ORIGINAL ARTICLE

Enhancing health and well-being: unlocking the speed abilities of 9-year-old primary school children

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Abstract

Background and Study Aim Physical activity is the key to fostering healthy growth and development in children. Encouraging children to engage in activities that enhance their speed abilities not only boosts their physical fitness but also contributes to their mental and emotional well-being. The purpose of the study - exploring speed abilities: a comparative study of 9-year-old primary school children in Ukraine and beyond.

Material and Methods The study was conducted at Kharkiv Central Educational School № 105 in Ukraine. A total of 29 children from the 4th grade (17 boys and 12 girls) participated in the study. These children were previously screened by a medical practitioner and were found to be in good health. Informed consent was obtained from the parents or guardians of the children, emphasizing their voluntary participation and the potential benefits and risks associated with the study. The study focused on assessing the speed abilities of the participating children. The tests included: 1) Running 30 meters (The time taken by each participant to run a distance of 30 meters was recorded in seconds); 2) Jumping rope (The number of times each participant successfully completed jumping rope within one minute was measured).

Results The study revealed that the general level of development of speed abilities among the participating children corresponded to the average level observed for this age group. Jumping Rope Results: 1) Boys - the average number of successful jumps per minute was 74.94 ± 13.85; 2) Girls - the average number of successful jumps per minute was 76.00 ± 28.16. 30-Meter Run Results: 1) Boys - the average time taken to complete the run was 6.64 ± 0.10 seconds; 2) Girls - the average time taken to complete the run was 6.63 ± 0.11 seconds.

Conclusions The findings of this study contribute to the existing body of knowledge on the speed abilities of 9-year-old primary schoolchildren, offering valuable insights for educators, researchers, and policymakers. Understanding the specific performance levels of boys and girls in jumping rope and running can inform the development of targeted interventions and programs aimed at enhancing speed-related skills among this age group.

Keywords: primary schoolchildren, speed abilities, health, well-being

Introduction

Ensuring the health and well-being of primary school children is a matter of utmost importance and urgency. A holistic approach that addresses their physical, mental, and emotional health is crucial in fostering their overall development and nurturing their potential.

Health and Well-being of Primary Schoolchildren

Promoting the health and well-being of primary schoolchildren is of utmost importance for their overall development. Extensive research has been conducted to investigate various factors and interventions associated with child well-being [1, 2, 8].

Nolvi et al. [3] and de Greeff et al. [4] emphasized the significance of examining the impact of social-emotional symptoms and sleep, particularly during global crises, and have indicated that parental well-being may play a mediating role in determining child well-being. Kliziene et al. [5], Rosa-Guillamon et al. [6], and Drenowatz et al. [7] have focused on exploring the effects of physical education programs on physical activity and emotional well-being, suggesting that such interventions can effectively increase activity levels and contribute to emotional wellness.

Buoncristiano et al. [9] and Ceschia et al. [10] have conducted studies examining the association between socioeconomic status (SES) and childhood overweight and obesity, highlighting the importance of implementing context-specific interventions to address these concerns.

The findings from these studies collectively enhance our understanding of the factors that influence child health and well-being, providing valuable insights for the development of effective

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strategies and interventions aimed at promoting their overall well-being.

Physical Fitness of Primary Schoolchildren

Ensuring an adequate level of health and well-being in children greatly relies on the development of their speed abilities, which contributes to their overall physical fitness.

Several studies have examined various aspects related to children's fitness, including motor skills, physical activity levels, cardiorespiratory fitness, body composition, and the impact of specific training interventions. Chang et al. [11] validated the use of the Children's Motor Skills Quotient (CMSQ) as a reliable tool for assessing movement skills in 6-9-year-old children within the classroom environment. Veijalainen et al. [12] and Mayorga-Vega et al. [13] have explored the associations between physical activity, sedentary time, cardiorespiratory fitness, and cardiac autonomic function in children, shedding light on their interrelationships.

Mendoza-Castejon et al. [14], Haywood et al. [15], and Abdelkarim et al. [16] observed a decline in physical activity levels and an increase in body mass index among school children, highlighting the importance of addressing these factors. Henriksson et al. [17] have emphasized the significance of maintaining a healthy fat mass for cardiovascular health in 9-year-old children. Bogdanis et al. [18] have demonstrated the benefits of plyometric training in improving jumping, sprinting, and change of direction performance.

These findings contribute to our understanding of children's fitness and provide valuable insights for the development of effective interventions and strategies aimed at enhancing their physical capabilities and overall well-being.

Physical fitness of primary schoolchildren in different countries

Understanding the physical development of primary schoolchildren in different countries is crucial for addressing their unique challenges and implementing targeted interventions [19, 20, 21, 22, 23]. Dobay [24] shed light on the high prevalence of inactivity, low sport activity, and poor eating habits among 6-9-year-old children in Slovakia and Hungary, emphasizing the urgent need for interventions to promote healthier lifestyles.

Hohmann et al. [25] examined the relationship between physical activity, physical fitness, and motor coordination in 8-9-year-old children in both Germany and China. Their findings underscored the importance of increasing moderate-to-vigorous physical activity levels to enhance physical fitness among children in both countries.

In Catalonia, Gomez Lopez et al. [26] explored the associations between children's physical fitness and various factors, including the family environment, parental anthropometric characteristics, and smoking habits. This study highlighted the interplay between these factors and their impact on the physical fitness levels of children.

Steene-Johannessen et al. [27] conducted research on temporal trends in physical activity among Norwegian children and adolescents. Although overall physical activity levels remained stable, concerns were raised regarding declining activity levels among 9-year-old boys and the low proportion of 15-year-olds meeting activity recommendations.

These studies collectively provide valuable insights into the physical development of primary schoolchildren in different countries. They emphasize the need for tailored interventions that take into account the unique challenges and circumstances of each country to promote the overall well-being and physical fitness of children.

The purpose of the study - exploring speed abilities: a comparative study of 9-year-old primary schoolchildren in Ukraine and beyond.

Materials and Methods

Participants

The study was conducted at Kharkiv Central Educational School № 105 in Ukraine. A total of 29 children from the 4th grade (17 boys and 12 girls) participated in the study. These children were previously screened by a medical practitioner and were found to be in good health. Informed consent was obtained from the parents or guardians of the children, emphasizing their voluntary participation and the potential benefits and risks associated with the study.

Research design

The study focused on assessing the speed abilities of the participating children. The tests included: 1) Running 30 meters (seconds); 2) Jumping rope (The number of times each participant successfully completed jumping rope within one minute was measured).

Statistical analysis

The value of $X \pm m$ (mean ± standard deviation) was calculated to describe the central tendency and variability of the data. To determine if there were any significant differences in cardiovascular function between boys and girls, an independent samples t-test was conducted. A p-value of < 0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA).

Results

The test results were compared with the rating scale presented in the curriculum [28]. According to the results of the jumping rope test, girls demonstrated indicators corresponding to an

assessment of 3 points (average level), while boys achieved 4 points (sufficient level). The percentage breakdown of grades for jumping rope performance is as follows (Figure):

- score 5 points - 25.0% of girls and 35.4% of boys;
- score 4 points - 16.7% of girls and 58.8% of boys;
- score 3 points - 25.0% of girls and 5.8% of boys;
- score 2 points - 33.3% of girls.

It is worth noting that a higher percentage of positive evaluations was established for boys (100%) compared to girls (66.7%).

In terms of the 30 m run, girls' performance corresponded to a rating of 4 points (adequate level), while boys achieved 3 points (average level). The percentage breakdown of grades for the 30 m run is as follows (Figure):

- score 5 points - 50.0% of girls and 17.6% of boys;
- score 4 points - 25.0% of girls and 29.4% of boys;
- score 3 points - 16.7% of girls and 41.2% of boys;
- score 2 points - 8.3% of girls and 11.8% of boys.

Interestingly, a higher percentage of positive evaluations was established for girls (91.7%) compared to boys (88.2%).

Table 1 presents a comparison of the results of speed abilities between boys and girls. The data indicates a slight predominance of girls' indicators, but these differences are not statistically significant ($p>0.05$).

Overall, the general level of development of speed abilities in schoolchildren corresponds to an assessment of 3 points (average level).

Discussion

Our study focused on evaluating the physical abilities of 4th-grade children, particularly their jumping and running performance. The results showed that there were no significant differences between boys and girls in both exercises. These findings are consistent with the study of Lopez Sanchez et al. [29], which implemented a physical activity program and observed improvements in systolic blood pressure and heart rate in 8- and 9-year-old school children.

In comparison to Ruedl et al. [30], who examined the impact of parental education and physical activity on children's development of physical fitness during primary education, our study did not investigate the influence of parental factors. However, both studies highlight the importance of physical activity and fitness for children's overall health.

Our study is also related to the work of Layne et al. [31], who examined the effectiveness of a classroom-based, technology-assisted physical activity break program on elementary students' cognitive response. In contrast, our study focused

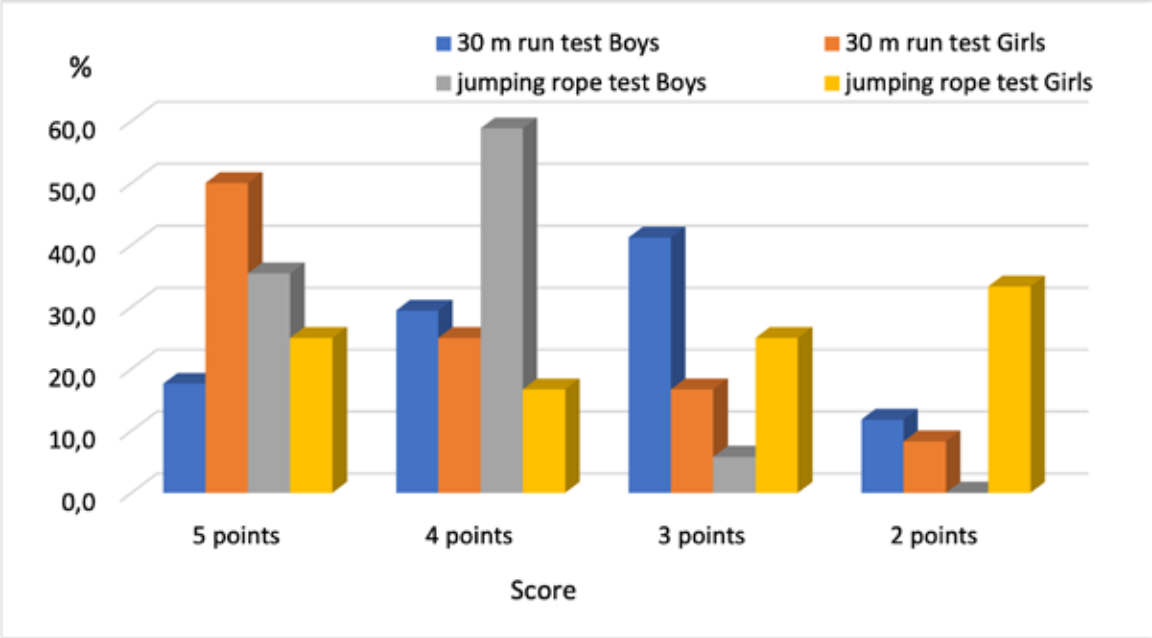

Figure. Rating of grades for schoolchildren (tests: 30 m run, jumping rope)

Table 1. Comparison of indicators of speed abilities manifestation of primary schoolchildren

Test exercises	Boys (n=17)	Girls (n=12)	t-value	p-value
	$\bar{X} \pm m$	$\bar{X} \pm m$		
Jumping over a rope on two legs in 1 minute (number of times)	74.94 ± 13.85	76.00 ± 28.16	0.12	>0.05
Running for 30 m (s)	6.64 ± 0.10	6.63 ± 0.11	1.26	>0.05

on physical performance, but both studies suggest the potential benefits of incorporating physical activity breaks into the classroom routine.

Similarly, Volmut et al. [32], Augste et al. [33] and Cocca et al. [34] emphasize the importance of physical activity for children's health. Our study also contributes to this topic by highlighting the potential decrease in physical activity during summer holidays, particularly in children with better physical abilities.

Our study is consistent with Gois Leandro et al. [35] and Mayorga-Vega et al. [13], who evaluated the effects of plyometric training on the blood pressure and heart rate of boys with obesity. Both studies suggest the benefits of intense exercise on cardiovascular health.

Debiec-Bak et al. [36] consider the effect of swimming on the functional changes in primary school-aged boys, is not directly related to our study's objectives. However, both studies emphasize the potential benefits of physical activity on children's health and highlight the importance of promoting physical activity among children.

Comparative analysis of test results for schoolchildren in Ukraine with the results of research in other countries

Our study aimed to assess the physical abilities of schoolchildren in Ukraine. To better understand the context of our findings, it is important to compare our results with studies conducted in other countries.

The following studies have examined similar aspects of physical abilities in schoolchildren: Abdelkarim [16] in Egypt, Arriscado [19] in Spain, Bonova [20] in Bulgaria, Gomwe [21] in South Africa, Tambalis [22] in Greece, Ruedl [37, 38] in Austria, and several others.

By comparing our results with these international studies, we can gain insights into the similarities and differences in physical abilities among schoolchildren across different countries. Further examination of the variations in physical abilities across different countries will shed light on the impact of cultural, environmental, and socio-economic factors on the physical well-being of children. Additionally, identifying any similarities or disparities in physical abilities can inform the development of targeted interventions and programs to enhance the health and well-being of schoolchildren in Ukraine.

Dobay [24] conducted research in Slovakia and Hungary, focusing on the physical development of 6-9-year-old children. Although the specific tests and methodologies may differ, our study aligns with Dobay's findings, indicating that inactivity, low sport activity, and poor eating habits contribute to challenges in physical development among children in both Ukraine and these European countries.

Hohmann et al. [25] investigated the relationship between moderate-to-vigorous physical activity and physical fitness in 8- to 9-year-old children from Germany and China. While their study focused on different aspects of physical fitness, our study shares a common theme of promoting physical activity among children. Both studies highlight the potential benefits of increasing physical activity levels in school and community settings.

Gomez Lopez et al. [26] conducted a study in Catalonia to assess the physical fitness level of children and its association with family environment and parental characteristics. Although the demographic and cultural contexts differ, our study and Gomez Lopez's study both emphasize the influence of environmental factors, such as parental education and lifestyle, on children's physical development.

Steene-Johannessen et al. [27] explored gender and age-specific trends in device-measured physical activity among children and adolescents in Norway. While their study focused on monitoring physical activity levels over time, our study provides a snapshot of physical abilities among schoolchildren in Ukraine. Both studies highlight the need to address physical activity levels and promote healthy lifestyles among children.

By comparing our results with these studies conducted in different countries, we gain a broader perspective on the challenges and opportunities related to physical development and physical activity promotion among children. These comparisons can inform future research and intervention strategies aimed at improving the physical well-being of children not only in Ukraine but also globally.

Conclusions

Priority development the speed abilities in 9-year-old primary school children can lead to enhanced health, well-being, and overall physical fitness. This highlights the importance of implementing targeted interventions and promoting regular physical activity to support their optimal growth and development. Further research is needed to deepen our understanding of the long-term effects and effective intervention strategies for unlocking the speed abilities of children, ultimately contributing to their improved health and well-being.

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