotional effects opposite to those required and this is precisely the moment when the therapist must intervene and be careful. help the client to set realistic expectations based on age, motor development, possibilities and experience on the physical activity being performed or being aimed at. For example, some sports games may be appropriate for a 12-year-old but not for a 7-8-year-old. The same goes for other ages, especially the third age. Older children, although they may imitate or model their idols in sports, it is important to explain to them if they are in a therapeutic process that the models of success in sports with which they often identify (football players, boxers, etc.) are one thing and their level of sports competence for therapeutic effects is another thing. This does not mean that talents cannot be discovered, but the objectives and goals for which this activity is being performed should be shared in collaboration with their parents and guardians (it is important to clarify during the sessions the involvement in sports activities for relaxation purposes different from those of sports competition or those for the development of talents in sports)

The same applies to clients of older age groups. For example, nowadays there has been an increase in the number of adults who attend gyms, fitness centers, etc. For clients in a psychotherapeutic process, this can only happen for various reasons. For example, discomfort with the body and physical appearance, body weight (even when it is not excessive), tendencies to look perfect (stimulated today significantly by the growing activity of social networks that advertise perfection in appearance, self-esteem problems that have other causes and tend to be regulated through physical appearance, can be some motives. On the other hand, these involvements can also be very healthy when clients are afraid of how they appear to others in terms of physical appearance due to confrontation as well as receiving feedback from others in environments where there are others who exercise physically or where they can receive psychoeducation (fitness trainers teach clients in this direction, orient them better and help them in a healthier acceptance of their physical appearance).

Clients who may have physical limitations as a result of an accident, work injury, a congenital limitation, etc., can benefit immensely emotionally from involvement in appropriate sports activities. Cases suffering from poor motor development such as temporary body paralysis, motor problems in clinical childhood disorders such as pervasive developmental disorders and mental retardation, hyperactivity problems in high anxiety states, etc. can benefit significantly from sports activities.

Since young children have great difficulty understanding and articulating their anxiety and fears, involvement in play or sports activities can more easily bring out their concerns and have an emotional effect.

Eating problems, which in the form of clinical problems are not infrequently present in adolescence, combined with the perception of physical appearance ("how do I look?") improve and increase self-esteem and the feeling of approval from others or the feeling of being separate and different from others. A recent special issue of Psychological Assessment was devoted to different forms of clinically relevant analogue behavioral observations that can include observation in any kind of physical activity helping assessment process. Often developed for research purposes, these assessments involve "the observation of clients (e.g., individual children and adults, families, couples) in an environment that is designed to increase the chance that the assessor can observe clinically important behavior and interactions" (Haynes, 2001, p. 3). Haynes (2001) notes that the assessor structures the environment to simulate problematic situations or to manipulate variables likely to be controlling client behavior. The resulting behaviors, observations, and data can increase the quality of the assessment procedure and provide information relevant to understanding process-outcome relations in the client or clients. (Meier S. T. 2003).

Conclusions

Clinical Psychologists that offer psychological treatment need to evaluate and consider the importance that physical activities and sports when applied by clients can have in therapy for emotional, social and cognitive improvement. Different ages have different need for specific activities to be involved but with the result to be always beneficiary for the client subjective well-being.

Psychotherapy is a field that requires a review and re-dimensioning of the techniques applied to clients with concerns and anxiety disorders, depressive mood, etc., since, as the studies themselves demonstrate, the benefits that come from involving clients in physical and/or sports activity (that is not intended for competition) cannot be overlooked and should be part of clinical therapeutic objectives.

However, more advanced and more specific studies on a possible combination between different types of psychotherapy, different types of techniques are needed to reinforce or refute the arguments raised among professionals. It is worth noting that these results also raise questions about the additional knowledge required of the clinical psychologist or another mental health professional about beneficial physical activities, different types of sports activities and benefits based on clinical specifics, impacts on physical health as well as their challenges for continuous education in this direction along with an openness to collaborate and why not to go out of the office often (this is a long-standing debate) and to be part of groups multidisciplinary that includes coaches, athletes, professionals of physical activities, recreational games for an increasingly beneficial help for the client. This without compromising confidentiality as well as leaving free space to discuss the limits and professional competences of everyone. In hospital centers, recommendations can be forwarded for the establishment of sports spaces to help patients who suffer from other physical problems, where the inclusion in a controlled and professional physical way would improve their forms of coping with the disease and the psycho-emotional effects that the disease often causes in every person. A biopsychosocial model applied to each client and each patient is increasingly beneficial and this should be emphasized during any professional treatment. The feeling of being included that the client feels when he chooses which performances to perform or to be involved in gives him a golden opportunity for a quick recovery and the feeling that he is able to succeed starting from the simplest or easiest to understand performances such as physical exercises. Emotional healing is a process that takes time, but it also allows time for the client to test behaviors that are beneficial to healing process as mentioned above. Some of the studies mentioned below can help understand the effects.

In a study done to assess the antidepressant-like effects of environmental enrichment (EE) and physical exercise (PE) compared with the selective serotonin reuptake inhibitor fluoxetine against the depression-related neurobehavioral alterations induced by postweaning social isolation (SI) in rats it was found that exercise and recreational activities may have broader health benefits than antidepressants to overcome confinement and the consequences of chronic stress. (Brenes C. Juan et al 2020)

In another study which aims to measure *the effects of physical exercise on anxiety, depression, and sensitivity to stress* it was mentioned that cross-sectional studies link exercise habits to protection from harmful effects of stress on physical and mental health, but causality is not clear. Nevertheless, the pattern of evidence suggests the theory that exercise training recruits a process which confers enduring resilience

to stress. This view allows the effects of exercise to be understood in terms of existing psychobiological knowledge, and it can thereby provide the theoretical base that is needed to guide future research in this area. Clinically, exercise training continues to offer clinical psychologists a vehicle for nonspecific therapeutic social and psychological processes. It also offers a specific psychological treatment that may be particularly effective for patients for whom more conventional psychological interventions are less acceptable. (Salmon P. 2001)

Study limitations

This study focuses primarily on the experience that professionals in the field of psychological and mental health treatments have with the cases they treat and the benefits. This is also one of the study's limitations as the focus on clinical cases and emotional distress has led to the lack of data on the negative emotional impacts of sports competitions where fatigue, concentration, expectations, competence, high demands of discipline (especially in players, coaches, teams) bring extremely high psycho-emotional loads but which have not been the focus of this study.

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EFFECTS OF STRENGTH TRAINING WITH AND WITHOUT BALL ON AGILITY PERFORMANCE IN YOUNG BASKETBALL PLAYERS: AN INTERVENTION STUDY

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Abstract

This study aimed to examine the effects of two distinct strength training models—general strength training without a ball (NB) and basketball-specific training with a ball (WB)—on agility performance in young basketball players. Fifty-nine male athletes (mean age 16.1 ± 1.0 years) were assigned to three groups: NB (n = 23), WB (n = 19), and control (n = 17). Both intervention groups followed a structured

12-week training program (circuit training using strength and conditioning drills-15 min duration; using seven drills x 3 times per week; in total, 12 weeks). while the control group continued standard basketball training. Agility was assessed using the 10×5 m shuttle run and T-test before and after the intervention. Results showed significant improvements in both intervention groups, with the NB group demonstrating greater gains (10×5 m: -0.99 s; T-test: -0.57 s) compared to the WB group (10×5 m: -0.54 s; T-test: -0.12 s), while the control group showed no improvement. ANOVA revealed significant differences between groups ($p = 0.001$), and post-hoc analysis confirmed that the NB group significantly outperformed the control group. These findings indicate that both general and sport-specific strength training improve agility performance, with general strength training producing slightly greater effects. The results highlight the importance of neuromuscular adaptations in youth athlete development.

Keywords: basketball, strength, agility, youth

Introduction

Basketball is a high-intensity, intermittent sport characterized by frequent accelerations, decelerations, and rapid changes of direction, all of which place significant demands on players' physical and neuromuscular capacities. Among the key performance components, agility has been identified as a critical determinant of success, particularly in youth basketball, where technical and motor development are still evolving (Chaouachi et al., 2009; Sheppard & Young, 2006). Agility is commonly defined as the ability to rapidly change direction while maintaining control of body position, and it is influenced by a combination of strength, speed, coordination, and cognitive processing (Young et al., 2015). During adolescence, athletes experience substantial neuromuscular adaptations, making this developmental stage particularly sensitive to training stimuli (Lloyd & Oliver, 2012). Strength training has been widely recognized as an effective method for enhancing agility performance through improvements in force production, rate of force development, and neuromuscular coordination (Behm et al., 2017; Haff & Nimphius, 2012). In this context, both general strength training and sport-specific training approaches are commonly used in basketball conditioning programs. General strength training focuses on the development of fundamental physical capacities, such as muscular strength, power, and stability, without direct integration of sport-specific skills. This approach is believed to create a strong neuromuscular foundation that supports overall athletic performance (Behm et al., 2017). In contrast, sport-specific strength training incorporates technical and tactical elements of the game, aiming to enhance the transfer of physical adaptations to actual performance situations (Spiteri et al., 2015). Although both approaches are widely applied in practice, the relative effectiveness of general versus sport-specific strength training for improving agility in youth basketball remains insufficiently explored. Previous research has demonstrated that plyometric and strength-based interventions can significantly improve agility performance (Miller et al., 2006), while other studies have highlighted the importance of lower limb strength as a determinant of change-of-direction ability in basketball players (Chaouachi et al., 2009). However, direct comparisons between training modalities that exclude or include ball-related tasks are limited, particularly in adolescent populations. This gap in the literature underscores the need for further investigation into the most effective training strategies for optimizing agility development. Therefore, the aim of the present study was to compare the effects of general strength training without a ball (NB) and basketball-specific strength training with a ball (WB) on agility performance in young basketball players. It was hypothesized that both training approaches would improve agility, with potential differences in the magnitude of improvement due to the specificity of training stimuli.

Methods

A total of fifty-nine youth basketball players (mean age 16.1 ± 1.0 years) participated in this study and were divided into three groups: a no-ball training group (NB; $n = 23$), a with-ball training group (WB; $n = 19$), and a control group ($n = 17$). All participants were healthy and injury-free at the time of the study. A 12-week intervention design was implemented, consisting of three training sessions per week. The experimental protocol included two intervention groups and one control group, with both intervention groups performing additional strength training integrated into their regular basketball practice. The NB

group followed a general strength training program without the ball, focusing on lower-body exercises (e.g., squats, lunges, jumps), upper-body exercises (e.g., push-ups, medicine ball throws), core stability, and plyometric training, aiming to enhance overall neuromuscular capacity. In contrast, the WB group performed sport-specific strength exercises incorporating basketball-related movements such as dribbling under resistance, jumping combined with shooting, agility drills with ball control, and game-like movement patterns, with the aim of improving the transfer of strength gains to sport-specific performance. The control group continued their regular basketball training without additional intervention. Training conditions were standardized across groups in terms of session duration (15 minutes), frequency (three times per week), total training load, supervision, and intervention length.

Measurement

Agility performance was assessed using two standardized field tests: the 10×5 m Shuttle Run Test and the T-Test, both widely used to evaluate change-of-direction speed and agility in basketball players. All participants were tested under the same environmental conditions before (pre-test) and after (post-test) the 12-week intervention period. The 10×5 m shuttle run test required participants to sprint back and forth between two lines placed 5 meters apart for a total of ten lengths, with time recorded in seconds. The T-test assessed multidirectional movement, including forward sprinting, lateral shuffling, and backward running, also recorded in seconds. Performance outcomes were expressed as the difference between post- and pre-intervention values (post-pre), where negative values indicated improvement in agility performance.

Statistical Analysis

Data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including mean and standard deviation (SD), were calculated for all variables. To examine differences between groups (NB, WB, and control), a one-way analysis of variance (ANOVA) was conducted for both agility tests. When significant differences were identified, Bonferroni post-hoc tests were applied to determine pairwise group comparisons. The assumption of homogeneity of variances was evaluated using Levene's test. Statistical significance was set at $p < 0.05$. All analyses were performed to assess the effectiveness of the intervention programs on agility performance.

Results

Descriptive statistics for agility performance, expressed as mean differences between post- and pre-intervention measurements, indicate improvements in both intervention groups, particularly in the NB (no-ball) group. In the 10×5 m shuttle run test, the NB group demonstrated the greatest improvement (Mean = -0.99 s; SD = 0.92), followed by the WB (with-ball) group (Mean = -0.54 s; SD = 0.90), while the control group showed no improvement and a slight decline in performance (Mean = 0.06 s; SD = 0.63). A similar pattern was observed in the T-test results, where the NB group again showed the largest improvement (Mean = -0.57 s; SD = 0.62), compared to the WB group (Mean = -0.12 s; SD = 0.55), whereas the control group exhibited a deterioration in performance (Mean = 0.23 s; SD = 0.78).

Table 1

Descriptive statistics for Agility 10x5m and T tests (mean difference= post-pre- measurement (unit= seconds))

		N	Mean	Std. Deviation
Agility 10x5m test (mean difference= Post- Pre-measurement (unit= seconds))	Intervention NB "no ball"	23	-0.9935	0.92104
	Intervention WB *with ball"	19	-0.5363	0.90133

	Control	17	0.0600	0.63202
	Total	59	-0.5427	0.93335
	Model	Fixed Effects		0.84174
		Random Effects		
Agility T-test (mean difference Post- Pre- Pre-measurement (unit= seconds))	Intervention NB "no ball"	23	-0.5670	0.62176
	Intervention WB *with ball"	19	-0.1179	0.54523
	Control	17	0.2300	0.77730
	Total	59	-0.1927	0.71786
	Model	Fixed Effects		0.64812
		Random Effects		

The assumption of homogeneity of variances was assessed using Levene's test for both agility measures. For the 10x5 m shuttle run test, the results were not statistically significant across all approaches (based on the mean: $F = 0.782$, $p = 0.462$; median: $p = 0.494$; adjusted median: $p = 0.495$; trimmed mean: $p = 0.478$), indicating that the variances were equal across groups. Similarly, for the T-test, Levene's test showed non-significant results (based on the mean: $F = 1.692$, $p = 0.193$; median: $p = 0.218$; adjusted median: $p = 0.219$; trimmed mean: $p = 0.193$), confirming the homogeneity of variances.

Table 2

Test of Homogeneity of Variances for Agility 10x5 m and T tests (mean difference Post-Pre-Pre-measurement (unit= seconds))

		Levene Statistic	df1	df2	Sig.
Agility 10x5m test (mean difference= Post- Pre-measurement (unit= seconds))	Based on the Mean	0.782	2	56	0.462
	Based on the Median	0.714	2	56	0.494
	Based on Median and with adjusted df	0.714	2	50.223	0.495
	Based on the trimmed mean	0.748	2	56	0.478
	Based on the Mean	1.692	2	56	0.193
	Based on the Median	1.563	2	56	0.218

Agility T-test (mean difference Post- Pre- Pre-measurement (unit= seconds))	Based on Median and with adjusted df	1.563	2	52.414	0.219
	Based on the trimmed mean	1.697	2	56	0.193

The one-way ANOVA revealed statistically significant differences between groups for both agility measures. For the 10×5 m shuttle run test, a significant effect of group was observed ($F(2,56) = 7.657$, $p = 0.001$), indicating that changes in agility performance differed across the NB, WB, and control groups. Similarly, for the T-test, the ANOVA results showed a significant group effect ($F(2,56) = 7.577$, $p = 0.001$). These findings demonstrate that the type of training intervention had a significant impact on agility performance improvements

Table 10

ANOVA comparison for Agility 10x5m and T tests (mean difference= Post- Pre- measurement (unit= seconds))

		Sum of Squares	df	Mean Square	F	Sig.
Agility 10x5m test (mean difference= Post- Pre- measurement (unit= seconds))	Between Groups	10.850	2	5.425	7.657	0.001
	Within Groups	39.677	56	0.709		
	Total	50.527	58			
Agility T-test (mean difference Post- Pre- Pre-measurement (unit= seconds))	Between Groups	6.365	2	3.183	7.577	0.001
	Within Groups	23.523	56	0.420		
	Total	29.888	58			

Post-hoc comparisons using the Bonferroni test revealed that, for the 10×5 m shuttle run test, the NB (no-ball) group showed a statistically significant improvement compared to the control group (Mean Difference = -1.05 s, $p = 0.001$). However, no significant difference was found between the NB and WB groups ($p = 0.256$), nor between the WB and control groups ($p = 0.115$). Similarly, for the T-test, the NB group demonstrated significantly greater improvement compared to the control group (Mean Difference = -0.80 s, $p = 0.001$). In contrast, differences between the NB and WB groups ($p = 0.088$) and between the WB and control groups ($p = 0.340$) were not statistically significant. These results indicate that the significant overall group differences identified in the ANOVA were primarily driven by the superior performance of the NB group compared to the control group, while the WB group did not differ significantly from either group.

Table 11

Post-hoc analysis, the Bonferroni test for multiple comparisons, and ANOVA. Comparison for Agility 10x5m and T tests (mean difference= Post- Pre- measurement (unit= seconds))

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.
Agility 10x5m test (mean difference= Post- Pre-measurement (unit= seconds))	Intervention NB "no ball"	Intervention WB *with ball"	-0.45716	0.26095	0.256
		Control	-1.05348*	0.26923	0.001
	Intervention WB *with ball"	Intervention NB "no ball"	0.45716	0.26095	0.256
		Control	-0.59632	0.28101	0.115
	Control	Intervention NB "no ball"	1.05348*	0.26923	0.001
		Intervention WB *with ball"	0.59632	0.28101	0.115
Agility T-test (mean difference Post- Pre- Pre-measurement (unit= seconds))	Intervention NB "no ball"	Intervention WB *with ball"	-0.44906	0.20093	0.088
		Control	-.79696*	0.20730	0.001
	Intervention WB *with ball"	Intervention NB "no ball"	0.44906	0.20093	0.088
		Control	-0.34789	0.21637	0.340
	Control	Intervention NB "no ball"	.79696*	0.20730	0.001
		Intervention WB *with ball"	0.34789	0.21637	0.340

*. The mean difference is significant at the 0.05 level.

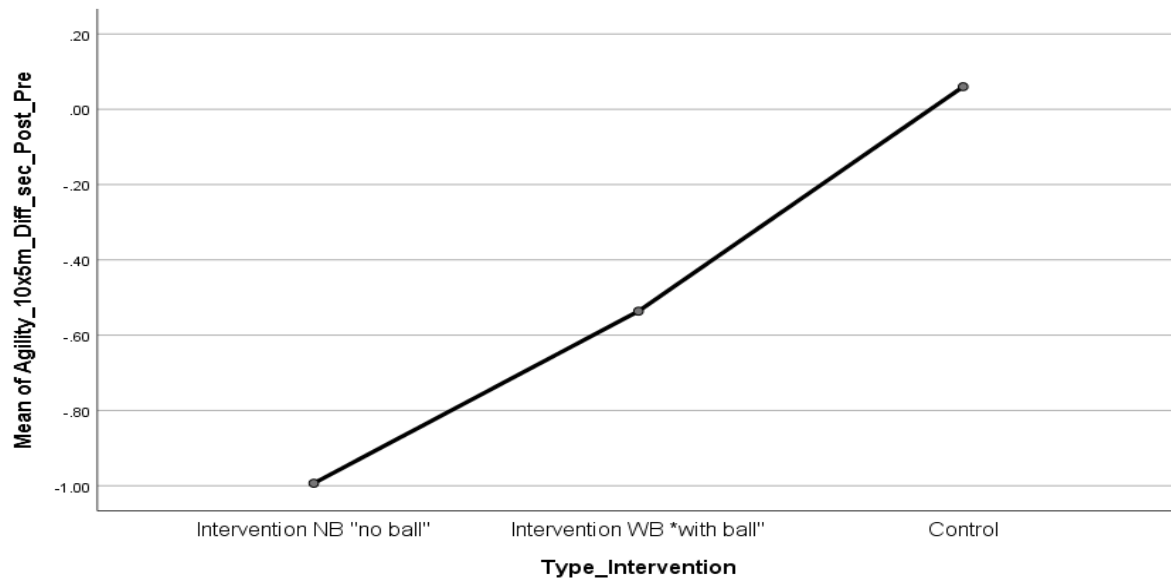


Figure 4 Mean plot for Agility 10x5m test (mean difference= Post- Pre- measurement (unit= seconds))

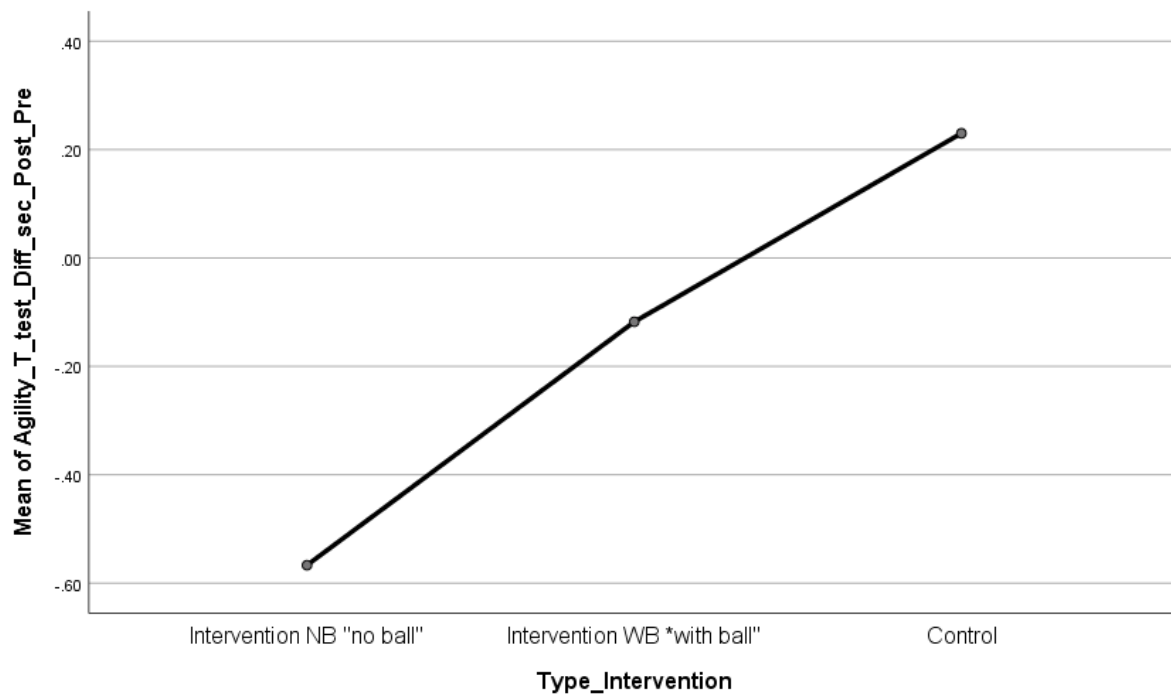


Figure 5 Mean plot for Agility T-test (mean difference Post- Pre- Pre-measurement (unit= seconds))

Discussion

The purpose of this study was to compare the effects of general strength training (NB) and sport-specific strength training (WB) on agility performance in youth basketball players. The main findings indicate that both intervention programs led to improvements in agility performance, as measured by the 10×5 m shuttle run and the T-test, while the control group showed no meaningful changes. Notably, the NB group demonstrated greater improvements compared to the WB group, suggesting that general strength training may provide a more effective stimulus for enhancing agility during adolescence. The significant improvements observed in both intervention groups are consistent with previous research indicating that strength and plyometric training enhance agility through neuromuscular adaptations, including increased force production, improved motor unit recruitment, and better intermuscular coordination (Behm et al., 2017; Haff & Nimphius, 2012). These adaptations are particularly relevant in youth athletes, as this developmental stage is characterized by high plasticity of the neuromuscular system (Lloyd & Oliver, 2012). The greater improvements observed in the NB group support the notion that general strength training plays a fundamental role in developing the physical capacities underlying agility performance. This finding aligns with previous studies suggesting that lower limb strength is a key determinant of change-of-direction ability in basketball players (Chaouachi et al., 2009). By focusing on fundamental movement patterns and high-intensity strength exercises, the NB training likely enhanced the athletes' ability to generate and absorb force more efficiently, leading to improved agility outcomes. In contrast, although the WB group also showed improvements, these were smaller and not significantly different from the NB group in post-hoc comparisons. This may be explained by the dual-task nature of sport-specific training, where the integration of technical skills (e.g., dribbling, shooting) may reduce the mechanical intensity of strength exercises. As a result, the neuromuscular stimulus may be less pronounced compared to general strength training. Similar observations have been reported in the literature, where the specificity of training does not always translate into superior physical performance outcomes, particularly when foundational capacities are not fully developed (Young et al., 2015).

The lack of improvement in the control group further highlights the importance of structured strength training interventions. Traditional basketball training alone may not provide sufficient stimulus to significantly enhance agility, especially when training is primarily focused on technical and tactical aspects rather than physical development. From a practical perspective, these findings suggest that coaches and practitioners working with youth basketball players should prioritize the development of general strength and neuromuscular capacities before emphasizing sport-specific training. While sport-specific exercises remain important for skill transfer, a solid physical foundation appears essential for maximizing performance improvements. However, some limitations of the study should be acknowledged. The sample size was relatively small, and only male youth players were included, which may limit the generalizability of the findings. Additionally, the intervention duration was limited to 12 weeks, and longer-term adaptations were not assessed. Future research should explore combined training approaches, different age groups, and the long-term effects of strength training on agility and overall performance. In conclusion, both general and sport-specific strength training improve agility performance in youth basketball players; however, general strength training appears to produce greater benefits. These results emphasize the importance of neuromuscular development as a foundation for athletic performance and support the integration of structured strength training programs in youth basketball development.

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AGE AND GENDER RELATED TRENDS IN PHYSICAL ACTIVITY AMONG SCHOOL AGED CHILDREN IN TIRANA, ALBANIA: EVIDENCE FROM TREND ANALYSIS AND POLICY DEVELOPMENT FOR CHILD WELL-BEING (2015-2025) STUDY

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Abstract

Background: Physical activity (PA) in youth is known to decline with age and differ by gender, yet limited evidence exists from Southeast European contexts such as Albania. **Purpose:** This study aimed to examine age-related trends and gender differences in physical activity among school-aged children and adolescents in Tirana using a PAQ-C–based questionnaire. **Methods:** A cross-sectional study was conducted with 1,250 participants from elementary (6.1–11.5 years; $n = 356$), middle (11.6–16.5 years; $n = 461$), and high school (16.6–18.6 years; $n = 433$). Physical activity was assessed using a validated PAQ-C–based instrument capturing moderate-to-vigorous physical activity over the previous 7 days. Scores ranged from 1 (low) to 5 (high). Descriptive statistics were computed, and comparisons were made across age groups and gender. **Results:** A clear declining trend in physical activity was observed across age groups, with mean scores decreasing from elementary ($M = 2.77$) to middle ($M = 2.64$) and high school ($M = 2.32$). Gender differences were evident across all levels, with boys consistently reporting higher PA than girls. The gender gap was more pronounced during adolescence, particularly in middle school (boys: $M = 2.79$; girls: $M = 2.52$). **Conclusions:** The findings reveal a significant age-related decline in physical activity

and persistent gender disparities among youth in Tirana. These trends highlight the need for age- and gender-sensitive interventions to promote physical activity, especially during adolescence and among girls.

Keywords: physical activity, PAQ-C, age trends, gender differences, adolescents, Albania

Introduction

Regular physical activity (PA) during childhood and adolescence is widely recognized as a key determinant of physical, psychological, and social well-being. Engagement in moderate-to-vigorous physical activity (MVPA) contributes to improved cardiovascular health, musculoskeletal development, mental health, and academic performance (World Health Organization, 2020; Centers for Disease Control and Prevention, 2022). Despite these well-documented benefits, global data indicate that a substantial proportion of children and adolescents do not achieve the recommended levels of daily physical activity. A consistent pattern observed in the literature is the decline in physical activity with increasing age, particularly during the transition from childhood to adolescence. Evidence from international surveillance systems such as the Health Behaviour in School-aged Children Study demonstrates that younger children tend to be more active, while adolescents show a marked reduction in activity levels. This decline is often attributed to a combination of biological, psychological, and environmental factors, including increased academic demands, reduced opportunities for unstructured play, and a rise in sedentary behaviors such as screen time. In addition to age-related trends, gender differences in physical activity are consistently reported across diverse cultural contexts. Boys generally exhibit higher levels of physical activity than girls, a disparity that tends to widen during adolescence (Sallis, J. F. et al., 2000; Janssen, I. & LeBlanc, A. G., 2010). These differences have been linked to sociocultural norms, variations in motivation and self-efficacy, and unequal access to sports and recreational opportunities. Understanding these disparities is essential for designing targeted interventions aimed at promoting physical activity among underrepresented groups, particularly adolescent girls. Accurate measurement of physical activity is crucial for identifying trends and informing public health strategies. The Physical Activity Questionnaire for Children (PAQ-C) is a widely used and validated instrument that provides a comprehensive assessment of general physical activity levels over a 7-day period. By capturing activity across multiple domains, including school, leisure time, and weekends, the PAQ-C allows for reliable comparisons across age groups and populations. In Albania, and particularly in urban areas such as Tirana, empirical evidence on physical activity patterns among children and adolescents remains limited. Societal changes, including urbanization and lifestyle shifts, may contribute to reduced physical activity and increased sedentary behavior among youth. However, few studies have systematically examined age-related trends and gender differences using standardized instruments. Therefore, the aim of the present study was to assess physical activity levels among school-aged children and adolescents in Tirana using a PAQ-C-based questionnaire, with a specific focus on differences across age groups (school levels) and gender-related patterns. It was hypothesized that physical activity levels would decline with increasing age and that boys would report higher activity levels than girls across all groups.

Methods

Study Design and Participants

A cross-sectional study design was employed to examine physical activity (PA) levels among school-aged children and adolescents in Tirana, Albania. The sample consisted of 1,250 participants, stratified by educational level into three age groups: elementary school (6.1–11.5 years; $n = 356$), middle school (11.6–16.5 years; $n = 461$), and high school (16.6–18.6 years; $n = 433$). Participants included both boys and girls across all school levels, allowing for the examination of age-related trends and gender differences in physical activity. All cases included in the analysis were valid, with no missing data reported.

Instrument

Physical activity was assessed using a questionnaire adapted from the Physical Activity Questionnaire for Children (PAQ-C). The PAQ-C is a validated, self-administered instrument designed to measure general levels of moderate-to-vigorous physical activity (MVPA) over the previous 7 days. The questionnaire

includes items covering multiple domains of physical activity, such as: activity during school (e.g., recess, physical education), after-school and leisure-time activities, weekend physical activity. Responses were recorded using a 5-point Likert scale (1 = low activity, 5 = high activity). A composite PA score was calculated as the mean of all items, with higher scores indicating higher levels of physical activity.

Procedure

Data collection was conducted in school settings during regular class hours. Participants completed the questionnaire under the supervision of trained researchers and/or teachers to ensure clarity and consistency. Participation was voluntary, and anonymity was maintained throughout the data collection process. Ethical considerations were respected in accordance with research standards involving minors, including institutional approval and informed consent procedures where applicable.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (Version 26). Descriptive statistics were calculated, including means and sample sizes (*N*) for each subgroup. Physical activity levels were examined across: age groups (school levels) to identify trends in PA, gender within each age group to assess differences between boys and girls. The PA score was treated as a continuous variable (range: 1–5). Mean values were compared descriptively across groups to evaluate patterns of decline or variation. Where appropriate, inferential statistical analyses (e.g., analysis of variance [ANOVA]) can be applied to test differences between groups and examine interaction effects between age and gender.

Results

The results indicate a progressive decline in physical activity (PA) levels across school levels and age groups. Elementary-school children (6.1–11.5 years) reported the highest mean PA level ($M = 2.77$, $SD = 0.70$), followed by middle-school students aged 11.6–16.5 years ($M = 2.64$, $SD = 0.72$). The lowest PA level was observed among high-school students aged 16.6–18.6 years ($M = 2.32$, $SD = 0.69$).

Table 1

School_Levels		N	Mean	Std. Deviation
Elementa (6.1- 11.5 yrs)	PA Level	356	2.77	0.697
	Valid N (listwise)	356		
Middle (11.6-16.5 yrs)	PA level	461	2.64	0.715
	Valid N (listwise)	461		
High (16.6- 18.6 yrs)	PA_level	433	2.32	0.685
	Valid N (listwise)	433		

Table 2 shows the distribution of physical activity (PA) levels by gender across the three school stages. Boys reported higher mean PA levels than girls at all school levels. The gender difference was smallest in elementary school ($\Delta M = 0.13$), increased in middle school ($\Delta M = 0.27$), and was 0.18 in high school. Importantly, both boys and girls showed an overall decline in PA as they progressed toward high school, although the pattern was not completely linear among boys: boys' mean PA increased slightly from elementary (2.81) to middle school (2.79 is actually a slight decrease of 0.02), before dropping more markedly in high school (2.39).

Table 2

School_Levels		Gender	N	Mean	Std. Deviation	Std. Error Mean
Elementary (6.1-11.5 yrs)	PA_level	Boy	182	2.81	0.679	0.05
		Girl	174	2.68	0.712	0.054
Middle (11.6-16.5 yrs)	PA_level	Boy	211	2.79	0.719	0.049
		Girl	250	2.52	0.691	0.044
High (16.6- 18.6 yrs)	PA_level	Boy	168	2.39	0.788	0.061
		Girl	265	2.21	0.604	0.037

Discussion

The present study examined physical activity (PA) levels among school-aged children and adolescents in Tirana, Albania, with a particular focus on age-related trends and gender differences. The findings indicate that PA levels are moderate overall but show a clear decline with increasing age, alongside consistent gender disparities favoring boys. The observed decline in PA from elementary to high school is consistent with international literature. Evidence from the World Health Organization and the Health Behaviour in School-aged Children Study demonstrates that physical activity decreases significantly during adolescence. This decline is often attributed to increased academic pressures, reduced time for structured and unstructured physical activity, and greater engagement in sedentary behaviors, such as screen-based activities. The present findings suggest that similar developmental and environmental influences are evident in the Albanian context. Gender differences identified in this study further support existing research. Boys consistently reported higher PA levels than girls across all school levels, with the gap becoming more pronounced during middle and high school years. This pattern aligns with findings by Sallis, J. F. et al. (2000) and Janssen, I. and LeBlanc, A. G. (2010), which highlight lower participation in physical activity among girls. Sociocultural expectations, lower perceived competence, and fewer opportunities for engagement in sports may contribute to these disparities, particularly during adolescence. Although mean PA scores in this study fall within a moderate range, they remain below levels recommended by the World Health Organization, which advises at least 60 minutes of daily moderate-to-vigorous physical activity for children and adolescents. The relatively low scores observed in high school students are particularly concerning, as this stage is critical for establishing lifelong health behaviors.

Strengths and Limitations

This study has several strengths. First, it includes a relatively large sample size across multiple school levels, allowing for meaningful comparisons across age groups and genders. Second, the use of a standardized and widely validated instrument, the Physical Activity Questionnaire for Children (PAQ-C), enhances the reliability of the findings and enables comparison with international studies. Third, the absence of missing data strengthens the robustness of the dataset. However, certain limitations should be acknowledged. The use of a self-reported questionnaire may introduce recall bias and social desirability bias, potentially affecting the accuracy of responses. Additionally, the cross-sectional design does not allow for causal inferences or the examination of longitudinal changes in physical activity. The study was conducted exclusively in Tirana, an urban setting, which may limit the generalizability of the findings to rural areas or other regions of Albania. Finally, the absence of objective measures of physical activity (e.g., accelerometry) may limit the precision of activity assessment.

Conclusion

The findings of this study highlight a progressive decline in physical activity with age and persistent gender differences among school-aged children and adolescents in Tirana. These results emphasize the need for targeted, age-appropriate, and gender-sensitive interventions to promote physical activity, particularly among adolescents and girls. Schools represent a key environment for intervention, through the enhancement of physical education programs, active school environments, and extracurricular opportunities. In addition, broader strategies involving families and communities are essential to support active lifestyles among youth. Future research should incorporate longitudinal designs and objective measurement tools to better understand the determinants of physical activity and inform evidence-based policies in Albania.

Funding Statement

This original article is part of the project- Assessing changes in lifestyle and health of children in Albania: Trend analysis and policy development for child well-being (2015-2025) led and coordinated by Sports University of Tirana, Faculty of Movement Sciences, Department of Education and Health. This project was funded by the National Agency for Scientific Research and Innovation (AKKSHI) as part of the Research and Development Proposals (PKKZH) with a timeline 2025-2027.

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FREQUENCY OF BREAKFAST CONSUMPTION AMONG SCHOOL CHILDREN IN TIRANA, ALBANIA: A CROSS-SECTIONAL STUDY BY GENDER

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Abstract

Background: Regular breakfast consumption is an important determinant of children's health, cognitive performance, and overall well-being. However, skipping breakfast remains a common behavior among school-aged populations. **Purpose:** This study aimed to examine the frequency of breakfast consumption among school children in Tirana, Albania, with a focus on overall patterns and gender differences.

Methods: A cross-sectional study was conducted including 1,243 valid participants (7 missing responses). Breakfast consumption frequency before school was assessed using a structured questionnaire with five categories ranging from "every day" to "1–2 times per month." Descriptive statistics were calculated, and distributions were analyzed overall and by gender. **Results:** Overall, 46.9% (n = 583) of participants reported consuming breakfast every day. A smaller proportion reported breakfast consumption 5–6 times per week (9.7%, n = 121) and 3–4 times per week (9.6%, n = 120). Notably, 15.4% (n = 192) reported eating breakfast only 1–2 times per week, while 18.3% (n = 227) consumed breakfast as infrequently as 1–2 times per month. Gender-specific analysis showed similar patterns, with 278 boys and 305 girls reporting daily breakfast consumption. However, a relatively higher number of girls reported lower-frequency breakfast consumption (e.g., 1–2 times per month: girls n = 135; boys n = 92), indicating a tendency toward less regular breakfast habits among girls. **Conclusions:** While nearly half of the participants reported daily breakfast consumption, a substantial proportion of children exhibited irregular or infrequent breakfast habits. Gender differences suggest that girls may be at higher risk of skipping breakfast. These findings highlight the need for targeted nutritional interventions promoting regular breakfast consumption among school-aged children in Tirana.

Keywords: breakfast consumption, children, adolescents, nutrition, gender differences, Albania

Introduction

Breakfast consumption is widely recognized as a fundamental component of a healthy lifestyle in children and adolescents. Regular breakfast intake has been associated with improved dietary quality, better cognitive performance, enhanced academic outcomes, and favorable metabolic health indicators (World Health Organization, 2020). Conversely, skipping breakfast has been linked to adverse outcomes, including poor concentration, reduced energy levels, unhealthy snacking behaviors, and an increased risk of overweight and obesity. Despite its importance, breakfast skipping remains a prevalent behavior among school-aged children worldwide. Evidence suggests that the frequency of breakfast consumption tends to decline with age, particularly during adolescence, when lifestyle patterns become more irregular and autonomy in food choices increases (Health Behaviour in School-aged Children Study, 2020). Factors such as time constraints, lack of appetite in the morning, and sociocultural influences contribute to this behavior. In addition to age-related trends, gender differences in breakfast consumption have been consistently reported. Studies indicate that girls are more likely than boys to skip breakfast or consume it less regularly (Sjöberg, A. et al., 2003; Keski-Rahkonen, A. et al., 2003). These differences may be influenced by body image concerns, dieting behaviors, and social norms, particularly during adolescence.

Understanding such disparities is important for developing targeted nutritional interventions. Regular breakfast consumption is also closely associated with other health-related behaviors, including physical activity, sleep patterns, and overall lifestyle habits. Children who consume breakfast regularly are more likely to engage in healthier behaviors and demonstrate better overall well-being compared to those who skip breakfast. Therefore, examining breakfast habits provides valuable insight into broader lifestyle patterns among youth populations. In the Albanian context, research on dietary habits among children and adolescents is still limited, particularly studies focusing on breakfast consumption patterns using structured and standardized approaches. Rapid urbanization and lifestyle changes in cities such as Tirana may influence eating behaviors, including meal frequency and timing. However, empirical data remain scarce, highlighting the need for further investigation. Therefore, the aim of the present study was to assess the frequency of breakfast consumption before school among children and adolescents in Tirana, Albania, and to examine differences in consumption patterns by gender. It was hypothesized that a substantial proportion of students would report irregular breakfast consumption and that girls would exhibit less frequent breakfast intake compared to boys.

Methods

Study Design and Participants

A cross-sectional study was conducted to examine the frequency of breakfast consumption among school-aged children and adolescents in Tirana, Albania. The total sample included 1,250 participants, of which 1,243 provided valid responses and 7 were missing. Participants were recruited from different school levels and included both boys and girls, allowing for the analysis of breakfast consumption patterns in the overall sample and by gender.

Instrument

Breakfast consumption was assessed using a structured questionnaire that included a single item measuring the frequency of eating breakfast before going to school. Participants selected one of five response categories:

- 1 = Every day
- 2 = 5–6 times per week
- 3 = 3–4 times per week
- 4 = 1–2 times per week
- 5 = 1–2 times per month

This ordinal scale reflects decreasing frequency of breakfast consumption, with lower scores indicating more regular breakfast habits.

Procedure

Data collection was carried out in school settings during regular class hours. Participants completed the questionnaire under the supervision of trained teachers and/or researchers to ensure clarity and consistency. Participation was voluntary and anonymous. Ethical procedures were followed in accordance with research standards involving minors, including institutional approval and informed consent where applicable.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (Version 26). Descriptive statistics were computed, including frequencies (N) and percentages (%) for each category of breakfast consumption. Analyses were conducted: for the total sample, and stratified by gender (boys and girls). The breakfast frequency variable was treated as an ordinal variable, and results were presented as distributions across categories. Gender differences were examined descriptively by comparing frequencies and percentages between boys and girls. Missing data ($n = 7$) were excluded from the analysis.

Results

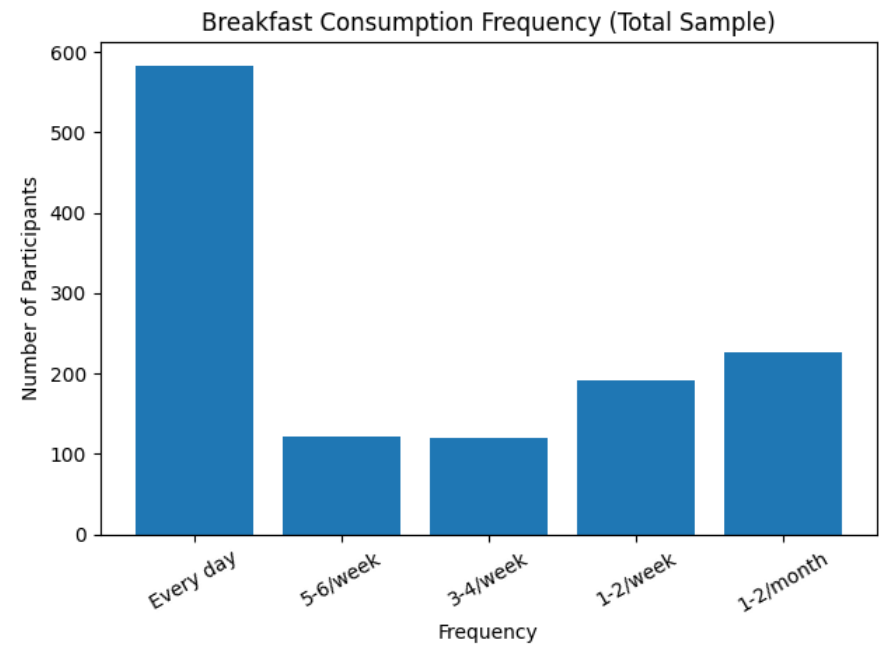
Breakfast Consumption Frequency

Out of 1,250 participants, 1,243 provided valid responses (99.4%), while 7 cases were missing (0.6%). The most common pattern was daily breakfast consumption, reported by 46.9% (n = 583) of participants. However, a considerable proportion reported irregular breakfast habits. Specifically, 9.7% (n = 121) consumed breakfast 5–6 times per week, and 9.6% (n = 120) reported 3–4 times per week. Notably, 15.4% (n = 192) consumed breakfast only 1–2 times per week, while 18.3% (n = 227) reported very low frequency (1–2 times per month).

Table 1

Frequency of Breakfast Consumption Before School (Total Sample)

Frequency Category	N	%
Every day	583	46.9
5–6 times per week	121	9.7
3–4 times per week	120	9.6
1–2 times per week	192	15.4
1–2 times per month	227	18.3
Total (Valid)	1243	100



Breakfast Consumption by Gender

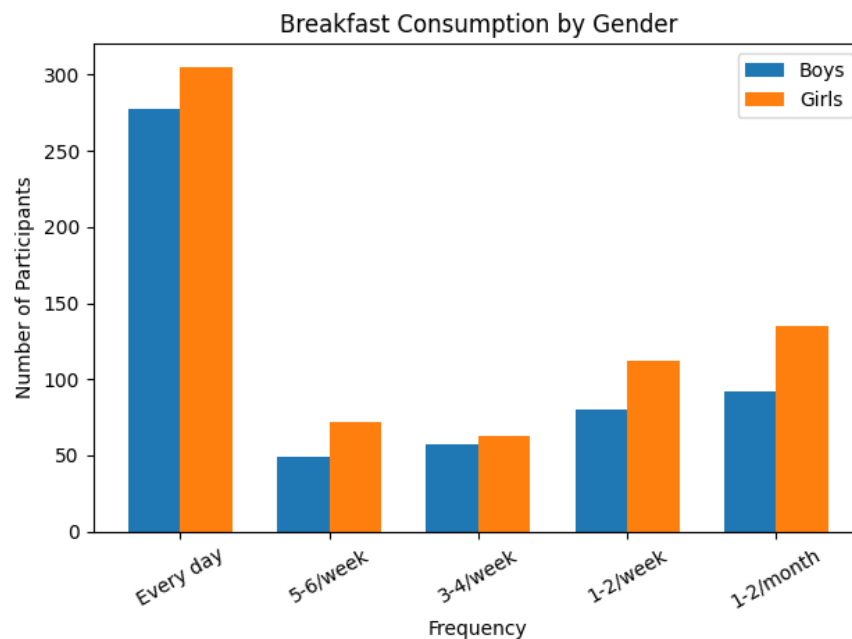
Gender-stratified analysis revealed similar patterns, with boys and girls both reporting high rates of daily breakfast consumption. However, differences emerged in lower-frequency categories. Daily consumption:

Boys (n = 278), Girls (n = 305), 1–2 times per month: Boys (n = 92), Girls (n = 135). A higher proportion of girls were represented in lower-frequency categories, suggesting a tendency toward less regular breakfast consumption among girls.

Table 2

Frequency of Breakfast Consumption by Gender

Frequency Category	Boys (N)	Girls (N)
Every day	278	305
5–6 times/week	49	72
3–4 times/week	57	63
1–2 times/week	80	112
1–2 times/month	92	135



Discussion

The present study examined the frequency of breakfast consumption among school-aged children in Tirana, Albania, with a focus on overall patterns and gender differences. The findings indicate that while nearly half of the participants reported consuming breakfast daily, a substantial proportion exhibited irregular or infrequent breakfast habits. Specifically, 46.9% of participants reported eating breakfast every day, whereas more than half did not meet this standard of regular consumption. A notable proportion reported low-frequency breakfast intake, with 15.4% consuming breakfast only 1–2 times per week and 18.3% as infrequently as 1–2 times per month. These findings suggest that irregular breakfast consumption is relatively common among children and adolescents in Tirana. The results are consistent with international evidence reported by the Health Behaviour in School-aged Children Study, which indicates that breakfast skipping is prevalent among youth and tends to increase with age. Irregular

breakfast consumption has been associated with negative health outcomes, including poor dietary quality, reduced cognitive performance, and increased risk of overweight and obesity. Gender differences observed in the present study further reinforce existing literature. Although boys and girls reported similar levels of daily breakfast consumption, girls were more represented in lower-frequency categories, particularly in the group consuming breakfast 1–2 times per month (girls: $n = 135$; boys: $n = 92$). This suggests that girls may be more prone to skipping breakfast or consuming it irregularly. Previous research has linked this pattern to sociocultural influences, body image concerns, and dieting behaviors, especially during adolescence. The presence of a large group of children with irregular breakfast habits raises important public health concerns. Breakfast consumption is often associated with healthier lifestyle behaviors, including better dietary choices, higher levels of physical activity, and improved school performance. Therefore, the observed patterns may reflect broader lifestyle issues among youth populations.

Strengths and Limitations

This study has several strengths. First, it includes a relatively large sample size ($n = 1,243$ valid cases), which enhances the reliability of the findings. Second, the use of clearly defined frequency categories allows for precise assessment of breakfast consumption patterns. Third, the analysis by gender provides additional insight into behavioral differences within the population.

However, some limitations should be considered. The data were collected using self-reported measures, which may be subject to recall bias and social desirability bias. The cross-sectional design limits the ability to establish causal relationships between breakfast consumption and health outcomes. Additionally, the study was conducted in an urban setting (Tirana), which may limit the generalizability of the findings to rural areas or other regions of Albania. Finally, other potentially relevant factors, such as socioeconomic status, parental influence, and school environment, were not assessed.

Conclusion

The findings of this study indicate that while a substantial proportion of children in Tirana consume breakfast daily, irregular breakfast consumption remains common, affecting more than half of the sample. Gender differences suggest that girls may be at greater risk of infrequent breakfast consumption. These results highlight the need for targeted interventions aimed at promoting regular breakfast habits among school-aged children. Schools, families, and public health institutions should collaborate to raise awareness about the importance of breakfast and to support healthy eating behaviors. Future research should explore the underlying determinants of breakfast consumption and incorporate longitudinal and objective measures to better understand its impact on children's health and development.

Funding Statement

This original article is part of the project- Assessing changes in lifestyle and health of children in Albania: Trend analysis and policy development for child well-being (2015-2025) led and coordinated by Sports University of Tirana, Faculty of Movement Sciences, Department of Education and Health. This project was funded by the National Agency for Scientific Research and Innovation (AKKSHI) as part of the Research and Development Proposals (PKKZH) with a timeline 2025-2027.

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PHYSICAL ACTIVITY LEVELS AMONG SCHOOL CHILDREN AND ADOLESCENTS IN TIRANA, ALBANIA: A CROSS-SECTIONAL STUDY USING THE PAQ-C MODEL

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Abstract

Background: Physical activity (PA) during childhood and adolescence is essential for health and development, yet global evidence suggests a decline in activity levels with age and differences by gender. **Purpose:** This study aimed to assess PA levels among school children and adolescents in Tirana, Albania, using the Physical Activity Questionnaire for Children (PAQ-C) model, and to examine differences by school level and gender. **Methods:** A cross-sectional design was employed, including 1,250 participants from elementary (6.1–11.5 years; n = 356), middle (11.6–16.5 years; n = 461), and high school (16.6–18.6 years; n = 433). PA levels were measured using a PAQ-C–based questionnaire assessing moderate-to-vigorous physical activity over the previous 7 days. Scores ranged from 1 (low activity) to 5 (high activity). Descriptive statistics were calculated using SPSS. **Results:** Mean PA scores decreased progressively across school levels: elementary (M = 2.77), middle (M = 2.64), and high school (M = 2.32). Boys reported higher PA levels than girls in all groups: elementary (boys: M = 2.81; girls: M = 2.68), middle (boys: M = 2.79; girls: M = 2.52), and high school (boys: M = 2.39; girls: M = 2.21). **Conclusions:** PA levels among children and adolescents in Tirana are moderate but show a clear decline with increasing age and are consistently lower among girls. These findings highlight the need for targeted interventions to promote physical activity, particularly among adolescents and female students. **Keywords:** physical activity, PAQ-C, children, adolescents, gender differences, school level, Albania

Introduction

Regular physical activity (PA) during childhood and adolescence plays a critical role in promoting physical, psychological, and social health. Adequate levels of moderate-to-vigorous physical activity (MVPA) are associated with improved cardiovascular fitness, healthy body composition, enhanced mental well-being, and better academic performance (World Health Organization, 2020; Centers for Disease Control and Prevention, 2022). Despite these well-established benefits, global evidence indicates that a large proportion of young people do not meet the recommended levels of daily physical activity (World Health Organization, 2020). A consistent finding across international studies is that physical activity levels tend to decline with increasing age, particularly during the transition from childhood to adolescence (World Health Organization, 2020). Additionally, gender differences are widely reported, with boys

generally exhibiting higher levels of physical activity compared to girls (World Health Organization, 2020). These patterns have been confirmed in large-scale studies such as the Health Behaviour in School-aged Children Study, which highlights disparities in activity levels across countries, age groups, and genders. Reliable assessment of physical activity in youth populations is essential for monitoring trends and informing interventions. Among the widely used instruments, the Physical Activity Questionnaire for Children (PAQ-C) has been recognized as a valid and practical tool for measuring general levels of physical activity over a 7-day period. The PAQ-C provides a composite score based on multiple domains of daily activity, including school-based, leisure-time, and weekend behaviors, making it suitable for epidemiological research and school-based studies. In the Albanian context, research on physical activity among children and adolescents remains limited, particularly studies employing standardized and internationally comparable instruments. Rapid urbanization, lifestyle changes, and increasing sedentary behaviors may influence activity patterns among young populations in urban settings such as Tirana. Therefore, there is a need for updated and context-specific data to better understand physical activity behaviors and their distribution across different age groups and genders. The present study aims to assess physical activity levels among school children and adolescents in Tirana, Albania, using a PAQ-C-based questionnaire. Specifically, the study examines differences in physical activity across school levels (elementary, middle, and high school) and between boys and girls. It is hypothesized that physical activity levels decrease with age and are higher among boys compared to girls.

Methods

Study Design and Participants

This cross-sectional study was conducted in Tirana, Albania, to assess physical activity (PA) levels among school-aged children and adolescents using the Physical Activity Questionnaire for Children (PAQ-C) model. The sample included students from three educational levels: elementary school (6.1–11.5 years), middle school (11.6–16.5 years), and high school (16.6–18.6 years). A total of 1,250 participants were included in the analysis, with no missing data reported. The distribution by school level was as follows: elementary ($n = 356$), middle ($n = 461$), and high school ($n = 433$). Both boys and girls were represented across all age groups.

Instrument

Physical activity was assessed using a questionnaire adapted from the Physical Activity Questionnaire for Children (PAQ-C), a validated self-administered instrument designed to measure general levels of moderate-to-vigorous physical activity (MVPA) over the previous 7 days. The questionnaire consists of multiple items covering different domains of daily activity, including: physical activity during school (e.g., recess, physical education), after-school and leisure-time activities, weekend activity patterns. Responses were recorded on a 5-point Likert scale (1 = low activity to 5 = high activity). A composite PA score was calculated as the mean of all items, with higher scores indicating higher levels of physical activity.

Procedure

Data collection was conducted in school settings during regular class hours. Students completed the questionnaire under the supervision of trained researchers and/or teachers. Instructions were provided to ensure understanding and consistency in responses. Participation was voluntary, and anonymity was maintained. Ethical standards for research involving minors were followed, including institutional approvals and informed consent procedures where applicable.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (version 26). Descriptive statistics were calculated, including means and valid sample sizes (N) for each subgroup. Physical activity levels were analyzed: by school level (elementary, middle, high school), and by gender within each school level.

The PA score was treated as a continuous variable (range 1–5). Results are presented as mean values for each group. No missing data were observed in the dataset. Comparative analyses (e.g., between gender

and school levels) can be further explored using inferential statistics such as ANOVA or independent samples t-tests where appropriate.

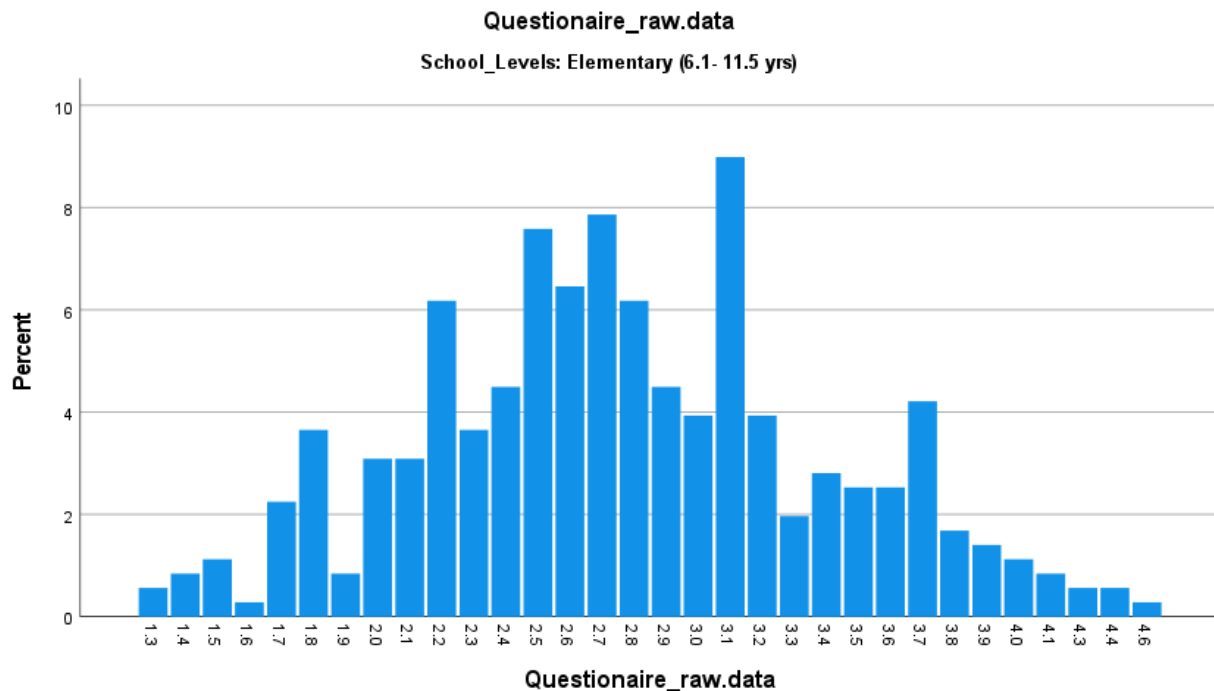
Results

As presented in Table 1, mean physical activity (PA) scores showed a decreasing pattern across school levels. Elementary school students (6.1–11.5 years) had the highest mean PA score ($M = 2.77$, $n = 356$), followed by middle school students (11.6–16.5 years; $M = 2.64$, $n = 461$). High school students (16.6–18.6 years) reported the lowest mean PA score ($M = 2.32$, $n = 433$). Overall, the descriptive results indicate a progressive decline in PA scores with increasing school level, with the largest reduction occurring between middle and high school ($\Delta M = 0.32$).

Table 1

Physical Activity Scores by School Level

School Level	N	Mean PA Score
Elementary (6.1–11.5 yrs)	356	2.77
Middle (11.6–16.5 yrs)	461	2.64
High (16.6–18.6 yrs)	433	2.32



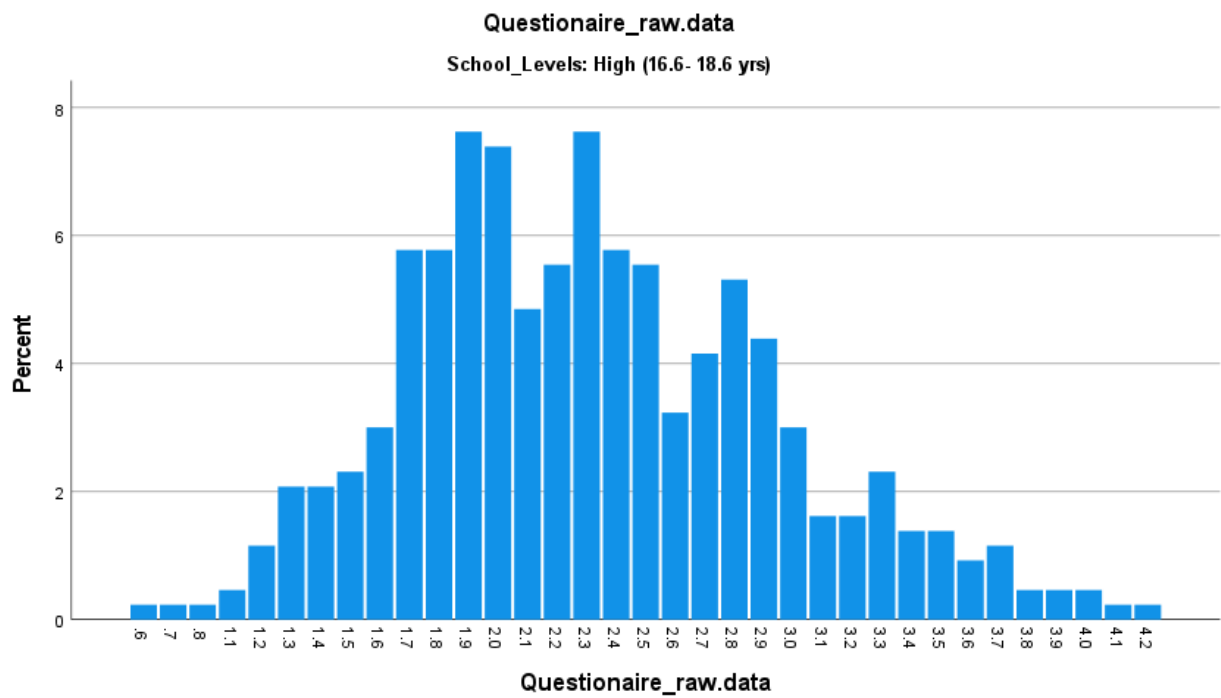
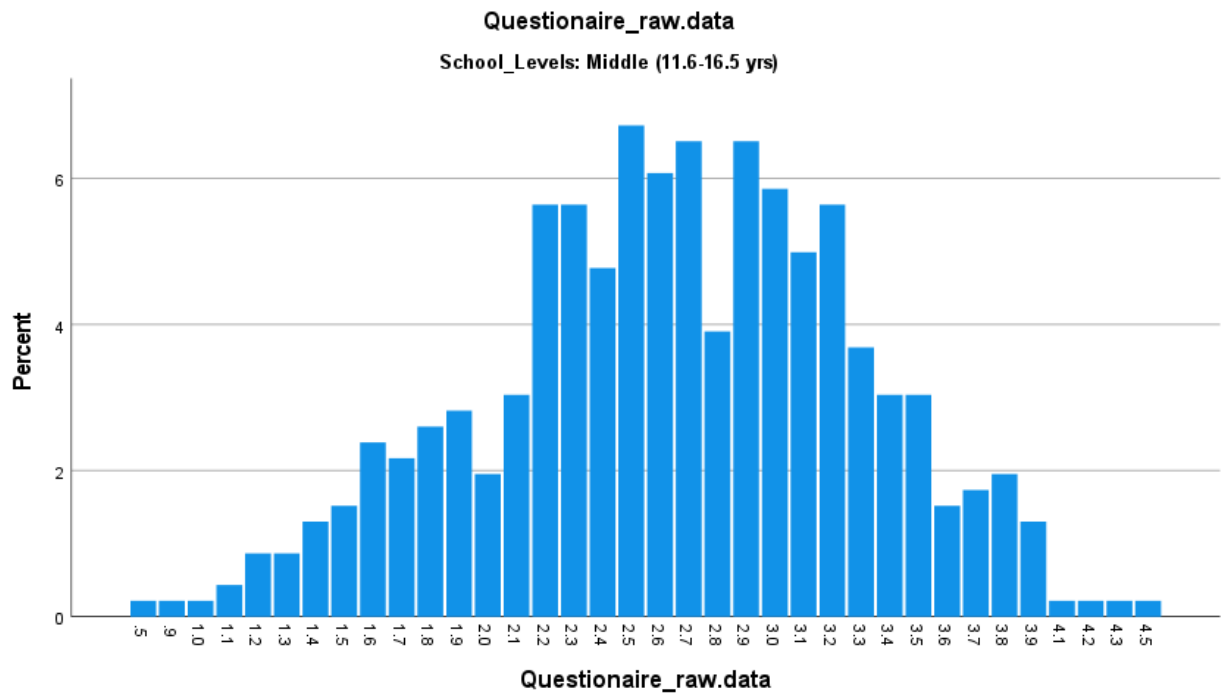
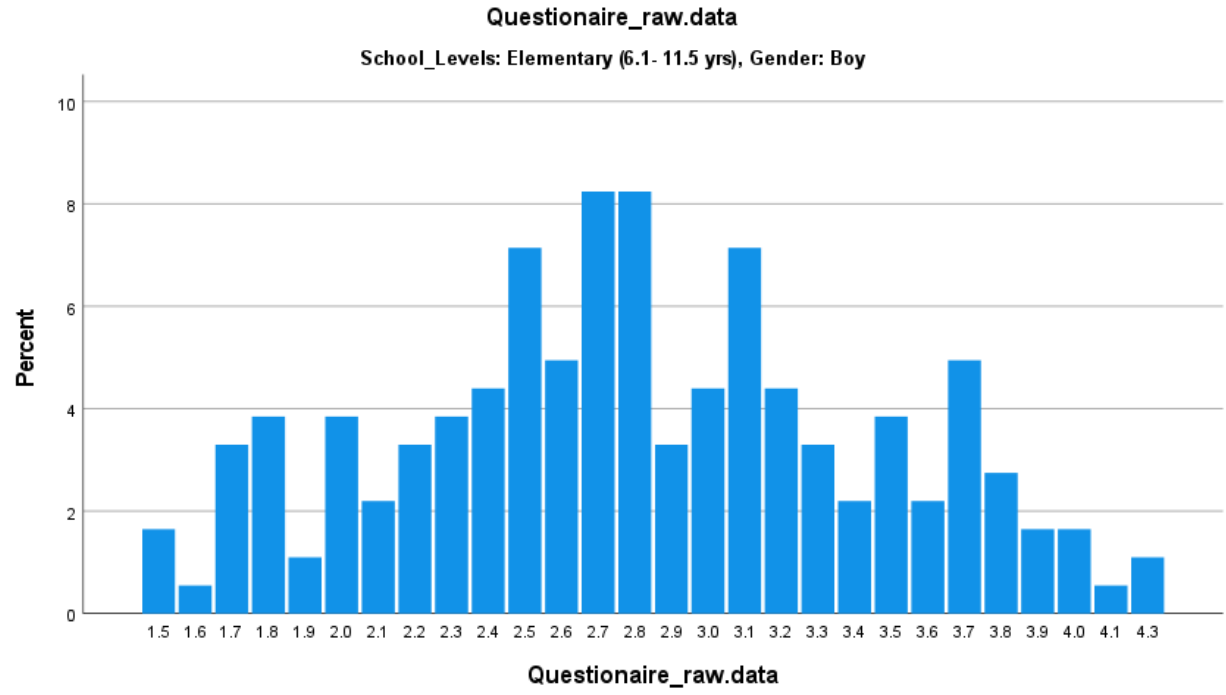
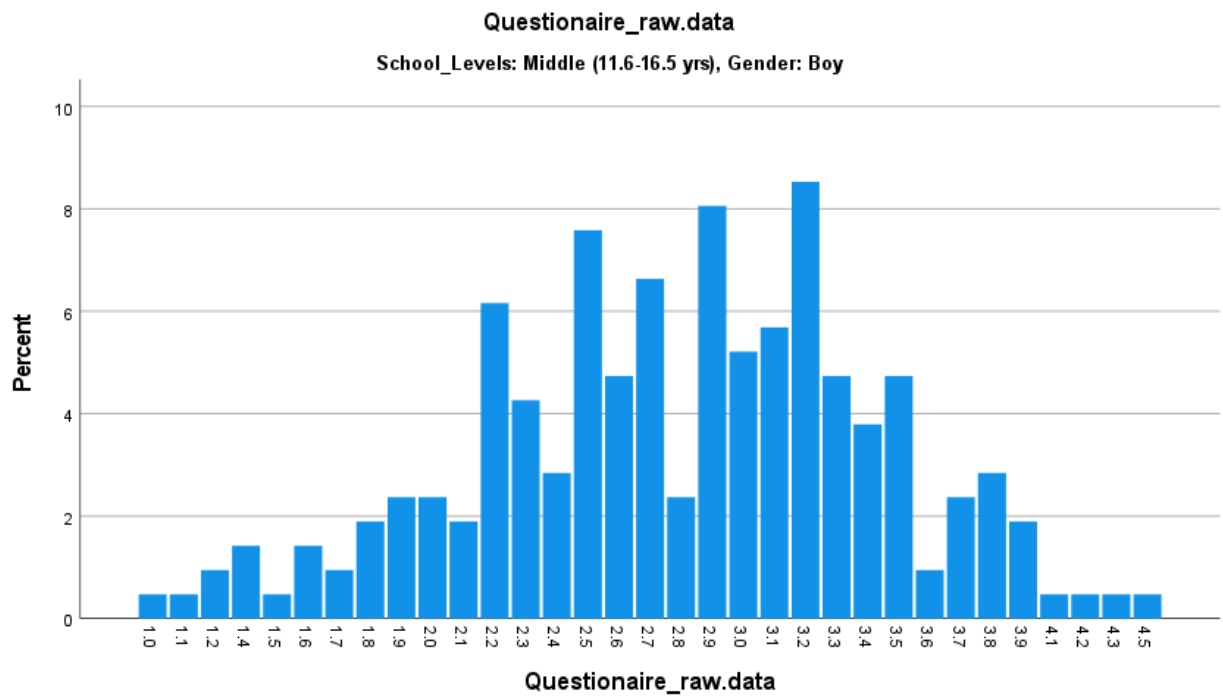
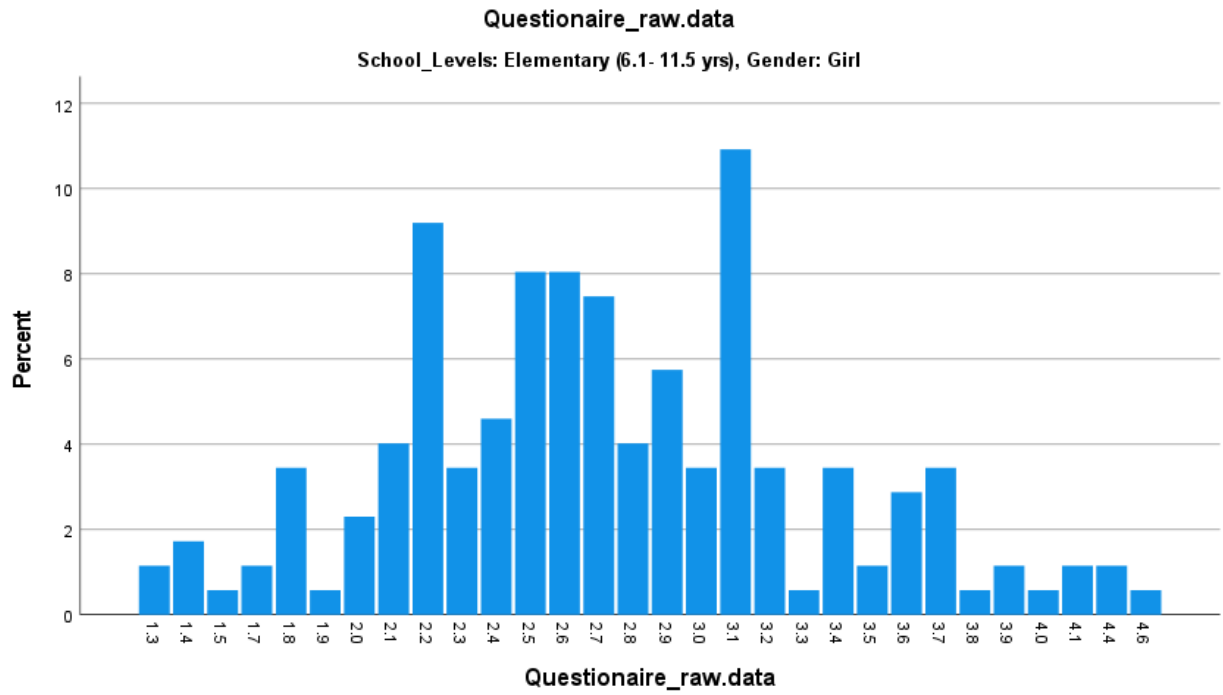
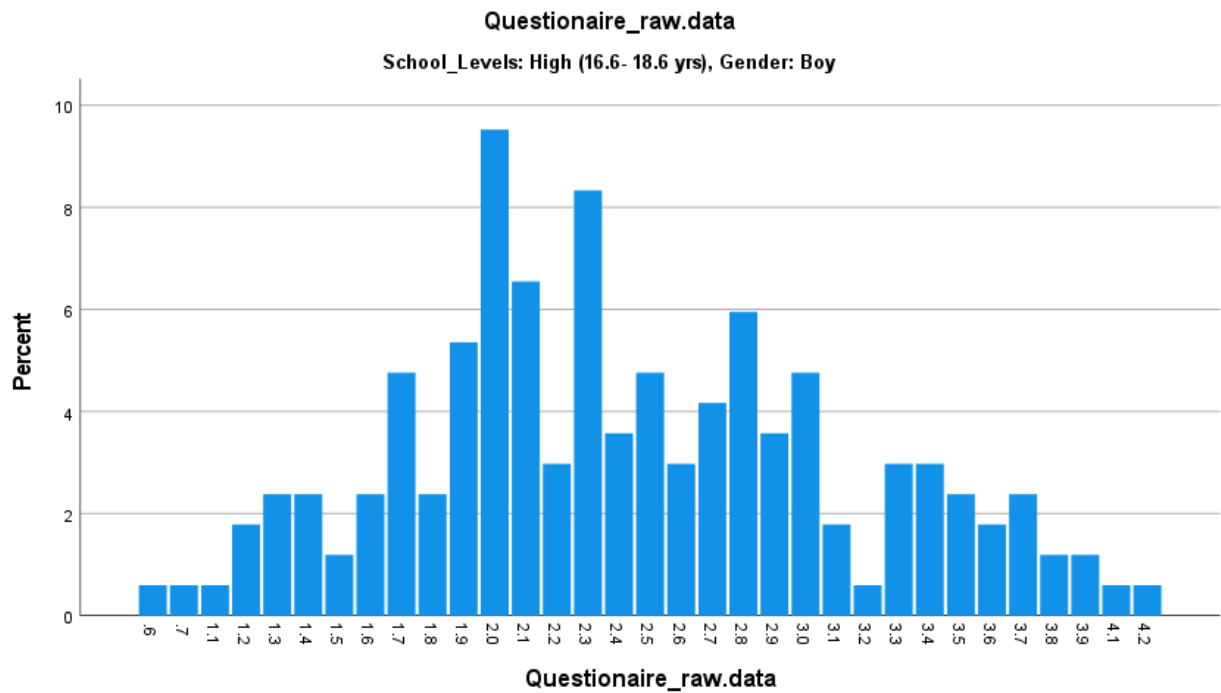
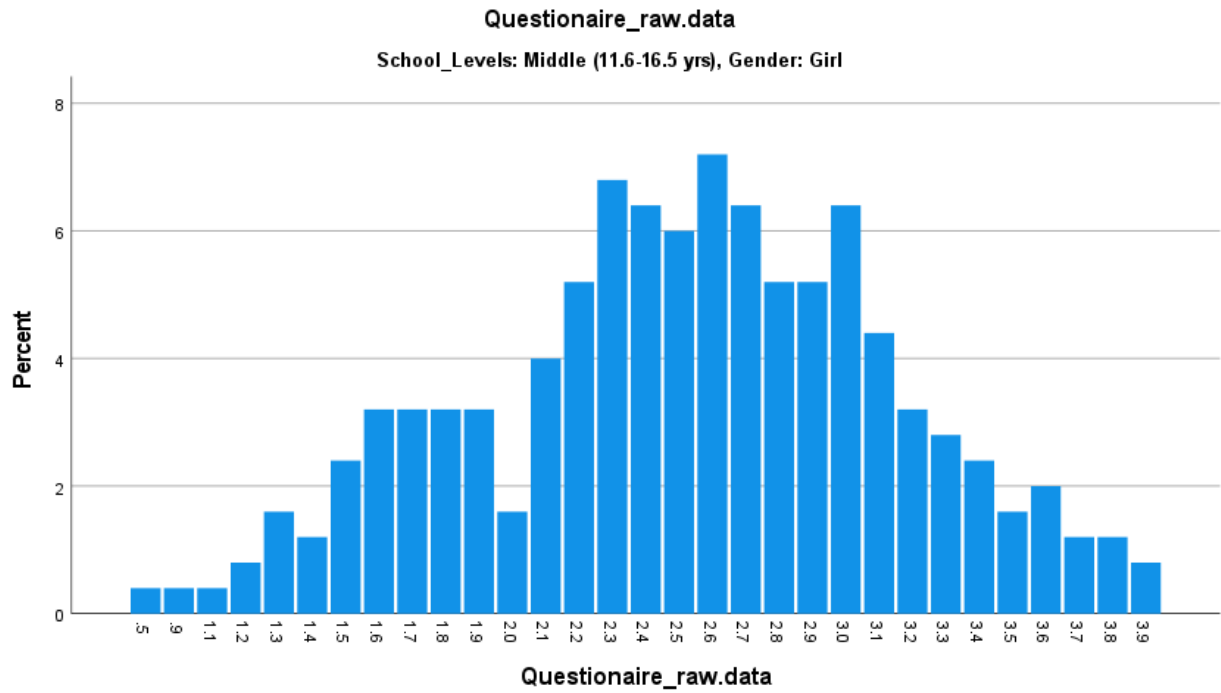


Table 2
Physical Activity Scores by School Level and Gender

School Level	Gender	N	Mean PA Score
Elementary	Boys	182	2.81
	Girls	174	2.68
Middle	Boys	211	2.79
	Girls	250	2.52
High	Boys	168	2.39
	Girls	265	2.21







Discussion

The present study examined physical activity (PA) levels among children and adolescents in Tirana, Albania, using a PAQ-C-based questionnaire. The findings indicate that overall PA levels were moderate

across all school levels but showed a clear decline with increasing age. In addition, boys consistently reported higher PA levels than girls in all age groups. The observed decrease in PA from elementary to high school is consistent with international evidence. Reports from the World Health Organization (2020) and the Health Behaviour in School-aged Children Study highlight that physical activity tends to decline during adolescence, particularly during the transition from childhood to teenage years. This trend has been attributed to multiple factors, including increased academic demands, reduced opportunities for structured play, and greater engagement in sedentary behaviors such as screen time. The present findings suggest that similar patterns are evident in the Albanian context, especially in an urban setting like Tirana. Gender differences observed in this study are also in line with previous research. Boys reported higher PA levels than girls across elementary, middle, and high school groups. This finding aligns with studies by Sallis, J. F. et al. (2000) and Janssen, I. and LeBlanc, A. G. (2010), which consistently demonstrate lower participation in physical activity among girls. Potential explanations include social and cultural factors, differences in motivation and self-efficacy, and fewer opportunities or encouragement for girls to engage in sports and active recreation. Although PA levels in the present study can be considered moderate (mean scores ranging from 2.32 to 2.77 on a 5-point scale), they remain below optimal levels recommended for health benefits. According to the World Health Organization (2020), children and adolescents should engage in at least 60 minutes of moderate-to-vigorous physical activity daily. The moderate scores observed suggest that a substantial proportion of students may not be meeting these guidelines, particularly among older adolescents and girls. The use of a PAQ-C-based instrument represents a strength of this study, as it allows for standardized assessment and comparability with international research. The questionnaire captures multiple domains of physical activity, including school-based and leisure-time activities, providing a comprehensive overview of habitual PA behavior. However, several limitations should be considered. First, the data are based on self-report, which may be subject to recall bias and social desirability effects. Second, the cross-sectional design limits the ability to establish causal relationships. Third, the study was conducted in an urban setting, and therefore the findings may not be generalizable to rural populations in Albania. Despite these limitations, the study provides important insights into PA patterns among young people in Tirana. The results highlight the need for targeted interventions to promote physical activity, particularly among adolescents and girls. Schools represent a key setting for such interventions, through enhanced physical education programs, active recess opportunities, and extracurricular sports activities. In addition, community and family-based approaches may further support active lifestyles.

Conclusion

The present study provides evidence that physical activity levels among children and adolescents in Tirana are moderate but decline significantly with increasing age. Furthermore, boys consistently demonstrate higher levels of physical activity compared to girls across all school levels. These findings align with international research and highlight a critical public health concern. The results suggest that a considerable proportion of students may not meet recommended physical activity levels, particularly during adolescence. This underscores the importance of implementing targeted interventions aimed at promoting active lifestyles, with a specific focus on older students and female populations. Schools, families, and community stakeholders should collaborate to create supportive environments that encourage regular participation in physical activity. Future research should consider longitudinal designs and include objective measures of physical activity to better understand behavioral patterns and inform policy development in Albania.

Funding Statement

This original article is part of the project- Assessing changes in lifestyle and health of children in Albania: Trend analysis and policy development for child well-being (2015-2025) led and coordinated by Sports University of Tirana, Faculty of Movement Sciences, Department of Education and Health. This project was funded by the National Agency for Scientific Research and Innovation (AKKSHI) as part of the Research and Development Proposals (PKKZH) with a timeline 2025-2027.

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PREVALENCE OF SELF-REPORTED MUSCULOSKELETAL PAIN AMONG SCHOOL CHILDREN AGED 9–16 YEARS DURING SCHOOL SCREENING PROGRAMS

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Abstract

Background: Musculoskeletal discomfort and spinal health issues among school-age children have become an increasing concern due to sedentary lifestyles, prolonged sitting, and inadequate postural habits. Early identification through school-based screening programs is essential for preventing long-term health consequences. Objective: The aim of this study was to determine the prevalence and characteristics of self-reported musculoskeletal pain among children aged 9–16 years during school screening programs. Methods: A cross-sectional study was conducted involving 431 students (235 females, 196 males) aged 9–16 years. Participants underwent school-based screening assessments and were asked to report the presence of pain or discomfort. Pain intensity was evaluated using the Visual Analog Scale (VAS) ranging from 1 to 10. Descriptive statistics were used to summarize demographic data and pain characteristics. Results: A total of 21.3% (n = 92) of students reported experiencing occasional pain or discomfort, while 78.7% (n = 339) reported no symptoms. Among those reporting pain, the majority experienced occasional discomfort (67.5%), followed by mild pain (26%) with intensity up to 4/10 on the VAS scale, and a smaller proportion reported moderate pain (6.5%) with intensity around 6/10. No cases of severe pain were identified. These findings indicate that while most children are asymptomatic, a considerable proportion experience intermittent musculoskeletal complaints. Conclusion: The results highlight that a notable percentage of school-age children experience mild to moderate musculoskeletal discomfort. School-based screening programs play a crucial role in early detection and provide an important opportunity for implementing preventive strategies aimed at improving spinal health and overall well-being in youth populations.

Keywords: school screening, musculoskeletal pain, spinal health, adolescents, VAS scale, posture

Introduction

Musculoskeletal health in children and adolescents has become an increasingly important public health concern, particularly in the context of modern lifestyles characterized by prolonged sitting, reduced physical activity, and increased use of digital devices. These behavioral patterns are associated with poor posture and may contribute to the early development of musculoskeletal discomfort and spinal disorders (World Health Organization [WHO], 2020). Early identification of such issues is essential, as musculoskeletal pain during childhood may persist into adulthood and negatively affect quality of life and physical functioning (Kamper et al., 2016). Musculoskeletal pain in school-age children is commonly reported, with prevalence rates varying widely depending on age, assessment methods, and population characteristics. Previous studies have shown that between 15% and 30% of children and adolescents report experiencing back pain or general musculoskeletal discomfort (Calvo-Muñoz et al., 2013). These symptoms are often associated with factors such as sedentary behavior, inadequate ergonomic conditions in schools, heavy schoolbags, and insufficient levels of physical activity (Cardon & Balagué, 2004). In addition, the rapid growth and developmental changes occurring during adolescence may increase vulnerability to postural imbalances and musculoskeletal strain (Straker et al., 2018).

School-based screening programs have been widely recognized as effective tools for the early detection of postural deviations and musculoskeletal complaints. Such programs allow for the systematic assessment of large populations of children in a structured and accessible environment, facilitating early intervention and prevention strategies (Grimmer et al., 2006). The use of simple and reliable tools, such as self-reported questionnaires and the Visual Analog Scale (VAS), enables the identification of pain intensity and patterns in a practical and cost-effective manner (Hawker et al., 2011).

Despite growing awareness of musculoskeletal health in youth populations, there remains a need for updated data on the prevalence and characteristics of pain among school children, particularly in specific regional and educational contexts. Understanding the distribution and severity of musculoskeletal discomfort can inform targeted interventions and contribute to the development of school health policies aimed at promoting physical well-being. Therefore, the aim of the present study was to assess the prevalence and characteristics of self-reported musculoskeletal pain among school children aged 9–16 years during school-based screening programs. It was hypothesized that a considerable proportion of students would report mild or intermittent discomfort, highlighting the importance of early detection and preventive strategies within the school setting.

Methods

Study Design and Participants

A cross-sectional study was conducted as part of school-based screening programs involving children aged 9–16 years. A total of 431 students participated in the study, including 235 females (54.5%) and 196 males (45.5%). Participants were recruited from several schools and included in the screening based on voluntary participation. All students present on the day of assessment were eligible to participate. The screening procedures were conducted during school hours under standardized conditions.

Measurement

Data collection included both demographic information and self-reported musculoskeletal symptoms. Participants were asked to indicate whether they experienced pain or discomfort at the time of the screening or occasionally during daily activities. Pain intensity was assessed using the Visual Analog Scale (VAS) ranging from 1 to 10, where higher values indicated greater pain intensity. Based on reported values, pain was categorized into three levels: mild pain ($VAS \leq 4$), moderate pain ($VAS = 6$), and occasional discomfort (intermittent symptoms without consistent intensity). The assessment focused on general musculoskeletal discomfort without restricting responses to a specific anatomical region.

Procedure

Screening was conducted in a school setting by trained professionals. Students completed a brief questionnaire regarding the presence of pain or discomfort, followed by classification of pain intensity using the VAS scale. The process was carried out in a structured and supervised environment to ensure clarity of responses and consistency in data collection.

Statistical Analysis

Descriptive statistical analysis was performed to summarize the data. Frequencies and percentages were calculated for categorical variables, including gender distribution and the prevalence of reported pain or discomfort. Pain intensity categories were also presented as frequencies and percentages. All analyses were conducted to describe the distribution and characteristics of musculoskeletal pain among the participants.

Results

A total of 431 students aged 9–16 years participated in the school screening program. The sample consisted of 235 females (54.5%) and 196 males (45.5%), indicating a relatively balanced gender distribution with a slight predominance of female participants.

Prevalence of Pain and Discomfort

Out of the total sample, 92 students (21.3%) reported experiencing occasional pain or discomfort, whereas the majority, 339 students (78.7%), reported no pain. This indicates that approximately one in five children in this age group experiences some form of musculoskeletal discomfort. Although most students were asymptomatic, the proportion reporting discomfort is notable and highlights the presence of early musculoskeletal concerns in school-aged populations.

Table 1. Demographic Characteristics of Participants

Variable	Number of Participants	Percentage
Female	235	54.5%
Male	196	45.5%
Total	431	100%

Among the 92 students who reported pain or discomfort, different levels of intensity were observed based on the Visual Analog Scale (VAS): 24 students reported mild pain ($VAS \leq 4$), 6 students reported moderate pain ($VAS = 6$) and 62 students reported occasional/intermittent discomfort. No cases of severe pain were reported. The findings suggest that musculoskeletal symptoms in this population are predominantly low-intensity and intermittent rather than severe, indicating early-stage or mild conditions rather than clinically advanced issues.

Table 2. Self-Reported Presence of Pain or Discomfort

Pain / Discomfort Reported	Number of Students	Percentage
Reported occasional pain or discomfort	92	21.3%
No pain reported	339	78.7%
Total	431	100%

When analyzing only the subgroup of students reporting pain ($n = 92$): 67.5% reported occasional discomfort, 26% reported mild pain and 6.5% reported moderate pain. The majority of reported symptoms

fall under occasional discomfort, suggesting that pain is not persistent but occurs intermittently, potentially related to posture, activity levels, or daily habits.

Table 3. Pain Intensity According to VAS Scale (1–10)

Pain Intensity (VAS)	Number of Students	Interpretation
Up to 4/10	24	Mild pain
VAS 6/10	6	Moderate pain
Occasional discomfort	62	Intermittent discomfort

Overall, the results indicate that while the majority of children do not report musculoskeletal pain, a meaningful proportion experiences mild or occasional discomfort. The low prevalence of moderate pain and absence of severe pain suggest that most cases are not yet clinically significant but may represent early indicators of postural or musculoskeletal issues. These findings reinforce the importance of early screening and preventive strategies in school environments.

Table 4. Distribution of Pain Severity Among Students Reporting Pain

Pain Category	Number	Percentage (of 92 students)
Mild pain (VAS ≤4)	24	26%
Moderate pain (VAS 6)	6	6.5%
Occasional discomfort	62	67.5%

Discussion

The aim of this study was to examine the prevalence and characteristics of self-reported musculoskeletal pain among school children aged 9–16 years during school-based screening programs. The findings indicate that while the majority of students (78.7%) did not report any pain or discomfort, a considerable proportion (21.3%) experienced occasional musculoskeletal symptoms. These results are consistent with previous research suggesting that musculoskeletal pain is relatively common among children and adolescents, even in non-clinical populations (Calvo-Muñoz et al., 2013; Kamper et al., 2016). A key finding of the present study is that most reported symptoms were of low intensity, with 67.5% of affected students describing occasional discomfort and 26% reporting mild pain. Only a small percentage (6.5%) reported moderate pain, and no cases of severe pain were identified. This distribution suggests that musculoskeletal issues in this age group are predominantly mild and intermittent. Similar patterns have been reported in the literature, where early-stage discomfort is often linked to postural habits, prolonged sitting, and insufficient physical activity rather than structural pathology (Straker et al., 2018). The presence of occasional discomfort in a substantial proportion of students may be associated with school-related factors such as extended sitting time, inadequate ergonomic conditions, and the use of school furniture that does not accommodate individual anthropometric characteristics (Cardon & Balagué, 2004). Furthermore, increased exposure to digital devices and sedentary behaviors may contribute to postural strain and muscle fatigue, particularly in the cervical and lumbar regions (WHO, 2020). These factors may explain the relatively high percentage of intermittent discomfort observed in the present study.

The findings also highlight the importance of early detection through school-based screening programs. Even though the majority of reported symptoms were mild, early identification is essential to prevent the progression of musculoskeletal problems into more persistent or chronic conditions later in life (Kamper et al., 2016). Screening programs provide an effective and practical approach for identifying at-risk students and implementing preventive strategies, including posture education, physical activity promotion, and ergonomic interventions (Grimmer et al., 2006).

From a practical perspective, the results suggest that schools should play a more active role in promoting musculoskeletal health. Integrating structured physical activity into the daily routine, improving classroom ergonomics, and educating students about proper posture may help reduce the prevalence of discomfort. Additionally, collaboration between educators, health professionals, and parents is essential to ensure a comprehensive approach to prevention. However, some limitations of the study should be acknowledged. The use of self-reported measures may introduce subjective bias, as students may underreport or overreport symptoms. Furthermore, the cross-sectional design does not allow for causal inferences. The study also did not differentiate between specific anatomical regions of pain, which could provide more detailed insights into the nature of musculoskeletal complaints. Future research should consider longitudinal designs, objective measurements, and more detailed pain localization.

Conclusion

In conclusion, the findings of this study indicate that although the majority of school children aged 9–16 years do not report musculoskeletal pain, a significant proportion experience mild or occasional discomfort. The predominance of low-intensity symptoms suggests that musculoskeletal issues are generally at an early stage, highlighting a valuable opportunity for preventive intervention. School-based screening programs represent an effective strategy for the early identification of musculoskeletal discomfort and can support the development of targeted interventions aimed at improving posture, increasing physical activity, and enhancing overall well-being. Preventive measures implemented during childhood may play a crucial role in reducing the risk of chronic musculoskeletal conditions later in life. These results emphasize the need for continued monitoring of musculoskeletal health in school populations and the integration of health promotion strategies within the educational system.

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RELATIONSHIPS BETWEEN ANTHROPOMETRIC CHARACTERISTICS AND SPEED–AGILITY PERFORMANCE IN U14 BASKETBALL PLAYERS

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Abstract

The aim of this study was to examine the relationships between anthropometric characteristics and performance variables, specifically speed and agility, in U14 basketball players. A total of 42 male athletes participated in this cross-sectional study. Anthropometric measurements included body weight, body height, body mass index (BMI), and waist circumference, while performance was assessed using a 20 m sprint test, T-test, and 10×5 m agility test. Descriptive statistics and Pearson correlation analyses were conducted to explore associations between variables. The results indicated significant positive correlations between BMI and performance times in the sprint ($r = .383$, $p < .05$) and agility tests ($r = .450-.475$, $p < .01$), suggesting that higher BMI is associated with lower performance. Waist circumference was also significantly correlated with agility performance ($r = .433-.447$, $p < .01$), indicating a negative influence of central adiposity on change-of-direction ability. Body weight showed a weaker association, being significantly related only to the 10×5 m test ($r = .335$, $p < .05$), while body height was not significantly associated with any performance variable. In conclusion, body composition indicators, particularly BMI and waist circumference, play an important role in determining speed and agility performance in U14 basketball players. These findings highlight the importance of monitoring anthropometric characteristics as part of youth athlete development and training optimization. Keywords: youth basketball, anthropometry, BMI, agility, sprint performance, body composition, adolescence

Introduction

Speed and agility are fundamental performance components in basketball, particularly during youth development stages where neuromuscular adaptations and motor coordination are rapidly evolving. Basketball is characterized by repeated high-intensity actions such as sprinting, jumping, and rapid changes of direction, making speed and agility essential determinants of performance (Ben Abdelkrim, El Fazaa, & El Ati, 2007). In youth athletes, these physical qualities are strongly influenced by growth, maturation, and anthropometric characteristics (Lloyd & Oliver, 2012). Anthropometric variables, including body weight, body height, body mass index (BMI), and waist circumference, play a critical role in shaping physical performance in young athletes. Previous studies have shown that excess body mass, particularly when associated with higher adiposity, may negatively affect speed and agility performance due to increased mechanical load and reduced movement efficiency (Nikolaidis, 2012; Malina, Bouchard, & Bar-Or, 2004). Conversely, optimal body composition is associated with improved neuromuscular performance and enhanced ability to perform explosive movements (Norton & Olds, 2001). BMI and waist circumference are widely used indicators of body composition in youth populations and have been linked to performance outcomes in various sports. Higher BMI values, especially when reflecting increased fat mass, have been associated with slower sprint times and poorer agility performance (D'Hondt et al., 2011). Similarly, central adiposity, as measured by waist circumference, may further impair movement efficiency and change-of-direction ability, which are crucial in basketball-specific tasks (Ortega et al., 2008). During early adolescence, typically around the U14 age category, athletes experience significant inter-individual variability in growth and biological maturation. These differences can lead to substantial variation in anthropometric profiles and physical performance, even within the same chronological age group (Malina et al., 2004). Therefore, understanding the relationship between anthropometric characteristics and performance variables is essential for coaches and practitioners when designing age-appropriate training programs and identifying talent. Despite the growing body of literature on youth athlete development, there is limited research focusing specifically on the interaction between anthropometric characteristics and performance indicators in youth basketball players within developing sport systems. In this context, the present study aims to examine the relationships between anthropometric variables (body weight, height, BMI, and waist circumference) and performance measures of speed and agility in U14 basketball players. It is hypothesized that body composition indicators, particularly BMI and waist circumference, will be significantly associated with sprint and agility performance.

Methods

This study employed a cross-sectional research design to examine the relationships between anthropometric characteristics and performance variables in youth basketball players. Data were collected from a sample of 42 male U14 basketball players, all of whom were actively engaged in organized training programs. Participants were of similar chronological age but may have differed in biological maturation, which is typical for this developmental stage.

Anthropometric measurements were obtained using standardized procedures. Body weight was measured to the nearest 0.1 kg using a calibrated digital scale, while body height was recorded using a stadiometer. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2). Waist circumference was measured using a flexible tape at the midpoint between the lower rib and the iliac crest. All measurements were conducted under consistent conditions to ensure reliability.

Performance testing focused on speed and agility, which are key components in basketball. Sprint speed was assessed using a 20 m sprint test, where participants performed maximal effort runs and times were recorded in seconds. Agility was evaluated using two commonly applied field tests: the T-test, which measures multidirectional movement and change-of-direction ability, and the 10×5 m shuttle run test, which assesses repeated sprinting and agility performance. All tests were administered following standardized protocols, and participants were familiarized with the procedures prior to testing.

Statistical analysis was performed using descriptive and inferential methods. Descriptive statistics, including mean, standard deviation, minimum, and maximum values, were calculated for all variables. Pearson correlation coefficients were used to examine the relationships between anthropometric characteristics (body weight, height, BMI, and waist circumference) and performance variables (sprint and agility tests). Statistical significance was set at $p < .05$. All analyses were conducted using appropriate statistical software.

Results

Descriptive statistics for anthropometric characteristics of U14 basketball players ($N = 42$) indicate substantial variability across all measures. Body weight ranged from 25.7 to 95.2 kg (mean = 57.57 ± 14.89 kg), while BMI varied between 14.4 and 30.9 kg/m^2 (mean = 21.77 ± 3.72 kg/m^2). Waist circumference showed values from 53.0 to 108.5 cm (mean = 79.49 ± 12.13 cm). Body height also demonstrated a wide range, reflecting differences in growth and maturation within the sample. Overall, the relatively high standard deviations suggest considerable heterogeneity in anthropometric profiles among players in this age group.

Table 1 Descriptive statistics for anthropometrics

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Body_Weight</i>	42	25.7	95.2	57.569	14.8883
<i>Body_Height</i>	42	1.34	182.00	13.9905	45.26598
<i>BMI</i>	42	14.4	30.9	21.771	3.7240
<i>Waist</i>	42	53.0	108.5	79.488	12.1346
<i>Valid N (listwise)</i>	42				

Descriptive statistics for speed and agility performance (N = 42) indicate moderate variability among U14 basketball players. Sprint performance over 20 m ranged from 3.44 to 5.23 s (mean = 4.03 ± 0.41 s). Agility performance showed values between 11.1 and 16.4 s in the T-test (mean = 13.62 ± 1.30 s) and 17.4 to 26.7 s in the 10×5 m test (mean = 20.92 ± 2.08 s). Overall, the dispersion of results suggests differences in speed and change-of-direction ability within the sample.

Table 2 Descriptive statistics for speed and agility

	N	Minimum	Maximum	Mean	Std. Deviation
Sprint_20m	42	3.44	5.23	4.0321	.40807
Agilty_T_test	42	11.1	16.4	13.623	1.3041
Agilty_10x5m	42	17.4	26.7	20.917	2.0821
Valid N (listwise)	42				

Pearson correlation analysis revealed several significant relationships between anthropometric variables and performance measures. BMI showed moderate positive correlations with sprint time ($r = .383$, $p = .012$) and agility tests, including the T-test ($r = .450$, $p = .003$) and 10×5 m ($r = .475$, $p = .001$), indicating that higher BMI is associated with lower speed and agility performance. Similarly, waist circumference was positively correlated with the T-test ($r = .433$, $p = .004$) and 10×5 m agility ($r = .447$, $p = .003$), suggesting reduced agility with increased central adiposity. Body weight was significantly correlated only with the 10×5 m test ($r = .335$, $p = .030$), while no significant associations were found between body height and performance variables. Overall, the results indicate that body composition indicators, particularly BMI and waist circumference, are important factors influencing speed and agility in U14 basketball players.

Table 3 Correlation for anthropometrics and speed and agility

		Sprint_20m	Agilty_T_test	Agilty_10x5m
Body_Weight	Pearson Correlation	.021	.121	.335*
	Sig. (2-tailed)	.896	.444	.030
	N	42	42	42
Body_Height	Pearson Correlation	-.206	-.037	.172
	Sig. (2-tailed)	.190	.815	.276
	N	42	42	42
BMI	Pearson Correlation	.383*	.450**	.475**
	Sig. (2-tailed)	.012	.003	.001

	N	42	42	42
Waist	Pearson Correlation	.290	.433**	.447**
	Sig. (2-tailed)	.062	.004	.003
	N	42	42	42

Discussion

The purpose of this study was to examine the relationships between anthropometric characteristics and performance variables, specifically speed and agility, in U14 basketball players. The findings indicate that body composition variables, particularly BMI and waist circumference, are significantly associated with performance outcomes, while body height showed no significant relationship with speed or agility. A key finding of this study is the moderate positive correlation between BMI and performance times in sprint and agility tests. Specifically, higher BMI values were associated with slower sprint performance ($r = .383$) and reduced agility ($r = .450-.475$). These results suggest that increased body mass, likely reflecting higher fat mass rather than lean tissue, negatively impacts movement efficiency. This is consistent with previous research indicating that excess body mass increases mechanical load and reduces acceleration and change-of-direction capacity (Nikolaidis, 2012; D'Hondt et al., 2011). Similarly, waist circumference was significantly correlated with agility performance, particularly in the T-test ($r = .433$) and 10×5 m test ($r = .447$), indicating that central adiposity may play a role in limiting agility performance. These findings support existing evidence that body fat distribution, especially abdominal fat, can impair motor performance and reduce efficiency in dynamic movements (Ortega et al., 2008). Although waist circumference was not significantly associated with sprint performance, the observed trend suggests a potential influence that may become more pronounced in larger samples. In contrast, body height did not show significant correlations with performance variables, suggesting that stature alone is not a determining factor for speed and agility at this developmental stage. This may be explained by the variability in biological maturation among U14 athletes, where differences in coordination, strength, and neuromuscular control may outweigh the influence of height (Malina et al., 2004). Similarly, body weight showed only a limited association, being significantly related only to the 10×5 m agility test, indicating that total mass may influence repeated movement performance more than single sprint efforts.

The relatively large variability observed in anthropometric and performance measures reflects the heterogeneity typical of early adolescence. During this period, differences in growth and maturation can significantly affect physical performance, making it essential to consider individual development rather than relying solely on chronological age (Lloyd & Oliver, 2012). From a practical perspective, these findings highlight the importance of monitoring body composition in youth basketball players. Coaches and practitioners should consider not only physical performance outcomes but also anthropometric profiles when designing training programs. Interventions aimed at optimizing body composition may contribute to improved speed and agility, which are critical for basketball performance. However, several limitations should be acknowledged. The relatively small sample size ($N = 42$) may limit the generalizability of the findings. Additionally, BMI does not distinguish between fat mass and lean mass, which may affect the interpretation of results. Future research should incorporate more precise body composition measures and consider longitudinal designs to better understand developmental changes.

Conclusion

In conclusion, the present study demonstrates that anthropometric characteristics, particularly BMI and waist circumference, are significantly associated with speed and agility performance in U14 basketball players. Higher values of these variables are linked to reduced performance, indicating the importance of body composition in youth athletic development. In contrast, body height does not appear to play a significant role in influencing these performance outcomes at this age. These findings emphasize the need for a holistic approach to youth training, where physical development, body composition, and performance are monitored together. Such an approach can support more effective talent development and contribute to improved performance in basketball.

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COMPARATIVE ANALYSIS OF PARENTAL SPORTS PARTICIPATION AND YOUTH SPORTS ENGAGEMENT IN ALBANIA

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Abstract

This study examines the relationship between parental sports participation and youth involvement in organized sports in Albania, using data derived from the START – SporT Assesment ReporT project. A total of 716 youth athletes (aged 8–19 years) were analyzed, providing information on their current sport discipline as well as the historical sports participation of their mothers and fathers. The findings reveal clear intergenerational and gender-specific patterns in sport engagement. Results indicate that fathers’ participation is strongly associated with boys’ involvement in football (81.8%) and basketball (40.3%), highlighting the dominant role of paternal influence in traditionally male-oriented sports. Similarly, fathers’ influence extends to girls, with 83.3% of girls in football having fathers with a football background, suggesting strong cross-gender transmission in this discipline. In contrast, mothers’ participation shows a stronger association with volleyball, where 60.0% of girls and 54.5% of boys in

related groups report maternal involvement, indicating that volleyball functions as a maternally influenced sport across genders. Additional findings reveal nuanced intergenerational dynamics, including cross-gender influences such as mothers' contribution to boys' participation in volleyball (66.7%) and fathers' influence on girls in basketball and taekwondo-related contexts. In contrast, participation in non-traditional sports (e.g., swimming, tennis, badminton) appears less dependent on parental background, suggesting a greater role of individual preference or access to opportunities. Overall, the results reflect strong cultural and gendered patterns in Albanian sport, where football and basketball are predominantly associated with paternal influence, while volleyball and similar disciplines are more closely linked to maternal legacy. These findings highlight the importance of family background in shaping youth sport participation and underline the need for policies that promote broader, more inclusive engagement across all sports disciplines.

Keywords: youth sport participation, parental influence, intergenerational transmission, gender differences, Albania, START project

Introduction

Participation in organized sport during childhood and adolescence is widely recognized as a key contributor to physical, psychological, and social development. Engagement in sport is associated with improved cardiovascular health, motor skill development, social integration, and overall well-being (Eime et al., 2013; Janssen & LeBlanc, 2010). However, participation patterns are not uniform and are influenced by a range of factors, including biological, environmental, and socio-cultural determinants (Côté, Baker, & Abernethy, 2007).

Among these factors, family environment—particularly parental influence—plays a central role in shaping children's involvement in sport. Parents not only provide logistical and emotional support but also act as role models, transmitting attitudes, behaviors, and preferences related to physical activity (Fredricks & Eccles, 2004). Previous research has demonstrated that children are more likely to participate in sports when their parents have a history of sport engagement, suggesting a strong intergenerational transmission effect (Wheeler, 2011). This influence may manifest differently across genders and sports disciplines, reflecting broader societal norms and expectations. Gender differences in sport participation remain a consistent finding in the literature. Boys generally exhibit higher levels of engagement in competitive and team-based sports such as football and basketball, whereas girls are more frequently represented in sports such as volleyball, gymnastics, and individual-based activities (Eime et al., 2013; Slater & Tiggemann, 2011). These patterns are often reinforced by cultural expectations, access to opportunities, and parental modeling behaviors (Knight, Boden, & Holt, 2010). In particular, fathers have been shown to exert a stronger influence on boys' sport participation, while mothers may play a more significant role in shaping girls' involvement, especially in traditionally gendered sports (Bois, Sarrazin, Brustad, Trouilloud, & Cury, 2005). Adolescence represents a critical period for sport participation and development, characterized by increased specialization, performance demands, and, in some cases, dropout (Fraser-Thomas, Côté, & Deakin, 2008). During this phase, parental influence continues to be significant, not only in supporting sustained participation but also in shaping sport preferences and commitment (Knight et al., 2010). Understanding these dynamics is essential for designing interventions aimed at increasing participation and promoting long-term engagement in sport. Despite the growing body of international research on parental influence in youth sport, there is a lack of systematic data in many national contexts, including Albania. The absence of structured datasets has limited the ability to conduct comprehensive analyses of participation patterns and to understand the socio-cultural mechanisms influencing sport engagement. To address this gap, the Albanian Sports Science Association (ASSA) initiated a structured data collection effort in 2017, which was later formalized into the START – Sport Assessment Report project (2021–2024). This project provides one of the first large-scale datasets on youth sport participation in Albania, including information on both athlete engagement and parental sport backgrounds. Using data from the START project, the present study aims to examine the relationship between parental sport participation and youth involvement in organized sports in Albania. Specifically, the study investigates how mothers' and fathers' historical engagement in sport relates to their children's current participation

across different disciplines. It is hypothesized that strong intergenerational patterns will be observed, with notable gender differences reflecting cultural norms and traditional sport structures.

Methods

Study Design

This study employed a cross-sectional design to examine the relationship between parental sports participation and youth involvement in organized sports in Albania. The research was conducted within the framework of the START – SporT Assessment ReporT project (2021–2024), an initiative led by the Albanian Sports Science Association (ASSA) to generate standardized data on athlete development and participation patterns.

Participants

The sample consisted of 716 youth athletes (boys and girls) aged 8 to 19 years, who were actively engaged in organized sports programs across Albania. Participants were recruited from sports clubs and training centers representing multiple disciplines, including basketball, football, volleyball, and combat sports (e.g., taekwondo, karate). Selection was based on voluntary participation and availability during the data collection period. All participants were involved in regular training activities and represented a broad spectrum of competitive levels. Gender-specific analyses were conducted to examine differences between male and female athletes.

Data Collection

Data were collected using a standardized questionnaire developed within the START project framework. The questionnaire was administered directly to the youth participants under supervised conditions to ensure clarity and consistency of responses. The instrument included the following key variables: Current sport participation (discipline practiced by the athlete) Parental sport history, including: Mother's participation in sport during her youth Father's participation in sport during his youth. Participants were asked to identify the sport(s) practiced by their parents, allowing for the analysis of intergenerational patterns in sport participation.

Variables and Measures

The main variables analyzed in the study were:

Dependent variable:

Athlete's current sport discipline

Independent variables:

Mother's sport participation (categorized by sport discipline)

Father's sport participation (categorized by sport discipline)

Grouping variables:

Gender (boys vs. girls)

Sports disciplines were grouped into categories such as basketball, football, volleyball, gymnastics, combat sports, and other activities (e.g., swimming, tennis, athletics).

Statistical Analysis

Data analysis was performed using descriptive statistical methods. Frequencies and percentages were calculated to determine the distribution of parental sport participation relative to the athletes' current sport involvement. Cross-tabulation analyses were conducted to examine: The relationship between parental sport background and children's sport participation. Differences between maternal and paternal influence. Gender-specific patterns in sport selection. Results were presented in the form of frequency tables and percentage distributions, allowing for clear interpretation of intergenerational trends. No inferential statistical tests were applied, as the study primarily aimed to describe patterns within the dataset.

Ethical Considerations

Participation in the study was voluntary, and all data were collected in accordance with ethical standards for research involving human participants. Anonymity and confidentiality of participants were ensured throughout the data collection and analysis process.

Results

The analysis of mothers' sport participation in relation to their children's current sport involvement reveals distinct patterns across both gender and sport disciplines. Among boys participating in basketball (n = 31), the most common maternal background was volleyball (38.7%), followed by basketball (32.3%), while smaller proportions were observed in judo (9.7%), athletics (6.5%), and swimming (6.5%). Minimal representation was found for football and gymnastics (3.2% each). For boys involved in football (n = 11), mothers' participation was predominantly in volleyball (54.5%), with lower frequencies in basketball (27.3%) and equal representation in football and athletics (9.1% each). Similarly, among boys in volleyball (n = 3), mothers were primarily associated with volleyball (66.7%), with a smaller proportion linked to badminton (33.3%).

In the female subgroup, for girls participating in football (n = 5), mothers' sport background was entirely concentrated in volleyball (60.0%) and gymnastics (40.0%), indicating no direct maternal link to football. Among girls in volleyball (n = 15), mothers' participation was again dominated by volleyball (60.0%), with additional representation in basketball, gymnastics, and badminton (each 13.3%).

Overall, the results demonstrate a strong maternal influence in volleyball across both genders, suggesting that this sport may represent a key intergenerational pathway. In contrast, maternal participation in football appears limited, particularly for girls, reflecting potential gender-specific trends and cultural patterns in sport participation.

Table 2

Gender	Participating athlete	Participating Mother	Frequency	Percent
Boy	Basketball	Basketball	10	32.3
		Football	1	3.2
		Volleyball	12	38.7
		Gymnastics	1	3.2
		Xhudo	3	9.7
		Athletics	2	6.5
		Swimming	2	6.5
		Total	31	
	Football	Basketball	3	27.3
		Football	1	9.1
		Volleyball	6	54.5
		Athletics	1	9.1
		Total	11	
	Volleyball	Volleyball	2	66.7
		Badminton	1	33.3
		Total	3	
Girl	Football	Volleyball	3	60.0
		Gymnastics	2	40.0
		Total	5	
	Volleyball	Basketball	2	13.3
		Volleyball	9	60.0
		Gymnastics	2	13.3
		Badminton	2	13.3
		Total	15	

The analysis of fathers' sport participation in relation to their children's current sport involvement reveals strong and consistent intergenerational patterns, particularly in football and basketball. Among boys participating in basketball (n = 62), the most common paternal background was basketball (40.3%), followed closely by football (37.1%). Smaller proportions were observed in volleyball (6.5%), gymnastics and tennis (4.8% each), while other disciplines such as weightlifting, table tennis, wrestling, and swimming were minimally represented (1.6% each). For boys involved in football (n = 77), a dominant pattern was observed, with the vast majority of fathers having a football background (81.8%). Other sports were represented at much lower levels, including tennis (3.9%), basketball, gymnastics, and judo (2.6% each), and minimal contributions from volleyball, weightlifting, wrestling, boxing, and athletics (1.3% each). Among boys participating in volleyball (n = 3), all fathers (100.0%) reported a background in football, further reinforcing the strong paternal association with this sport. Similarly, in boys practicing taekwondo (n = 3), fathers' participation was equally distributed across football, karate, and taekwondo (33.3% each). In the female subgroup, all girls participating in basketball (n = 2) reported fathers with a football background (100.0%). For girls in football (n = 12), the majority of fathers also had a football background (83.3%), with minor representation in basketball and gymnastics (8.3% each). Among girls participating in volleyball (n = 34), fathers' backgrounds were more diverse, although football remained the most common (41.2%), followed by volleyball (23.5%), gymnastics (14.7%), and smaller proportions in basketball (8.8%), wrestling (5.9%), tennis (2.9%), and boxing (2.9%). In girls practicing taekwondo (n = 1), the father's background was exclusively in boxing (100.0%). Overall, these findings indicate a strong paternal influence in shaping youth sport participation, particularly in football, which appears as the dominant intergenerational pathway across both boys and girls. Compared to maternal patterns, fathers' influence is more concentrated and sport-specific, especially in traditionally male-dominated disciplines.

Table 2

Gender	Participating athlete	Participating Father	Frequency	Percent
Boy	Basketball	Basketball	25	40.3
		Football	23	37.1
		Volleyball	4	6.5
		Weight Lifting	1	1.6
		Table Tennis	1	1.6
		Gymnastics	3	4.8
		Tennis	3	4.8
		Wrestling	1	1.6
		Swimming	1	1.6
		Total	62	
	Football	Basketball	2	2.6
		Football	63	81.8
		Volleyball	1	1.3
		Weight Lifting	1	1.3
		Gymnastics	2	2.6
		Xhudo	2	2.6
		Tennis	3	3.9
		Wrestling	1	1.3
		Boxing	1	1.3
		Athletics	1	1.3
		Total	77	
	Volleyball	Football	3	100.0
		Total	3	

Girl	Taekwondo	Football	1	33.3
		Karate	1	33.3
		Taekwondo	1	33.3
		Total	3	
	Basketball	Football	2	100.0
		Basketball	1	8.3
		Football	10	83.3
		Gymnastics	1	8.3
		Total	12	
	Volleyball	Basketball	3	8.8
		Football	14	41.2
		Volleyball	8	23.5
		Gymnastics	5	14.7
		Tennis	1	2.9
		Wresling	2	5.9
		Boxing	1	2.9
		Total	34	
		Taekwondo		
		Boxing	1	100.0

Discussion

The purpose of this study was to examine the relationship between parental sport participation and youth involvement in organized sports in Albania. The findings reveal clear intergenerational patterns, with distinct differences between maternal and paternal influence, as well as strong gender-related trends across sport disciplines.

A key result of this study is the dominant role of fathers in shaping children's sport participation, particularly in football. The very high proportion of fathers with a football background among boys in football (81.8%) and girls in football (83.3%) indicates a strong intergenerational transmission of this sport. This finding aligns with previous literature suggesting that fathers often play a central role in promoting participation in competitive and traditionally male-dominated sports (Bois et al., 2005; Wheeler, 2011). Furthermore, the consistent presence of football as the most common paternal background across multiple groups—including boys in volleyball (100%) and girls in basketball (100%)—highlights its cultural dominance within the Albanian sport context. In contrast, maternal influence appears more diversified but strongly associated with volleyball. Mothers' participation was most frequently linked to volleyball across both boys and girls, with high proportions observed in boys' football (54.5%) and girls' volleyball (60.0%). This suggests that volleyball functions as a key maternal pathway of sport transmission, reflecting gendered participation patterns that are commonly reported in the literature (Eime et al., 2013). Unlike fathers, whose influence is concentrated in specific sports, mothers appear to contribute more broadly across different disciplines, including gymnastics, badminton, and other activities. The findings also highlight important gender-specific patterns. Boys' sport participation is more strongly aligned with paternal sport backgrounds, particularly in football and basketball, whereas girls show a stronger association with maternal participation in sports such as volleyball and gymnastics. These differences likely reflect broader societal norms and expectations regarding gender roles in sport, where certain disciplines are traditionally associated with either males or females (Slater & Tiggemann, 2011). However, the presence of cross-gender influences—such as fathers influencing girls' participation in football and mothers influencing boys' participation in volleyball—suggests that these patterns are not rigid and may be evolving. Another important observation concerns the limited influence of parents in non-traditional or less popular sports, such as swimming, tennis, and badminton. These activities appear less dependent on intergenerational transmission and may instead be influenced by factors such as availability, access to facilities, or individual preference. This indicates that

while family background plays a crucial role in shaping participation in dominant sports, other factors may be more relevant in emerging or less culturally embedded disciplines. From a broader perspective, the results reflect the socio-cultural structure of sport in Albania, where football and basketball are strongly embedded in male traditions, while volleyball and similar disciplines are more closely associated with female participation. These patterns highlight both opportunities and challenges. On one hand, strong intergenerational links can support sustained participation and talent development. On the other hand, they may reinforce gender stereotypes and limit diversification across sports. Some limitations of the study should be acknowledged. The data are based on self-reported information, which may introduce recall bias or inaccuracies in reporting parental sport history. In addition, the study focuses on organized sport participants and does not include non-participating youth, which may limit the generalizability of findings. Future research should consider longitudinal designs and include additional variables such as socio-economic status, access to sport facilities, and motivational factors.

Conclusion

In conclusion, this study demonstrates that parental sport participation plays a significant role in shaping youth sport involvement in Albania, with clear intergenerational and gender-specific patterns. Fathers exert a strong influence on participation in football and other traditionally male-dominated sports, while mothers play a key role in promoting volleyball and related disciplines. These findings highlight the importance of family background as a determinant of sport participation. At the same time, the results reveal imbalances across sports and genders, suggesting the need for policies and interventions aimed at promoting more inclusive and diversified participation. Encouraging parental engagement across a wider range of sports, as well as reducing gender-based barriers, may help create a more balanced sport system. The findings from the START project provide valuable evidence for coaches, sport organizations, and policy makers, supporting the development of targeted strategies to enhance youth participation and long-term engagement in sport. Future research should continue to explore the complex interplay between family, culture, and sport participation in order to foster more equitable and sustainable sport development systems.

Funding

The project, supported, funded and coordinated by ASSA, aimed to establish a comprehensive and standardized database of athlete performance indicators through a multi-year research framework. By integrating longitudinal data collection and consistent testing protocols, the START project has contributed to the creation of national reference values and athlete profiling systems, thereby strengthening the scientific basis of sport development in Albania.

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AEROBIC FITNESS PROFILES IN YOUTH SOCCER PLAYERS: A COMPARATIVE ANALYSIS WITH OTHER SPORTS DISCIPLINES

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Abstract

Aerobic fitness is a key determinant of performance in youth sports, particularly in soccer, where players are required to sustain repeated high-intensity efforts over extended periods. The aim of this study was to analyze aerobic fitness profiles in youth soccer players and compare them with athletes from other sports disciplines, including basketball, volleyball, and martial arts (taekwondo/karate)- data part of START project implemented by ASSA association. A total of over 400 youth athletes aged 10–17 years participated in the study. Aerobic performance was assessed using the 20 m Shuttle Run Test (Beep Test), a validated field-based measure of aerobic capacity and an indirect estimator of maximal oxygen uptake (VO_2max). Performance was expressed as the number of completed laps. Descriptive statistics (mean $\pm$ standard deviation) were calculated across age groups, gender, and sport disciplines, and comparative analyses were conducted to identify developmental trends and sport-specific differences. The results showed that aerobic performance increased progressively with age across all sports. Soccer players demonstrated the highest aerobic performance among males, particularly from early adolescence onward, with a clear increase in the gender gap favoring boys. In contrast, volleyball athletes, especially females, exhibited the highest aerobic scores among girls, while martial arts athletes showed relatively balanced performance between genders. Basketball players demonstrated moderate and consistent aerobic development with smaller gender differences. These findings highlight the sport-specific nature of aerobic development in youth athletes and emphasize the importance of tailored conditioning programs. Soccer, in particular, requires high levels of aerobic endurance, suggesting the need for structured, age-appropriate training strategies. The study contributes to the development of normative data and provides practical implications for coaches, trainers, and sport scientists working in youth athletic development.

Keywords: aerobic fitness, soccer, youth athletes, 20 m Shuttle Run Test, sport comparison, endurance development

Introduction

Aerobic fitness is a fundamental component of physical performance and overall health in youth populations. It reflects the capacity of the cardiovascular and respiratory systems to deliver oxygen to working muscles during sustained physical activity and is commonly expressed as maximal oxygen uptake (VO_2max) (Kenney et al., 2021). In young athletes, well-developed aerobic capacity supports recovery between high-intensity efforts, enhances metabolic efficiency, and contributes to long-term athletic development (American College of Sports Medicine [ACSM], 2022). Among team sports, soccer places particularly high demands on aerobic fitness due to its intermittent high-intensity nature. Players are required to perform repeated bouts of sprinting, jogging, and walking over prolonged match durations, often covering distances of 8–12 km depending on age and level (Reilly et al., 2009). The ability to sustain performance throughout the game is closely linked to aerobic endurance, which facilitates faster recovery between efforts and maintains tactical efficiency (Bangsbo, 2014). For this reason, aerobic fitness is considered a key determinant of success in youth soccer development programs.

The 20 m Shuttle Run Test, also known as the Beep Test, is one of the most widely used field-based protocols for assessing aerobic capacity in youth populations. It provides a practical and reliable estimation of VO_2max and allows for large-scale testing across different sports and age groups (Léger et al., 1988). Its progressive and externally paced structure makes it particularly suitable for evaluating cardiorespiratory endurance in both trained and untrained individuals. Previous research has demonstrated that aerobic fitness develops progressively during childhood and adolescence, with significant improvements occurring during periods of rapid growth and maturation (Malina & Bouchard, 2019). However, the rate and magnitude of this development may vary depending on sport-specific demands, training exposure, and biological factors. For example, sports such as soccer and basketball require continuous movement and repeated high-intensity efforts, while volleyball and martial arts involve more intermittent activity patterns, leading to different aerobic adaptations (Stølen et al., 2005; Bridge et al., 2014). Gender differences in aerobic fitness have also been widely documented, particularly during adolescence. While boys and girls tend to show similar aerobic performance in early childhood, differences become more pronounced with age, often favoring males due to physiological factors such as increased muscle mass, hemoglobin concentration, and cardiac output (Armstrong & Welsman, 2006). In addition, variations in training intensity, participation levels, and sport-specific demands may further contribute to these differences. Despite the growing body of international literature, there is a lack of comprehensive data on aerobic fitness profiles among youth athletes in Albania. Most existing studies have focused on single sports or limited age groups, without providing a comparative perspective across disciplines. This gap highlights the need for systematic analysis that integrates multiple sports, age categories, and gender differences in order to establish normative values and inform evidence-based training strategies. In this context, the present study aims to analyze aerobic fitness profiles in youth soccer players and to compare them with athletes from other sports disciplines, including basketball, volleyball, and martial arts (taekwondo/karate). By examining developmental trends and gender-based patterns, the study seeks to provide a broader understanding of sport-specific aerobic adaptations and to contribute to the development of national reference data for youth athletic performance.

Methods

Study Design

This study employed a cross-sectional and comparative design to examine aerobic fitness profiles in youth athletes and to compare soccer players with athletes from other sports disciplines, including basketball, volleyball, and martial arts (taekwondo/karate). The analysis focused on identifying age-related developmental trends, gender differences, and sport-specific patterns in aerobic performance.

Participants

A total of over 400 youth athletes aged between 10 and 17 years participated in the study. Participants were actively involved in organized sports programs and were categorized according to sport discipline (soccer, basketball, volleyball, and taekwondo/karate), age group (10–11, 12–13, 14–15, and 16–17 years), and gender.

All participants were considered healthy and physically active, with regular training exposure appropriate for their respective sports. Prior to participation, informed consent was obtained from parents or legal guardians, and the study procedures were conducted in accordance with ethical standards for research involving minors.

Aerobic Fitness Assessment

Aerobic performance was assessed using the 20 m Shuttle Run Test (Beep Test), a widely used and validated field-based protocol for estimating cardiorespiratory fitness and maximal oxygen uptake ($\text{VO}_{2\text{max}}$).

During the test, participants ran continuously back and forth between two lines set 20 meters apart, following audio signals that progressively increased in frequency. The initial running speed was low and increased at regular intervals, requiring participants to maintain pace with the beeps until exhaustion. The test was terminated when the participant failed to reach the line on two consecutive occasions or voluntarily stopped due to fatigue. Performance was recorded as the total number of completed laps, which served as the primary indicator of aerobic capacity.

Data Collection Procedures

Data were collected during organized testing sessions under standardized conditions. Participants performed a general warm-up prior to testing, including light aerobic activity and dynamic stretching. All tests were administered by trained professionals to ensure consistency and reliability. Environmental conditions (e.g., surface, space, and instructions) were kept as uniform as possible across testing sessions. Participants were encouraged to perform at maximal effort throughout the test.

Statistical Analysis

Descriptive statistics, including mean (M) and standard deviation (SD), were calculated to summarize aerobic performance across sport disciplines, age groups, and gender. To examine differences between groups, Independent Samples t-tests were conducted to compare aerobic performance between sport disciplines (e.g., soccer vs. volleyball, soccer vs. basketball, etc.) as well as to evaluate gender differences within each sport. The assumption of homogeneity of variances was assessed using Levene's test, and where this assumption was violated, results for unequal variances were reported. Statistical significance was set at $p < 0.05$. In addition, effect size was calculated using Cohen's d to determine the magnitude of differences between groups, allowing for a more meaningful interpretation of practical significance. All statistical analyses were performed using IBM SPSS Statistics software 22.0.

Results

Table 1 presents the performance in the 20 m Shuttle Run Test (Beep Test) across sport disciplines, age groups, and gender. Overall, aerobic performance shows a progressive increase with age in all sports, reflecting expected developmental improvements in cardiorespiratory fitness. In basketball, both girls and boys demonstrate steady gains across age groups, with girls consistently outperforming boys, although the gender difference decreases from +1.5 laps at younger ages to +0.9 laps at 16–17 years. A similar pattern is observed in volleyball, where girls show the highest aerobic values across all sports, maintaining a clear advantage over boys, with differences ranging from +1.5 to +2.3 laps. In contrast, football displays a different trend, with boys outperforming girls in all age groups. The gender gap increases with age, from –0.7 laps at 10–11 years to –1.8 laps at 16–17 years, indicating a progressive male advantage in soccer-related aerobic performance. This pattern reflects the high endurance demands and possibly greater training exposure in male football players. Meanwhile, taekwondo/karate shows the most balanced performance between genders, with minimal differences (ranging from +0.2 to +0.7 laps), suggesting similar aerobic development in both boys and girls within this discipline. The standard deviation values across all sports remain relatively consistent (approximately 3.0–3.7), indicating moderate variability

within groups. Overall, the results highlight sport-specific and gender-dependent patterns in aerobic fitness, with volleyball favoring female athletes, football favoring males, and martial arts demonstrating near gender parity.

Table 112 20 m Shuttle Run Test (Beep Test) total lap performance by sport disciplines and gender

	Age group	Girls (M $\pm$ SD)	Boys (M $\pm$ SD)	Δ (G–B)
B Ball	10–11 yrs	23.5 $\pm$ 3.1	22.0 $\pm$ 2.9	+1.5 **
	12–13 yrs	26.2 $\pm$ 3.4	24.7 $\pm$ 3.3	+1.5**
	14–15 yrs	28.5 $\pm$ 3.6	27.1 $\pm$ 3.5	+1.4**
	16–17 yrs	29.1 $\pm$ 3.2	28.2 $\pm$ 3.3	+0.9*
V Ball	10–11 yrs	24.7 $\pm$ 3.0	23.2 $\pm$ 2.8	+1.5*
	12–13 yrs	27.4 $\pm$ 3.3	25.1 $\pm$ 3.4	+2.3**
	14–15 yrs	29.8 $\pm$ 3.7	27.5 $\pm$ 3.5	+2.3**
	16–17 yrs	31.1 $\pm$ 3.4	29.0 $\pm$ 3.2	+2.1**
F Ball	10–11 yrs	22.8 $\pm$ 2.7	23.5 $\pm$ 2.9	–0.7*
	12–13 yrs	24.2 $\pm$ 3.0	25.5 $\pm$ 3.1	–1.3*
	14–15 yrs	25.4 $\pm$ 3.3	27.0 $\pm$ 3.4	–1.6*
	16–17 yrs	26.0 $\pm$ 3.2	27.8 $\pm$ 3.3	–1.8**
T. Wondo Karate	10–11 yrs	25.8 $\pm$ 3.0	25.1 $\pm$ 3.2	+0.7*
	12–13 yrs	27.9 $\pm$ 3.3	27.2 $\pm$ 3.1	+0.7*
	14–15 yrs	29.5 $\pm$ 3.5	29.0 $\pm$ 3.4	+0.5
	16–17 yrs	30.0 $\pm$ 3.2	29.8 $\pm$ 3.2	+0.2

Notes: * $P \leq 0.05$ ** $P \leq 0.01$

Table 2 presents the dominant sport discipline for aerobic performance across age groups and gender, based on the 20 m Shuttle Run Test results. Among female athletes, volleyball emerges as the leading discipline in aerobic performance from ages 10–11 through 14–15 years, with mean values progressively increasing from 24.7 $\pm$ 3.0 to 29.8 $\pm$ 3.7 laps. At 16–17 years, taekwondo slightly surpasses volleyball (30.0 $\pm$ 3.2 laps), indicating a shift in peak aerobic performance toward martial arts in late adolescence. This pattern suggests that female athletes tend to achieve higher aerobic capacity in sports characterized by rhythmic and continuous movement patterns, as well as structured training environments. In contrast, male athletes demonstrate a different trend. Football is the dominant discipline at younger ages (10–11 and 12–13 years), with mean values of 23.5 $\pm$ 2.9 and 25.5 $\pm$ 3.1 laps, respectively, reflecting the early development of aerobic fitness in soccer. However, from 14–15 years onward, taekwondo becomes the leading discipline, with values increasing to 29.0 $\pm$ 3.4 and 29.8 $\pm$ 3.2 laps at 16–17 years. This transition suggests that while soccer promotes early aerobic development, martial arts training may support more balanced and sustained aerobic progression during later adolescence. Overall, the results highlight clear sport-specific differences in aerobic development between genders, with volleyball dominating in females and football in early male development, followed by a shift toward martial arts in both groups at older

ages. These findings emphasize the influence of training structure, sport demands, and maturation on aerobic performance trajectories.

Table 2 20 m Shuttle Run Test (Beep Test) total lap performance by gender

	Age group	Dominant sport	M ± SD (laps)
Female	10–11 yrs	Volleyball **	24.7 ± 3.0
	12–13 yrs	Volleyball**	27.4 ± 3.3
	14–15 yrs	Volleyball*	29.8 ± 3.7
	16–17 yrs	Taekwondo*	30.0 ± 3.2
Male	10–11 yrs	Football**	23.5 ± 2.9
	12–13 yrs	Football*	25.5 ± 3.1
	14–15 yrs	Taekwondo**	29.0 ± 3.4
	16–17 yrs	Taekwondo**	29.8 ± 3.2

Notes: * $P \leq 0.05$ ** $P \leq 0.01$

Discussion

The aim of this study was to analyze aerobic fitness profiles in youth soccer players and compare them with athletes from other sport disciplines, including basketball, volleyball, and martial arts. The results revealed clear developmental trends, sport-specific differences, and gender-related patterns in aerobic performance. A primary finding of the study is the progressive increase in aerobic performance with age across all sport disciplines, confirming previous evidence that cardiorespiratory fitness improves significantly during adolescence due to growth, maturation, and increased training exposure. However, the rate of improvement was not uniform across sports, highlighting the importance of discipline-specific physiological demands. Soccer players demonstrated the highest aerobic performance among males, particularly from early adolescence onward. This finding reflects the high physiological demands of soccer, which requires continuous movement combined with repeated high-intensity efforts. The nature of soccer, characterized by intermittent running, sprinting, and active recovery, promotes significant adaptations in aerobic metabolism. These results are consistent with previous research indicating that soccer players typically exhibit superior aerobic capacity compared to athletes in less endurance-oriented sports. In contrast, volleyball athletes—particularly females—showed the highest aerobic performance among girls, suggesting that structured and consistent training environments may contribute to more homogeneous aerobic development. The relatively low variability observed in female groups supports the idea of more standardized training loads and consistent participation patterns. An important observation of this study is the increasing gender gap in aerobic performance within soccer, where boys begin to outperform girls during adolescence. This difference may be attributed to both biological and environmental factors, including greater muscle mass, higher hemoglobin levels, and increased cardiac output in males, as well as differences in training intensity and competitive exposure. However, in sports such as martial arts, where training is more standardized and less dependent on continuous running, gender differences were minimal, suggesting that sport structure plays a significant role in shaping aerobic outcomes.

Basketball players demonstrated moderate and stable aerobic development, with smaller gender differences compared to soccer. This may be explained by the mixed physiological demands of basketball, which combines aerobic and anaerobic efforts without requiring sustained endurance at the same level as soccer. Overall, the findings highlight that aerobic fitness development is strongly influenced by sport-specific demands, training structure, and maturation processes. The variability observed, particularly among male athletes, may reflect differences in biological maturation timing, training load, and positional roles within each sport.

Conclusion

In conclusion, this study demonstrates that aerobic fitness in youth athletes increases progressively with age and is strongly influenced by sport discipline and gender. Soccer players, particularly males, exhibit the highest levels of aerobic performance, reflecting the high endurance demands of the sport. Volleyball players, especially females, show consistent and high aerobic capacity, while martial arts athletes display balanced development with minimal gender differences. Gender differences in aerobic fitness become more pronounced during adolescence, particularly in soccer, suggesting the combined influence of biological maturation and training exposure. In contrast, sports with more uniform training structures tend to show smaller gender disparities. These findings emphasize the need for sport-specific and age-appropriate conditioning programs, particularly in soccer, where aerobic fitness plays a critical role in performance. Additionally, the results highlight the importance of promoting structured training opportunities for female athletes to support optimal aerobic development. The study provides valuable reference data for youth athletic performance and can inform coaches, sport scientists, and policymakers in designing effective training strategies and development models.

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ANTHROPOMETRIC TRENDS AND GENDER DIFFERENCES IN EARLY CHILDHOOD: EVIDENCE FROM THE SUNRISE STUDY ALBANIA (2023–2026)

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Abstract

This study aimed to examine gender differences in anthropometric characteristics among preschool children aged 3–5 years in Albania, using data collected within the framework of the SUNRISE Study (International Surveillance Study of Movement Behaviours in the Early Years). A comparative cross-sectional design was employed, analyzing data from two measurement periods (2023 and 2026). Anthropometric variables included body height, body weight, and waist circumference. This study was conducted within the SUNRISE Study in Albania, led by the “Aleksandër Xhuvani” University of Elbasan in partnership with ASSA and funded by AKKSHI (PKKZH), contributing to the development of a national database and evidence-based policy on early childhood health and movement behaviors. Descriptive statistics were calculated by gender and year, and independent samples t-tests were conducted to examine gender differences. Effect sizes were estimated using Cohen’s d, Hedges’ correction, and Glass’s delta. The results indicated that boys consistently presented slightly higher mean values across most anthropometric variables; however, these differences were not statistically significant in either year ($p > .05$). Effect size analysis confirmed that gender differences were small or negligible. A comparison across years revealed an increase in mean body weight in 2026, while waist circumference remained relatively stable. Body height data for 2026 showed high variability, suggesting potential measurement or data entry inconsistencies that should be interpreted with caution. In conclusion, the findings suggest that gender does not significantly influence anthropometric characteristics in early childhood within the Albanian context. This study contributes to the national database established through the SUNRISE Study project and provides evidence to support future research and policy development related to child health and movement behaviors.

Keywords: SUNRISE study, Early childhood, Anthropometric characteristics, gender

Introduction

Early childhood (3–5 years) represents a critical developmental period during which growth patterns, movement behaviors, and health-related habits are established. Anthropometric characteristics such as body height, body weight, and waist circumference are widely recognized as key indicators of children’s growth, nutritional status, and overall health (World Health Organization, 2020). Monitoring these indicators in early years is essential not only for identifying potential health risks but also for informing preventive strategies and public health policies. In recent decades, increasing attention has been directed toward the relationship between movement behaviors—including physical activity, sedentary behavior, and sleep—and health outcomes in young children. The integrated 24-hour movement paradigm highlights that these behaviors are interdependent and collectively influence physical, cognitive, and psychosocial development (World Health Organization, 2019). Within this framework, international surveillance initiatives such as the SUNRISE Study (International Surveillance Study of Movement Behaviours in the Early Years) aim to generate comparable data across countries, particularly in low- and middle-income settings, to support evidence-based decision-making. Gender differences in anthropometric characteristics during early childhood remain an important area of investigation. Although biological differences between boys and girls may emerge early, research findings are often inconsistent, with some studies reporting minimal or non-significant differences in body composition and growth patterns at preschool age (Valerie Carson et al., 2017; Mark S. Tremblay et al., 2018). Understanding whether such differences exist within specific populations is crucial for tailoring interventions and ensuring equitable health promotion strategies. In Albania, there is a limited body of nationally representative data addressing health and movement behaviors in early childhood. The present study is part of the SUNRISE Study, implemented at the national level and led by the “Aleksandër Xhuvani” University of Elbasan in collaboration with the Albanian Sport Science Association (ASSA). This initiative contributes to the creation of a national database and supports policy development in the field of child health and physical activity. Funded by the National Agency for Scientific Research and Innovation (AKKSHI), the project represents a significant step toward strengthening research capacity and evidence-based practice in Albania. The aim of this study is to compare anthropometric data collected from children aged 3–5 years in Albania across two measurement periods (2023 and 2026), with a particular focus on gender differences. By examining changes over time and potential gender-related patterns, this study seeks to provide valuable insights into

early childhood growth trends and contribute to the broader objectives of international surveillance and national health policy development.

Methods Participants

The study included preschool children aged 3–5 years from Albania, assessed as part of the national implementation of the SUNRISE (International Surveillance Study of Movement Behaviours in the Early Years) project. Data were collected during two measurement periods (2023 and 2026). In total, 98 children were included for body height measurements in 2023 and 122 children in 2026, with slightly smaller subsamples available for body weight and waist circumference due to missing data. Participants were recruited from preschool institutions across selected regions using a convenience sampling approach. Both boys and girls were included, allowing for gender-based comparisons. Parental consent was obtained prior to participation, and all procedures adhered to ethical standards for research involving children.

Measurements

Anthropometric measurements included body height (cm), body weight (kg), and waist circumference (cm). Body height was measured using a portable stadiometer, with children standing barefoot in an upright position. Body weight was assessed using a calibrated digital scale, with children wearing light clothing. Waist circumference was measured at the midpoint between the lowest rib and the iliac crest using a flexible measuring tape. All measurements were conducted following standardized protocols to ensure consistency and reliability. Data were recorded to the nearest 0.1 cm for height and waist circumference and 0.1 kg for body weight.

Procedure

Data collection was carried out by trained researchers and physical education specialists in preschool settings. Prior to data collection, assessors received training based on the SUNRISE study protocol to ensure standardized measurement procedures. Measurements were conducted during school hours in a controlled environment. Each child was measured individually, and where necessary, repeated measurements were taken to ensure accuracy. Data from both years were compiled into a single dataset to allow comparative analysis across time and gender.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics software. Descriptive statistics (mean, standard deviation, minimum, and maximum values) were calculated for all anthropometric variables by year and gender. Independent samples t-tests were used to examine differences between boys and girls for each measurement year. The assumption of homogeneity of variances was assessed using Levene's test. Effect sizes were calculated using Cohen's d, Hedges' correction, and Glass's delta to evaluate the magnitude of gender differences. Statistical significance was set at $p < .05$. Prior to analysis, data were screened for missing values and potential outliers, and implausible values were considered with caution during interpretation.

Results

Table 1 presents the descriptive statistics for anthropometric variables measured in preschool children in 2023 and 2026. In 2023, the mean body height was 109.94 cm (SD = 8.54), with values ranging from 61.8 cm to 129.3 cm (N = 98). The mean body weight was 19.68 kg (SD = 3.72), ranging from 13.7 kg to 31.8 kg (N = 94), while waist circumference had a mean of 56.15 cm (SD = 6.52), with values between 48.0 cm and 78.0 cm (N = 33). In 2026, the mean body height was reported as 94.86 cm (SD = 113.72), with an unusually wide range from 1.1 cm to 1215.0 cm (N = 122). The mean body weight increased to 22.02 kg (SD = 4.01), ranging from 14.3 kg to 38.7 kg (N = 122), whereas waist circumference showed a mean of 55.67 cm (SD = 5.90), with values between 40.0 cm and 75.0 cm (N = 118). Overall, body weight appears higher in 2026 compared to 2023, while waist circumference remains relatively similar between years.

Table 1 Descriptive Statistics for anthropometrics by year of measurement

Year Measurement		N	Minimum	Maximum	Mean	Std. Deviation
2023	Body Height	98	61.8	129.3	109.939	8.5426
	Body Weight	94	13.7	31.8	19.684	3.7166
	Waist Circumference	33	48.00	78.00	56.1515	6.52457
	Valid N (listwise)	33				
2026	Body Height	122	1.1	1215.0	94.855	113.7214
	Body Weight	122	14.3	38.7	22.016	4.0131
	Waist Circumference	118	40.00	75.00	55.6686	5.89977
	Valid N (listwise)	118				

Table 2 presents the descriptive statistics for anthropometric variables by gender across the two measurement years (2023 and 2026). In 2023, boys showed a slightly higher mean body height ($M = 110.69$ cm, $SD = 9.65$) compared to girls ($M = 109.19$ cm, $SD = 7.30$). Similarly, boys had a higher mean body weight ($M = 20.32$ kg, $SD = 3.40$) than girls ($M = 19.02$ kg, $SD = 3.94$). Waist circumference was also marginally higher in boys ($M = 56.87$ cm, $SD = 6.28$) compared to girls ($M = 55.56$ cm, $SD = 6.84$), although the differences were small. In 2026, boys again presented higher mean values for body weight ($M = 22.46$ kg, $SD = 3.61$) compared to girls ($M = 21.59$ kg, $SD = 4.41$), while waist circumference was nearly identical between boys ($M = 55.66$ cm, $SD = 5.53$) and girls ($M = 55.65$ cm, $SD = 6.39$). However, body height values in 2026 showed substantial variability, with boys ($M = 109.57$ cm, $SD = 150.31$) and especially girls ($M = 79.07$ cm, $SD = 52.22$) presenting unusually large standard deviations and inconsistent mean values compared to 2023.

Table 2 Descriptive Statistics for anthropometrics by gender and year of measurement

Year Measurement		Gender	N	Mean	Std. Deviation	Std. Error Mean
2023	Body Height	Boys	49	110.690	9.6475	1.3782
		Girls	49	109.189	7.2971	1.0424
	Body Weight	Boys	48	20.323	3.4032	.4912
		Girls	46	19.017	3.9446	.5816
	Waist Circumference	Boys	15	56.8667	6.27770	1.62090
		Girls	18	55.5556	6.84468	1.61331
2026	Body Height	Boys	62	109.573	150.3108	19.0895
		Girls	59	79.073	52.2214	6.7986
	Body Weight	Boys	62	22.458	3.6083	.4583

Waist Circumference	Girls	59	21.590	4.4076	.5738
	Boys	62	55.6629	5.52933	.70223
	Girls	55	55.6509	6.39108	.86177

Table 3 presents the results of the independent samples t-test examining gender differences in anthropometric variables for both 2023 and 2026. In 2023, no statistically significant differences were observed between boys and girls for any of the measured variables. Specifically, body height did not differ significantly between genders ($t(96) = 0.869$, $p = .387$), nor did body weight ($t(92) = 1.721$, $p = .089$) or waist circumference ($t(31) = 0.569$, $p = .574$). Although boys showed slightly higher mean values across all variables, these differences were not statistically significant. Similarly, in 2026, no significant gender differences were found. Body height differences between boys and girls were not statistically significant ($t(119) = 1.476$, $p = .143$), despite a relatively large mean difference favoring boys. Body weight also showed no significant difference ($t(119) = 1.188$, $p = .237$), and waist circumference was nearly identical between genders ($t(115) = 0.011$, $p = .991$). Levene's test indicated that the assumption of homogeneity of variances was met in all cases ($p > .05$), allowing interpretation under equal variances assumed.

Table 3 Independent Samples Test by gender

Levene's Test for Equality of Variances

		Levene's Test for Equality of Variances									
Year Measurement		t-test for Equality of Means									
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
2023	Body Height	Equal variances assumed	.297	.587	.869	96	.387	1.5010	1.7280	-1.9291	4.9312
		Equal variances not assumed			.869	89.379	.387	1.5010	1.7280	-1.9324	4.9344
	Body Weight	Equal variances assumed	.653	.421	1.721	92	.089	1.3063	.7589	-.2009	2.8135
		Equal variances not assumed			1.716	88.824	.090	1.3063	.7613	-.2064	2.8189

	Waist Circumference	Equal variances assumed	.024	.877	.569	31	.574	1.31111	2.30551	-3.39102	6.01324
		Equal variances not assumed			.573	30.681	.571	1.31111	2.28693	-3.35508	5.97731
2026	Body Height	Equal variances assumed	.006	.937	1.476	119	.143	30.5007	20.6654	-10.4189	71.4204
		Equal variances not assumed			1.505	76.167	.136	30.5007	20.2640	-9.8571	70.8586
	Body Weight	Equal variances assumed	.423	.517	1.188	119	.237	.8681	.7307	-.5788	2.3150
		Equal variances not assumed			1.182	112.186	.240	.8681	.7343	-.5869	2.3230
	Waist Circumference	Equal variances assumed	.664	.417	.011	115	.991	.01199	1.10205	-2.17095	2.19493
		Equal variances not assumed			.011	107.545	.991	.01199	1.11165	-2.19160	2.21559

Table 4 presents the effect sizes for gender differences in anthropometric variables for both 2023 and 2026. In 2023, the magnitude of differences between boys and girls was generally small across all variables. For body height, Cohen's d indicated a small effect ($d = 0.175$), with confidence intervals crossing zero (95% CI: -0.222 to 0.572), suggesting no meaningful gender difference. Similarly, body weight showed a small-to-moderate effect size ($d = 0.355$), although the confidence interval (-0.053 to 0.762) included zero, indicating non-significance. Waist circumference also demonstrated a small effect ($d = 0.199$), with wide confidence intervals (-0.490 to 0.884), further supporting negligible gender differences. In 2026, effect sizes remained generally small. For body height, Cohen's d ($d = 0.268$) suggested a small effect, with confidence intervals (-0.090 to 0.626) again including zero. Interestingly, Glass's delta indicated a moderate effect ($\delta = 0.584$; 95% CI: 0.210 to 0.954), although this should be interpreted cautiously due to the large variability observed in height data. Body weight differences were small ($d = 0.216$; 95% CI: -0.142 to 0.573), while waist circumference showed a negligible effect ($d = 0.002$; 95% CI: -0.361 to 0.365), indicating virtually no difference between boys and girls.

Table 4 Independent Samples Effect Sizes

				95% Confidence Interval		
Year	Measurement	Standardizer ^a	Point Estimate	Lower	Upper	
2023	Body Height	Cohen's d	8.5534	.175	-.222	.572
		Hedges' correction	8.6210	.174	-.220	.567
		Glass's delta	7.2971	.206	-.193	.603
	Body Weight	Cohen's d	3.6780	.355	-.053	.762
		Hedges' correction	3.7083	.352	-.053	.756
		Glass's delta	3.9446	.331	-.081	.739
	Waist Circumference	Cohen's d	6.59466	.199	-.490	.884

		Hedges' correction	6.75976	.194	-.478	.863
		Glass's delta	6.84468	.192	-.499	.877
2026	Body Height	Cohen's d	113.6249	.268	-.090	.626
		Hedges' correction	114.3474	.267	-.090	.622
		Glass's delta	52.2214	.584	.210	.954
	Body Weight	Cohen's d	4.0178	.216	-.142	.573
		Hedges' correction	4.0433	.215	-.141	.570
		Glass's delta	4.4076	.197	-.162	.554
	Waist Circumference	Cohen's d	5.94954	.002	-.361	.365
		Hedges' correction	5.98870	.002	-.359	.363
		Glass's delta	6.39108	.002	-.361	.365

a. The denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control group.

Discussion

The aim of this study was to examine gender differences in anthropometric characteristics among preschool children aged 3–5 years in Albania and to compare findings across two measurement periods (2023 and 2026). Overall, the results indicate that gender differences in body height, body weight, and waist circumference were small and not statistically significant in both years. These findings are consistent with previous research suggesting that, during early childhood, biological differences between boys and girls in anthropometric characteristics are generally minimal and often not pronounced enough to reach statistical significance. In 2023, boys presented slightly higher mean values in all measured variables compared to girls; however, these differences were not statistically significant. Similarly, in 2026, although boys again showed marginally higher values in body weight and body height, the differences remained non-significant. The effect size analysis further confirmed that these differences were small or negligible, reinforcing the conclusion that gender does not play a major role in anthropometric variation within this age group. These results align with international evidence indicating that growth patterns in early childhood are influenced more by environmental, nutritional, and behavioral factors than by gender alone. An important observation in the present study is the increase in mean body weight from 2023 to 2026, while waist circumference remained relatively stable. This pattern may suggest changes in overall body mass without a proportional increase in central adiposity. Such findings highlight the importance of continuous monitoring of growth indicators in early childhood, particularly in the context of lifestyle changes that may influence physical activity and dietary behaviors. However, the interpretation of body height results in 2026 should be approached with caution due to the presence of extreme variability and implausible values. The unusually high standard deviation and unrealistic minimum and maximum values suggest potential data entry or measurement errors. These inconsistencies may have influenced both descriptive and inferential results, particularly in relation to gender comparisons and effect size estimations. Future analyses should include data cleaning procedures and validation checks to ensure the accuracy and reliability of measurements. The present study contributes to the limited body of literature on early childhood anthropometrics in Albania and supports the broader objectives of the SUNRISE

project in generating nationally relevant data. By providing comparative insights across time, this study offers valuable information for policymakers and practitioners working in child health, physical education, and early childhood development.

Conclusion

In conclusion, the findings of this study indicate that there are no statistically significant gender differences in anthropometric characteristics among preschool children aged 3–5 years in Albania in either 2023 or 2026. Although boys tended to present slightly higher mean values, these differences were small and not meaningful in practical terms. Body weight showed a modest increase over time, while waist circumference remained stable, suggesting the need for continued monitoring of growth patterns in early childhood.

The study highlights the importance of high-quality data collection and validation, particularly when working with young populations. Future research should focus on longitudinal analyses, inclusion of behavioral variables (physical activity, sedentary time, and nutrition), and expansion of nationally representative samples. These efforts will further support evidence-based policy development and contribute to improving health outcomes for children in Albania.

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DEVELOPMENT OF STRENGTH AND BALANCE IN PRESCHOOL CHILDREN: A SUNRISE-BASED LONGITUDINAL COMPARISON IN ALBANIA

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Abstract

This study aimed to examine changes in strength and balance performance among preschool children aged 3–5 years in Albania, using data collected within the framework of the SUNRISE Study (International Surveillance Study of Movement Behaviours in the Early Years). A comparative cross-sectional design was employed, analyzing data from two measurement periods (2023 and 2026). This

study was conducted within the framework of the SUNRISE Study in Albania, led by the “Aleksandër Xhuvani” University of Elbasan in partnership with the Albanian Sport Science Association (ASSA), and funded by the National Agency for Scientific Research and Innovation (AKKSHI) under the Research and Development Programme (PKKZH), aiming to contribute to the development of a national database and evidence-based policy for early childhood health and movement behaviors. Motor fitness was assessed using handgrip strength (right and left hand) and balance performance through a one-leg standing test. Descriptive statistics were calculated for all variables, and independent samples t-tests were used to examine differences between years. The results showed significant improvements in right-hand grip strength and right-leg balance performance in 2026 compared to 2023 ($p < .001$). In contrast, left-hand grip strength was significantly higher in 2023, indicating a decrease over time ($p < .001$). No statistically significant differences were observed for left-leg balance ($p > .05$), despite large differences in mean values. The findings suggest partial improvements in motor fitness over time, particularly in dominant-side performance, while inconsistencies in left-side measures may reflect variability in motor development or measurement-related factors. Additionally, high variability observed in left-leg balance in 2026 indicates the presence of extreme values that should be interpreted with caution. In conclusion, this study contributes to understanding motor development trends in early childhood within the Albanian context and supports the objectives of the SUNRISE Study project in generating evidence for child health and physical activity policy development.

Keywords: SUNRISE study, early childhood, motor development, handgrip strength

Introduction

Early childhood represents a fundamental stage for the development of motor competence, which includes components such as muscular strength, balance, coordination, and overall physical fitness. These abilities are essential for children’s physical, cognitive, and psychosocial development and are strongly associated with long-term health outcomes (World Health Organization, 2019; Mark S. Tremblay et al., 2018). In particular, motor competence developed during the preschool years (3–5 years) has been linked to future participation in physical activity and reduced risk of obesity and related health conditions (David F. Stodden et al., 2008). Muscular strength, commonly assessed through handgrip strength, is considered a reliable and simple indicator of overall muscular fitness and health status in children. Previous studies have demonstrated that handgrip strength is associated with bone health, cardiovascular fitness, and general physical development (Ortega et al., 2008; Jonatan R. Ruiz et al., 2016). Similarly, balance, often evaluated through one-leg standing tests, reflects neuromuscular control and postural stability, which are critical for daily activities and injury prevention (Gallahue & Ozmun, 2006; Jeffrey D. Ulrich, 2000). Recent research emphasizes the importance of monitoring motor fitness indicators within the broader context of 24-hour movement behaviors, including physical activity, sedentary time, and sleep. The SUNRISE Study (International Surveillance Study of Movement Behaviours in the Early Years) provides a global framework for assessing these behaviors and their relationship with health outcomes, particularly in low- and middle-income countries (Valerie Carson et al., 2017; Mark S. Tremblay et al., 2021). Within this context, motor competence is increasingly recognized as a key component of early childhood development and a determinant of lifelong health trajectories. Despite growing international evidence, there is a lack of comprehensive data on motor fitness in preschool children in Albania. The implementation of the SUNRISE Study in Albania offers a unique opportunity to address this gap by providing nationally relevant data on strength and balance among young children. Understanding how these variables change over time is particularly important for informing educational practices and health policies. Therefore, the aim of this study was to examine differences in handgrip strength and balance performance among children aged 3–5 years in Albania across two measurement periods (2023 and 2026). By analyzing temporal changes in these motor fitness indicators, the study seeks to contribute to the understanding of early motor development and support evidence-based interventions in the field of child health and physical activity.

Methods Participants

The study included preschool children aged 3–5 years from Albania, assessed within the framework of the SUNRISE Study (International Surveillance Study of Movement Behaviours in the Early Years). Data were collected during two measurement periods, in 2023 and 2026. The sample consisted of children recruited from preschool institutions across selected regions using a convenience sampling approach. A total of 220–221 participants were included for handgrip strength measurements and 205 participants for balance assessments, with slight variations in sample size due to missing data. Both boys and girls participated in the study. Written informed consent was obtained from parents or guardians prior to participation, and all procedures were conducted in accordance with ethical standards for research involving children.

Measurements

Motor fitness was assessed through measures of muscular strength and balance. Handgrip strength was evaluated using a calibrated hand dynamometer, with measurements taken separately for the right and left hands. Children were instructed to squeeze the dynamometer with maximum effort while standing, with the arm positioned alongside the body. The best score from two trials for each hand was recorded in kilograms. Balance was assessed using the one-leg standing test, a commonly used measure of static balance and postural control. Children were asked to stand on one leg (right and left, separately) for as long as possible, with hands on hips and eyes open. The duration was recorded in seconds, with a maximum cutoff applied according to the testing protocol. Each child performed one trial per leg, and the recorded time was used for analysis.

Procedure

Data collection was conducted by trained researchers and physical education specialists in preschool settings during regular school hours. All assessors received prior training based on the SUNRISE Study protocol to ensure standardized administration of tests. Measurements were performed in a controlled environment, and children were given clear instructions and demonstrations before each test. Data from both measurement periods were compiled into a single dataset to enable comparison across years.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics software. Descriptive statistics (mean, standard deviation, minimum, and maximum values) were calculated for all variables. Independent samples t-tests were used to compare differences between the two measurement years (2023 and 2026). The assumption of homogeneity of variances was assessed using Levene's test. Statistical significance was set at $p < .05$. Data were screened for missing values and potential outliers prior to analysis. Particular attention was given to extreme values observed in balance performance, which were considered during interpretation of the results.

Result

Table 1 presents the descriptive statistics for strength and balance variables among the participants. For handgrip strength, the mean value for the right hand was 5.96 (SD = 2.26), with values ranging from 0.0 to 12.9 (N = 220), while the left hand showed a higher mean of 7.33 (SD = 3.45), with a wider range from 0.0 to 22.3 (N = 221). These results indicate slightly greater strength performance in the left hand, accompanied by higher variability. Regarding balance performance assessed through the one-leg standing test, the mean time for the right leg was 11.07 seconds (SD = 8.14), with values ranging from 1.0 to 30.0 seconds (N = 205). In contrast, balance on the left leg showed a higher mean value of 26.02 seconds but with extremely large variability (SD = 198.24), and an unusually wide range from 1.0 to 2848.0 seconds (N = 205).

Table 1 Descriptive Statistics for strength and balance

N		Minimum	Maximum	Mean	Std. Deviation
Handgrip Right	220	.0	12.9	5.960	2.2573
Handgrip Left	221	.0	22.3	7.334	3.4502
Balance Right	205	1.0	30.0	11.067	8.1441
Balance Left	205	1.0	2848.0	26.015	198.2407
Valid N (listwise)	204				

Table 2 presents the descriptive statistics for strength and balance variables by year of measurement (2023 and 2026). For handgrip strength, the mean value for the right hand increased from 4.92 (SD = 1.80) in 2023 to 6.81 (SD = 2.24) in 2026, indicating an improvement in performance. In contrast, the left hand showed a decrease in mean values from 8.28 (SD = 4.39) in 2023 to 6.56 (SD = 2.17) in 2026, accompanied by a reduction in variability. Regarding balance performance in the one-leg standing test, the mean time for the right leg increased from 7.71 seconds (SD = 6.10) in 2023 to 14.21 seconds (SD = 8.57) in 2026, suggesting a notable improvement in balance ability. Similarly, balance on the left leg showed a substantial increase in mean values from 8.88 seconds (SD = 6.63) in 2023 to 42.02 seconds in 2026. However, the standard deviation for the left leg in 2026 was extremely high (SD = 275.28), indicating considerable variability and the presence of extreme values.

Table 2 Descriptive Statistics for strength and balance by year of measurement

	Year Measurement	N	Mean	Std. Deviation	Std. Error Mean
Handgrip Right	2023	99	4.916	1.8038	.1813
	2026	121	6.813	2.2380	.2035
Handgrip Left	2023	99	8.284	4.3868	.4409
	2026	122	6.562	2.1722	.1967
Balance Right	2023	99	7.705	6.1036	.6134
	2026	106	14.206	8.5725	.8326
Balance Left	2023	99	8.881	6.6259	.6659
	2026	106	42.017	275.2759	26.7372

Table 3 presents the results of the independent samples t-test comparing strength and balance variables between the two measurement years (2023 and 2026). Significant differences were observed in most variables. For handgrip strength of the right hand, a statistically significant difference was found ($t(218) = -6.815, p < .001$), with higher mean values in 2026 compared to 2023, indicating improved performance over time. Similarly, for handgrip strength of the left hand, a significant difference was observed ($t(219) = 3.801, p < .001$), although in this case, mean values were higher in 2023 than in 2026, suggesting a decrease in left-hand strength. Regarding balance performance, significant differences were also identified for the right leg ($t(203) = -6.216, p < .001$), with better performance in 2026 compared to 2023, indicating an improvement in balance ability over time. In contrast, no statistically significant difference was found for balance on the left leg ($t(203) = -1.197, p = .233$), despite a large mean difference between years. Levene's test indicated that the assumption of homogeneity of variances was violated for several variables ($p < .05$), particularly for handgrip left and balance right, suggesting unequal variances between groups. Therefore, results from the "equal variances not assumed" rows should be considered in these cases, although the overall interpretation remains unchanged.

Table 3 Independent Samples Test by year of measurement

Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Handgrip Right	Equal variances assumed	6.362	.012	-6.815	218	.000	-1.8972	.2784	-2.4458 -1.3485
	Equal variances not assumed			-6.962	217.957	.000	-1.8972	.2725	-2.4342 -1.3601
Handgrip Left	Equal variances assumed	43.925	.000	3.801	219	.000	1.7220	.4531	.8291 2.6150
	Equal variances not assumed			3.567	136.502	.000	1.7220	.4828	.7674 2.6767
Balance Right	Equal variances assumed	13.286	.000	-6.216	203	.000	-6.5009	1.0459	-8.5631 -4.4387

Equal variances not assumed				-6.286	189.957	.000	-6.5009	1.0342	-8.5409	-4.4609
Balance Left	Equal variances assumed	3.122	.079	-1.197	203	.233	-33.1356	27.6783	-87.7093	21.4381
	Equal variances not assumed			-1.239	105.130	.218	-33.1356	26.7455	-86.1661	19.8949

Discussion

The present study aimed to investigate changes in strength and balance performance among preschool children in Albania between 2023 and 2026. The findings revealed significant improvements in right-hand grip strength and right-leg balance performance over time, while left-hand grip strength decreased and left-leg balance did not show statistically significant changes. The improvement observed in right-hand grip strength may reflect natural developmental progression, as muscular strength typically increases with age due to neuromuscular maturation and increased physical activity engagement (Malina et al., 2004). Additionally, the dominance of the right hand in most individuals may contribute to greater use and development, resulting in higher strength values. Similar trends have been reported in previous studies, where dominant-side strength tends to be higher and more responsive to developmental changes (Ortega et al., 2008). In contrast, the decrease in left-hand grip strength observed in 2026 is an unexpected finding and may be influenced by several factors, including measurement variability, differences in sample characteristics, or reduced bilateral engagement in physical activities. Previous literature suggests that asymmetries in motor development can occur during early childhood, particularly when activities favor the dominant side (Stodden et al., 2008). This highlights the importance of promoting balanced motor skill development through targeted interventions. Balance performance showed notable improvement for the right leg, indicating enhanced neuromuscular control and postural stability over time. This finding is consistent with developmental models suggesting that balance improves with age as children gain better control over body movements and coordination (Gallahue & Ozmun, 2006). However, the lack of significant change in left-leg balance, despite a large increase in mean values, suggests high variability within the data. The extremely large standard deviation observed in 2026 indicates the presence of outliers or measurement inconsistencies, which may have influenced the statistical results. Overall, the findings suggest that motor development in early childhood is not uniform across all components and may be influenced by factors such as limb dominance, physical activity patterns, and measurement conditions. These results underscore the need for standardized assessment protocols and continuous monitoring to ensure accurate evaluation of motor fitness in young children.

Conclusion

In conclusion, this study provides evidence of changes in strength and balance performance among preschool children in Albania between 2023 and 2026. Significant improvements were observed in right-hand grip strength and right-leg balance, while left-hand strength decreased and left-leg balance did not show statistically significant changes. These findings highlight the importance of considering motor asymmetries and variability in early childhood development. The results also emphasize the need for balanced physical activity programs that promote the development of both sides of the body and enhance overall motor competence. Furthermore, the study contributes to the growing body of evidence generated through the SUNRISE Study and supports the development of evidence-based policies and interventions aimed at improving child health and physical activity in Albania. Future research should focus on longitudinal designs, integration of behavioral variables, and improved data quality control to better understand motor development trajectories in early childhood.

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TOWARDS PROFESSIONAL STANDARDIZATION IN THE ALBANIAN FITNESS SECTOR: THE CASE FOR A NATIONAL FITNESS INSTRUCTORS’ ORDER

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Abstract

The rapid expansion of the global fitness industry has transformed exercise services into an important component of public health systems and commercial sport markets. Despite the development of international competency frameworks and professional standards by organizations such as the World Health Organization (WHO), EuropeActive, the American College of Sports Medicine (ACSM), and the National Strength and Conditioning Association (NSCA), the regulation of the fitness profession remains fragmented and inconsistent across countries. This issue is particularly evident in transitional contexts such as Albania, where the absence of a dedicated legal framework has resulted in heterogeneous entry pathways, inconsistent professional standards, and limited institutional oversight. The purpose of this study was to examine the regulatory landscape of the Albanian fitness sector in relation to European and international standards and to assess the perceptions of fitness professionals regarding the need for

institutional regulation. The study adopted a descriptive-comparative research design, integrating qualitative policy analysis with quantitative descriptive data collected through a structured questionnaire. Secondary data were derived from scientific literature, international competency frameworks, and European regulatory instruments, including the European Qualifications Framework (EQF) and EN 17229 standards. Primary data were collected from 49 fitness professionals actively working in Albania. The findings revealed a fragmented professional environment characterized by diverse educational backgrounds and weak entry requirements. More than half of the respondents reported that formal qualifications are not required for employment within the sector. At the same time, strong consensus emerged regarding the necessity of institutional regulation, licensing systems, and the establishment of a national professional order. Respondents also identified major structural problems, including the presence of unqualified instructors, inconsistent certification systems, weak professional accountability, and the proliferation of unregulated training providers. The study concludes that the Albanian fitness sector reflects a combination of globally certification-based professional models and locally intensified regulatory deficiencies. In response, the paper proposes the establishment of a National Fitness Instructors' Order as a central regulatory mechanism aimed at standardizing competencies, strengthening professional accountability, improving service quality, and aligning the Albanian fitness sector with European and international frameworks.

Keywords: fitness regulation, professional standards, governance, exercise professionals, Albania

Introduction

The rapid growth of the global fitness industry during the last two decades has transformed exercise and wellness services into a major component of both commercial sport markets and preventive health systems. International reports published by the International Health, Racquet & Sportsclub Association (IHRSA) and EuropeActive demonstrate continuous increases in fitness participation, health club memberships, and industry revenues across Europe and worldwide. Simultaneously, international institutions such as the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD) increasingly recognize physical activity promotion as an essential strategy for reducing non-communicable diseases and improving population health outcomes. Within this evolving environment, fitness professionals have acquired a more prominent role in society. Beyond their traditional function as exercise instructors, they are now expected to contribute to health promotion, behavioural change, injury prevention, and exercise prescription. However, despite the increasing importance of the profession, the regulation of fitness professionals remains fragmented and inconsistent internationally. Existing literature suggests that insufficient regulation may negatively affect service quality, public safety, and professional accountability (De Lyon et al., 2016; Malek et al., 2002). Furthermore, previous studies indicate discrepancies between expected professional competencies and the actual educational preparation of practitioners operating within the sector (Jankauskiene & Pajaujiene, 2018). To address these challenges, several international organizations have developed competency-based frameworks and professional standards. The American College of Sports Medicine (ACSM), National Strength and Conditioning Association (NSCA), and National Academy of Sports Medicine (NASM) have established evidence-based guidelines for exercise testing, prescription, and fitness instruction. In Europe, EuropeActive introduced a structured framework aligned with the European Qualifications Framework (EQF), while initiatives such as the European Register of Exercise Professionals (EREPS) and the International Confederation of Registers for Exercise Professionals (ICREPs) aim to standardize competency recognition through professional registration systems. At the European level, additional regulatory mechanisms have emerged. The EN 17229 standard developed by the European Committee for Standardization establishes operational and safety requirements for fitness centres, including recommendations related to staff qualifications and facility management. Similarly, Directive 2005/36/EC on the recognition of professional qualifications and the European Qualifications Framework promote comparability and professional mobility across European countries. Nevertheless, the application of these

frameworks to the fitness sector remains uneven, and the profession is not consistently regulated across European Union member states. Within this context, Albania represents a particularly underdeveloped regulatory environment. Existing legislation concerning sport and higher education provides only indirect references to fitness activities and exercise professionals. No dedicated legal framework currently exists to regulate entry into the profession, licensing systems, competency standards, or professional accountability mechanisms. Consequently, fitness professionals operate through fragmented pathways combining formal education and private certifications with limited oversight or standardization. The purpose of this study was therefore to examine the Albanian fitness sector from a comparative policy perspective, integrating international regulatory standards with empirical evidence collected from active practitioners. Specifically, the study aimed to identify structural gaps in professional regulation, evaluate practitioners' perceptions regarding institutional reform, and provide evidence supporting the potential establishment of a National Fitness Instructors' Order in Albania.

Materials and Methods

Research Design

This study adopted a descriptive-comparative research design integrating qualitative policy analysis with quantitative descriptive data. The research followed an exploratory and policy-oriented approach, aiming to analyze the Albanian fitness profession in relation to European and international regulatory frameworks while simultaneously examining the perspectives of active fitness professionals.

Data Sources

The study was based on two complementary categories of data: Secondary data, including scientific literature, international competency frameworks, policy documents, and regulatory standards such as ACSM guidelines, NSCA standards, EuropeActive frameworks, EQF documentation, and EN 17229 standards. Primary data, collected through a structured questionnaire administered to fitness professionals working in Albania.

Participants and Sampling

A total of 50 questionnaires were collected, of which 49 were considered valid for analysis. Participants consisted of fitness professionals actively employed within the Albanian fitness sector.

A non-probability sampling strategy combining convenience sampling and network-based recruitment was employed. The questionnaire was distributed through professional contacts, social media networks, and online communication channels targeting fitness instructors and personal trainers operating throughout Albania. The study did not collect demographic variables such as gender or age, as the primary focus was placed on professional characteristics, educational background, and regulatory perceptions.

Research Instrument

Data collection was conducted through a structured questionnaire composed of 12 items designed specifically for this study. The instrument included: Multiple-choice questions concerning years of experience and educational background. Checkbox questions allowing multiple professional role selections. Dichotomous Yes/No questions related to hiring requirements and standardization. Likert-scale items (1–5) assessing perceptions regarding: legal regulation of the profession, national licensing systems, effects of regulatory absence on service quality, establishment of a professional order, continuing professional education systems. The questionnaire aimed to evaluate the attitudes of fitness professionals regarding institutional regulation and professional standardization within Albania.

Data Collection Procedure

Data were collected through an online questionnaire administered via Google Forms between March and April 2026. The survey link was distributed electronically through professional fitness networks and digital communication channels.

Participation was entirely voluntary, and all respondents completed the questionnaire independently.

Data Analysis

The analysis followed a descriptive statistical approach. Data were processed using frequency distributions and percentage calculations. Results were presented through descriptive summaries supported by graphical representations generated using spreadsheet software.

No inferential statistical analyses were conducted because the study was exploratory in nature and focused primarily on identifying structural trends and policy-relevant insights rather than statistical generalization.

Ethical Considerations

The study adhered to fundamental ethical research principles. Participation was voluntary, responses were anonymous, and no identifying personal data were collected. Participants provided implicit informed consent through completion of the questionnaire. All data were used exclusively for academic and scientific purposes.

Results and Discussion

Professional Experience and Occupational Roles

The findings indicate that the Albanian fitness workforce includes both experienced and early-career professionals (Table 1). A considerable proportion of respondents reported more than six years of professional experience (40.8%), followed by those with one to three years of experience (24.5%). Participants with three to six years of experience represented 18.4% of the sample, while 16.3% reported less than one year of professional activity. This distribution suggests that the sample includes practitioners with diverse levels of professional exposure and sectoral experience. The occupational profile of respondents demonstrated considerable professional diversification (Table 2). The majority identified themselves as personal trainers (73.5%), followed by fitness instructors (46.9%), group exercise instructors (26.5%), CrossFit coaches (24.5%), and fitness managers (20.4%). Because respondents were allowed to select multiple occupational roles, the results reflect the multifunctional nature of employment within the Albanian fitness sector. This pattern suggests that professionals frequently operate across several domains simultaneously, reflecting a relatively fluid and non-specialized labour market structure.

Educational Background and Entry Pathways

The educational background of participants revealed substantial heterogeneity within the profession (Table 3). Although 51% of respondents reported holding a Master's degree in Physical Education and Sport Sciences, a significant proportion (28.6%) indicated that they did not possess a formal academic qualification related to the field. Smaller proportions reported holding a Bachelor's degree (12.2%) or doctoral-level education (8.2%). These findings become particularly significant when interpreted alongside responses regarding employment requirements (Table 4). A majority of respondents (65.3%) stated that a formal diploma was not required to begin working as a fitness instructor, whereas only 34.7% indicated that formal qualifications were mandatory for employment. This pattern reflects the broader international tendency toward certification-based professional entry rather than strictly academic qualification systems. However, within the Albanian context, the absence of clearly defined regulatory standards appears to intensify the fragmentation of professional pathways and weaken the distinction between qualified and non-qualified practitioners.

Perceptions of Professional Standardization

Participants expressed divided perceptions regarding the existence of unified professional standards within Albania (Table 5). While 44.9% of respondents believed that a unified standard currently exists, a slightly higher proportion (55.1%) reported that no such standard is in place. This distribution highlights uncertainty and inconsistency in the perception and implementation of professional standards within the Albanian fitness sector. The findings reinforce the argument that the profession currently lacks a centralized regulatory mechanism capable of defining and enforcing unified competency standards and professional requirements.

Attitudes Toward Legal Regulation

One of the most significant findings of the study was the strong support for institutional regulation among practitioners. As presented in Table 6, a substantial majority of respondents (81.6%) strongly agreed that the fitness profession should be regulated by law, while only a very small proportion expressed disagreement. Similarly, strong support emerged regarding the establishment of a national licensing system for fitness professionals (Table 7). Approximately 79.6% of respondents strongly agreed with the implementation of such a system, indicating broad acceptance of formalized professional oversight mechanisms. In addition, respondents perceived the absence of regulation as directly affecting service quality within the sector (Table 8). Specifically, 73.5% strongly agreed that the lack of regulation negatively impacts the quality of fitness services, suggesting that practitioners themselves associate regulatory deficiencies with reduced professional standards and public trust. These findings are consistent with previous literature emphasizing the importance of competency-based regulation, professional accountability, and standardized qualifications within exercise and health-related professions (De Lyon et al., 2016; Malek et al., 2002).

Support for a National Professional Order

The results also demonstrate strong support for the establishment of a National Fitness Instructors' Order (Table 9). Approximately 77.6% of respondents strongly agreed that such an institution would improve service quality and strengthen professional governance within the Albanian fitness sector. Furthermore, respondents emphasized the importance of continuing professional education systems (Table 10). Nearly half of participants (49%) strongly agreed that continuing education based on credit systems should be mandatory, while 30.6% expressed moderate agreement. These findings suggest increasing awareness among practitioners regarding the importance of lifelong learning, competency maintenance, and professional development. When asked directly about their willingness to support the creation of a national regulatory body, the majority of respondents expressed strong support (Table 11). Specifically, 69.4% strongly agreed with supporting such an initiative, while additional participants expressed moderate agreement. This finding further confirms the existence of substantial internal demand for institutional reform and professional standardization within the sector.

Structural Problems Within the Sector

Qualitative responses provided additional insight into the structural challenges affecting the Albanian fitness profession (Table 12). Participants consistently identified several recurring issues, including the presence of unqualified instructors, low quality of professional practice, lack of legal regulation, weak professional accountability, and inconsistent certification systems. Additional concerns included weaknesses in academic preparation, unregulated compensation structures, and the proliferation of private training providers offering certifications without standardized oversight or recognized accreditation mechanisms. These findings reflect broader patterns commonly observed in loosely regulated professional sectors, where the absence of institutional supervision facilitates the emergence of parallel qualification systems characterized by inconsistent scientific validity and professional legitimacy.

Comparative Interpretation

Taken together, the findings suggest that the Albanian fitness sector reflects a combination of global and local dynamics. Internationally, the profession already operates predominantly through certification-based models rather than mandatory academic systems. However, the Albanian context demonstrates a more pronounced regulatory vacuum characterized by limited oversight, inconsistent standards, fragmented professional recognition, and weak institutional governance. At the same time, the findings reveal a strong internal demand for institutional reform originating from practitioners themselves. Respondents generally perceive regulation not as a restrictive mechanism, but rather as a necessary process for improving service quality, strengthening professional credibility, protecting clients, and organizing the labour market more effectively. Overall, the results support the argument that Albania requires a structured regulatory mechanism capable of integrating international competency frameworks with national governance

structures. In this regard, the establishment of a National Fitness Instructors' Order emerges as a coherent and evidence-based response to the current challenges facing the sector.

Conclusions

The present study examined the regulatory landscape of the Albanian fitness profession through a combined analysis of international frameworks and empirical data collected from active practitioners. The findings demonstrate that although the global fitness industry has developed increasingly sophisticated competency standards and professional frameworks, the profession itself continues to operate predominantly through certification-based pathways rather than unified academic systems. Within Albania, this global pattern is intensified by the absence of a dedicated legal and institutional framework governing the profession. The results reveal fragmented entry pathways, inconsistent qualification requirements, and limited professional oversight. A substantial proportion of practitioners operate without formal academic preparation, while employment practices do not consistently require professional qualifications. At the same time, the study identified strong consensus among fitness professionals regarding the need for institutional reform. Respondents overwhelmingly supported legal regulation, national licensing systems, continuing professional education, and the creation of a National Fitness Instructors' Order. The findings further highlighted the problematic role of unregulated private certification providers operating without standardized oversight. Such practices contribute to market distortion, weaken professional credibility, and complicate the identification of legitimate competencies within the sector.

Overall, the Albanian fitness sector appears characterized by three interconnected dynamics:
a global reliance on certification-based professional entry,
a locally intensified regulatory vacuum,
and a strong internal demand for institutional organization.

In response to these conditions, the study supports the establishment of a National Fitness Instructors' Order as a central regulatory mechanism capable of standardizing competencies, ensuring accountability, strengthening professional legitimacy, and aligning the Albanian fitness sector with European and international standards. Future research should expand sample sizes, include comparative regional analyses, and explore the perspectives of policymakers, gym owners, and fitness clients in order to further strengthen evidence-based policy development within the sector.

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Table 1 Professional Experience of Respondents (n = 49)

Years of Experience	Frequency (n)	Percentage (%)
Less than 1 year	8	16.3
1–3 years	12	24.5
3–6 years	9	18.4
More than 6 years	20	40.8

Table 2 Professional Roles of Respondents (Multiple Responses Allowed)

Professional Role	Frequency (n)	Percentage (%)
Personal Trainer	36	73.5
Fitness Instructor	23	46.9
Group Exercise Instructor	13	26.5
CrossFit Coach	12	24.5
Fitness Manager	10	20.4

Table 3 Educational Background of Respondents

Educational Qualification	Frequency (n)	Percentage (%)
Master's Degree in Sport Sciences	25	51.0
Bachelor's Degree in Sport Sciences	6	12.2
Doctoral-Level Education	4	8.2
No Formal Degree in the Field	14	28.6

Table 4 Requirement of Formal Qualifications for Employment

Response	Frequency (n)	Percentage (%)
Yes	17	34.7
No	32	65.3

Table 5 Perception of Unified Professional Standards in Albania

Response	Frequency (n)	Percentage (%)
Yes	22	44.9
No	27	55.1

Table 6 Attitudes Toward Legal Regulation of the Profession

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	40	81.6
Agree (4)	6	12.2
Neutral (3)	2	4.1
Disagree (2)	1	2.1
Strongly Disagree (1)	0	0.0

Table 7 Support for a National Licensing System

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	39	79.6
Agree (4)	7	14.3
Neutral (3)	2	4.1

Disagree (2)	1	2.0
Strongly Disagree (1)	0	0.0

Table 8 Perceived Impact of Lack of Regulation on Service Quality

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	36	73.5
Agree (4)	9	18.4
Neutral (3)	3	6.1
Disagree (2)	1	2.0
Strongly Disagree (1)	0	0.0

Table 9 Support for the Establishment of a National Professional Order

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	38	77.6
Agree (4)	8	16.3
Neutral (3)	2	4.1

Disagree (2)	1	2.0
Strongly Disagree (1)	0	0.0

Table 10 Attitudes Toward Mandatory Continuing Professional Education

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	24	49.0
Agree (4)	15	30.6
Neutral (3)	7	14.3
Disagree (2)	2	4.1
Strongly Disagree (1)	1	2.0

Table 11 Willingness to Support the Creation of a National Regulatory Body

Likert Scale Response	Frequency (n)	Percentage (%)
Strongly Agree (5)	34	69.4
Agree (4)	10	20.4

Neutral (3)	3	6.1
Disagree (2)	2	4.1
Strongly Disagree (1)	0	0.0

Table 12 Main Problems Identified Within the Albanian Fitness Sector

Identified Problem	Frequency of Mention
Presence of unqualified instructors	High
Lack of legal regulation	High
Weak professional accountability	High
Low quality of professional practice	Moderate-High
Unregulated certification providers	Moderate-High
Weaknesses in academic preparation	Moderate
Inconsistent compensation structures	Moderate

REHABILITATION BEYOND MEDICATION: INTEGRATING PHYSICAL ACTIVITIES INTO PSYCHIATRIC TREATMENT FOR INDIVIDUALS WITH MENTAL HEALTH PROBLEMS

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Abstract

This paper addresses the importance of integrating physical activities into the treatment and rehabilitation of patients in psychiatric institutions, placing the focus beyond pharmacological treatment. In clinical practice, treatment is often centered on stabilizing symptoms through medication, while psychosocial and rehabilitative aspects remain limited, especially in contexts where community-based services are lacking. The study is conducted using a qualitative method based on practical experience in social work within a psychiatric institution. The aim is to highlight the role of physical activities as part of the rehabilitation process for patients with mental health disorders, as well as their impact on psychosocial functioning and preparation for reintegration into the community. Data were collected through direct observation, continuous interaction with patients, active involvement in organizing and implementing physical activities within the institution, as well as the presentation of a case study. Based on practical experience in a psychiatric hospital, this paper highlights the challenges related to the long-term institutionalization of patients, as a result of the lack of family and community support. In this context, physical activities are presented as an effective rehabilitative tool that contributes to improving mental health, enhancing social functioning, and strengthening individual autonomy. The role of the social worker is emphasized as crucial in promoting and organizing these activities, as well as in advocating for patients' rights to comprehensive care. The paper concludes with recommendations for the systematic integration of physical activities into psychiatric treatment and for the development of supportive community services. Keywords: Mental health, physical activity, psychosocial rehabilitation, social work, community reintegration.

Introduction

Mental health constitutes an essential component of an individual's overall well-being and is not limited merely to the absence of illness, but also includes emotional, psychological, and social functioning. In traditional psychiatric practice, treatment has primarily focused on the use of pharmacological interventions aimed at stabilizing acute symptoms and managing mental disorders. However, contemporary evidence shows that such an approach, centered solely on medication, is insufficient to achieve sustainable rehabilitation and social reintegration of patients. In this context, the importance of the bio-psycho-social approach is increasingly recognized. This approach aims to treat the individual as a whole, encompassing not only the biological aspect but also psychological and social dimensions. Physical activity, as an important component of this approach, has gained particular attention in recent years due to its positive impact on mental health and overall well-being. Studies have shown that physical activity directly contributes to the improvement of symptoms associated with various mental disorders, including depression, anxiety, and psychotic disorders. According to the World Health Organization, physical activity helps reduce depressive and anxiety symptoms while also improving cognitive functioning and quality of life¹. The biological mechanisms include increased production of neurotransmitters such as serotonin and dopamine, which play a key role in mood regulation. Beyond biological effects, physical activity also has a significant psychological impact. It helps increase self-esteem, improve self-perception, and foster a sense of control over one's life. Individuals who engage in physical activities report lower levels of stress and higher levels of emotional well-being². Another important dimension is the social impact of physical activity. Particularly for psychiatric patients, who often face social isolation, stigma, and difficulties in interaction, group physical activities create opportunities for socialization and relationship-building. They contribute to the development of social skills, improve communication, and reduce feelings of isolation³. However, despite these documented benefits, in many psychiatric institutions treatment continues to be dominated by pharmacological interventions, while rehabilitative components remain limited. This situation becomes even more problematic in contexts where community services and post-discharge support structures are lacking. As a

result, patients often remain institutionalized for long periods, even when their clinical condition has stabilized. Treatment based solely on medication, although necessary in many cases, does not address the individual's complex needs for social functioning and independence. Medications may reduce symptoms, but they do not develop life skills, improve social integration, or prepare patients for life in the community⁴. In this context, physical activity emerges as an important complementary intervention that helps bridge these gaps. Furthermore, physical activities contribute to structuring patients' daily lives by creating routine and a sense of purpose. This is particularly important for individuals who experience passivity, lack of motivation, and dependence on institutional structures. Participation in regular physical activities helps increase energy levels, improves overall daily functioning, and positively influences the long-term rehabilitation process⁵. From a social work perspective, the promotion of physical activities is closely linked to the protection of patients' rights to dignified and comprehensive care. The social worker plays a key role in identifying patients' rehabilitative needs, organizing activities, and encouraging their active participation. Additionally, they act as a mediator between the patient and other institutions, aiming to facilitate reintegration into the community. In conclusion, the integration of physical activities into psychiatric treatment represents a necessary and effective approach to improving patients' clinical and social outcomes. A treatment model that combines pharmacological interventions with rehabilitative and psychosocial components is better suited to address the complexity of mental disorders and to promote long-term well-being.

Methodology

This paper is based on a qualitative approach, grounded in practical experience in social work at the Elbasan Psychiatric Hospital. The aim is to highlight the role of physical activities as part of the rehabilitation process for patients with mental health disorders, as well as their impact on psychosocial functioning and preparation for reintegration into the community.

Data were collected through direct observation, continuous interaction with patients, and active involvement in organizing and implementing physical activities within the institution. In addition, the daily practices of multidisciplinary teams and the psychosocial interventions carried out by occupational therapy staff were taken into consideration. The target group included in this study sample consists of long-term hospitalized patients who, despite the stabilization of their clinical condition, continue to remain in the institution due to a lack of community services, family support, and reintegration structures. In compliance with professional ethics, all data have been handled anonymously, ensuring the confidentiality and dignity of the patients.

Data Analysis

In daily practice within the psychiatric institution, physical activities have been used as a supportive component in the rehabilitation process of patients. These activities are organized in a structured manner and tailored to the capacities and condition of each individual. The main activities carried out include: Walking within the institution's premises, Light group physical exercises, Recreational and sports games, Outdoor activities (when conditions allow) Patients' participation in these activities was initially limited due to lack of motivation, negative symptoms, and social isolation. However, through the intervention of psychosocial staff and collaboration with occupational therapists, a gradual increase in their involvement has been achieved.

The Role of the Social Worker in Implementing Activities

The social worker plays a fundamental role in the planning and implementation of physical activities as part of the rehabilitation process. This role includes:

Identifying the individual needs of patients

- Motivating and encouraging participation
- Organizing group activities
- Creating a supportive and non-stigmatizing environment
- Collaborating with the multidisciplinary team

The Role of Occupational Therapists

The role of occupational therapists in a psychiatric hospital is highly important for the rehabilitation and reintegration of patients into daily life. Physical and sports activities are one of the main tools used in this process, as they have a direct impact on physical, emotional, and social well-being. Occupational therapists consistently adapt activities according to each patient's condition and abilities. They set individual goals, monitor progress, and ensure that activities are safe and motivating. Furthermore, they educate patients to maintain an active lifestyle even after discharge from the hospital, thereby helping to prevent symptom relapse.

Physical activities improve mood and reduce stress.

They help develop social skills through group games.

They create routine and structure in daily life.

They improve physical condition and energy levels, especially in patients with depression or schizophrenia.

Observed Impact on Patients

From continuous observation of patients involved in physical activities, several positive changes have been identified:

Psychological aspect:	Social aspect:	Functional aspect:
Reduction in anxiety and emotional tension	Increased interaction with other patients	Increased participation in daily activities
Improvement in mood	Improved communication	Better structuring of time
Increase in self-esteem	Reduction of social isolation	Higher levels of energy and motivation

Challenges in Daily Practice

Despite the observed benefits, the implementation of physical activities within the institution faces several challenges:

Lack of resources and appropriate spaces

Limited number of staff

Low levels of patient motivation

Stigmatizing and institutional attitudes

Lack of continuity of activities after hospital discharge

Inadequate infrastructure resources

Shortage of human resources

Low patient engagement and motivation
Dominance of the medical model of care
Stigma and institutional attitudes
Lack of continuity of care within the community

Case Study

Case description

The patient is a 45-year-old female, divorced and mother of a 14-year-old son, who presents with a long history of difficulties in psychosocial functioning. Following her divorce, she returned to live in her parents' home, where she lived alone, as other family members (her sister and brother) live abroad and have provided only minimal support. Over the years, the patient's condition gradually worsened, characterized by significant social isolation, impaired daily functioning, and poor adherence to outpatient treatment. Her behavior has at times also become problematic for the community. Following a coordinated intervention by community mental health services, in collaboration with relevant structures, the patient was referred for treatment at the psychiatric hospital.

Condition at the time of admission

At the time of hospitalization, the patient presented as follows:

- Withdrawn and socially isolated
- Refusal of social interaction
- Low level of cooperation
- Lack of motivation to engage in activities

Initially, treatment focused on stabilizing her condition through pharmacological interventions, combined with support from a psychologist and a social worker.

However, despite a gradual improvement in clinical symptoms, the patient continued to show significant difficulties in interaction and social participation, confirming the limitations of treatment based solely on medication.

Psychosocial intervention and physical activities

After several therapeutic efforts and sessions, a gradual inclusion of the patient in the institution's day center activities was achieved, which provide rehabilitative and recreational programs.

The intervention was carried out in a structured manner:

Initial phase:	Intermediate phase:	Advanced phase:
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Short walks assisted by psychosocial staff	Participation in group therapy	Involvement in physical activities such as: Ping-pong Basketball Walking in nature
Limited but continuous contact with the social environment	Encouragement of interaction with other patients	Participation in other rehabilitative activities such as: Cooking Art and music Handcraft activities

Achieved results

After continuous participation in activities, noticeable changes were observed:

Psychological aspect:	Social aspect:	Functional aspect:
Improved mood Increased motivation Reduction of emotional isolation	Increased interaction with patients and staff Development of meaningful relationships with other patients Improvement in communication skills	Active participation in daily activities Increased cooperation with the therapeutic team Consistent acceptance of treatment

Currently, the patient is in a stable condition, with a good level of social functioning, and is in the process of being prepared for discharge from the hospital, in collaboration with the multidisciplinary team

Conclusions

This paper highlights that psychiatric treatment should not be limited to pharmacological interventions alone. While medication is essential for symptom stabilization, it is not sufficient to ensure full rehabilitation and social reintegration.

Physical activities represent an important component of a comprehensive treatment approach, positively influencing patients' psychological, social, and functional aspects. As demonstrated in the case study, gradual involvement in physical and social activities leads to significant improvements in individual well-being and functioning.

The role of the social worker is essential in this process, acting as a motivator, organizer, and advocate for patients' rights to dignified and comprehensive care.

Recommendations

Based on the findings of this paper, the following recommendations are proposed:

Integration of physical activities into individual treatment plans

Increased collaboration among multidisciplinary team professionals
Staff training on rehabilitative and psychosocial approaches
Investment in infrastructure and spaces for physical activities
Development of community-based services to ensure continuity of care
Inclusion of family members in the rehabilitation process
Reduction of stigma through institutional and public awareness initiatives

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