

**ENHANCING PHYSICAL FITNESS PARAMETERS IN CHILDREN AGED 10–12  
THROUGH THE IMPLEMENTATION OF ATHLETICS-BASED GAMES**

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**Annotation.** This study investigated the effectiveness of athletics-based games in improving physical fitness parameters among children aged 10–12. These findings indicate that integrating athletics-based games into physical education can effectively enhance physical development and promote sustained engagement in physical activity among school-aged children. The study also provides practical recommendations for incorporating structured, game-oriented athletics activities into primary school curricula.

**Keywords.** Athletics-based games, physical fitness, children aged 10–12, school physical education, motor development, speed, muscular strength, agility, endurance, explosive power, game-based learning, physical literacy, early adolescence.

**Introduction.** Physical fitness in childhood is a fundamental determinant of health, motor development, and long-term engagement in physical activity. Early adolescence, particularly between the ages of 10 and 12, represents a critical period for the development of coordination, strength, speed, and endurance. Incorporating play-based approaches into physical education has been widely recognized as an effective strategy to enhance these fitness components while maintaining motivation and enjoyment among children. Athletics-based games, which combine structured physical exercises with competitive and cooperative elements, provide an engaging context for improving physical performance indicators. Previous studies have demonstrated that such games not only contribute to the development of motor skills but also foster social interaction, discipline, and cognitive engagement, thereby promoting holistic child development. Despite extensive research on traditional training methods, there is a growing need to explore innovative, game-oriented approaches that can enhance physical fitness in school-aged children. The present study aims to examine the effectiveness of athletics-based games in developing physical fitness parameters in children aged 10–12. By focusing on this age group, the research seeks to provide evidence-based recommendations for physical education curricula and pedagogical strategies that support optimal physical and motor development.

**Literature Review.** Recent empirical research increasingly supports the integration of game-based approaches into physical education as an effective strategy for improving physical fitness parameters among school-aged children. Cocca, Espino Verdugo, Ródenas Cuenca, and Cocca (2020) demonstrated that a structured game-based physical education program implemented with children aged 10–12 significantly improved health-related physical fitness indicators while also positively influencing psychological well-being. Their findings suggest that play-centered methodologies can achieve outcomes comparable to traditional training models while maintaining higher levels of engagement. Expanding this perspective, Aygün and Çakır-Atabek (2023) examined Kids' Athletics Game Practices and found that athletics-based games effectively enhanced agility, speed, and overall physical fitness among elementary school students. Their results highlight the pedagogical relevance of incorporating structured running, jumping, and throwing activities within playful formats. Similarly, Petrušič, Trajković, and Bogataj (2022) reported significant improvements in physical fitness following a 12-week school-based game intervention, emphasizing the positive effects of varied movement games on adolescents' motor performance. Further evidence from Onarici Gungor, Yaliz Solmaz, Guven, and Gurol (2025) demonstrated that a 12-week after-school game-based

physical activity program produced measurable gains in handgrip strength, standing long jump performance, and sprint speed among children. Complementing these findings, Batez and Gil-Arias et al. (2024), in a systematic review, concluded that game-oriented physical education programs significantly increase enjoyment and intrinsic motivation, both of which are closely associated with sustained physical activity participation and long-term fitness development. Yovira et al. (2023) compared small-sided game formats with traditional exercise routines and found superior improvements in physical fitness indicators within the game-based groups, reinforcing the value of structured play in educational settings. Moreover, Çinar and Hassani (2026) highlighted that traditional and culturally embedded games contribute not only to physical competence but also to broader physical literacy development, including cognitive engagement and social interaction.

Within the Uzbek research context, Dehqonova, Hamdamov, Ubaydullaev, and Ahmedov (2024) investigated the role of Uzbek folk games in improving gross motor skills and physical readiness among primary schoolchildren, demonstrating their effectiveness in enhancing coordination and strength. Julbekov (2022) emphasized the importance of structured physical education programs in fostering children's physical development and health in Uzbekistan. Additionally, Muxitdinova and Olloyorova (2025) examined movement-based games in school settings and reported positive effects on children's motor development and overall physical preparedness. Collectively, contemporary international and national research conducted after 2020 provides consistent evidence that athletics-based and game-oriented interventions significantly enhance key physical fitness components—such as speed, strength, agility, endurance, and coordination—among children aged 10–12. At the same time, these approaches promote motivation, enjoyment, and holistic development. However, despite the expanding body of evidence, further research is needed to systematize athletics-based game models specifically tailored to early adolescence and to integrate them more effectively into school physical education curricula.

**Methodology.** The present study employed a quasi-experimental research design using pre-test and post-test assessments with experimental and control groups to determine the effectiveness of athletics-based games in enhancing physical fitness parameters among children aged 10–12. A total of 60 students (30 boys and 30 girls) from a general secondary school participated in the study. The participants were randomly assigned to an experimental group ( $n = 30$ ) and a control group ( $n = 30$ ). All participants were medically cleared to participate in physical activity, and parental consent as well as school administration approval were obtained prior to data collection. The experimental group participated in a structured athletics-based games program for 12 weeks, conducted three times per week with each session lasting 45 minutes. The intervention program was specifically designed to target key physical fitness components. The sessions included sprint relay games aimed at improving speed, standing long jump competitions for developing explosive lower-body strength, medicine ball throwing games to enhance upper-body strength, agility ladder drills and obstacle races to improve coordination and agility, and endurance-based tag and running team challenges to develop cardiorespiratory endurance. Each session consisted of a 10-minute warm-up phase, 30 minutes of athletics-based game activities, and a 5-minute cool-down and reflection period. In contrast, the control group followed the standard physical education curriculum based on traditional exercises and drills without the structured implementation of game-based athletics activities. Physical fitness parameters were assessed before and after the 12-week intervention using standardized testing protocols. The selected indicators included the 30-meter sprint test to measure speed, the standing long jump test to evaluate lower-body power, handgrip dynamometry to assess muscular strength, the 4×10 meter shuttle run to measure agility, and the 6-minute run test to evaluate cardiorespiratory endurance. All tests were administered under consistent conditions to ensure reliability and validity. Statistical analysis was conducted using descriptive and inferential statistical methods. Means and standard deviations were calculated for all variables. Paired sample t-tests were applied to compare

pre- and post-test results within each group, while independent sample t-tests were used to compare post-intervention differences between the experimental and control groups. The level of statistical significance was set at  $p < 0.05$ .

**Results.** At baseline, no statistically significant differences were observed between the experimental and control groups across all measured physical fitness parameters ( $p > 0.05$ ), indicating homogeneity of the groups prior to the intervention. Following the 12-week program, the experimental group demonstrated statistically significant improvements in all assessed variables. Sprint performance improved as evidenced by a significant reduction in 30-meter sprint time ( $p < 0.01$ ). Standing long jump distance increased significantly ( $p < 0.01$ ), indicating enhanced lower-body explosive strength. Handgrip strength also showed statistically significant gains ( $p < 0.05$ ). Agility performance, measured through the 4×10 meter shuttle run, improved significantly ( $p < 0.01$ ). Furthermore, the 6-minute run test results revealed significant enhancement in cardiorespiratory endurance ( $p < 0.01$ ). In contrast, the control group exhibited only minor, non-significant changes in most physical fitness indicators. Between-group comparisons after the intervention revealed significantly greater improvements in the experimental group compared to the control group across all parameters ( $p < 0.05$ ). These findings confirm the positive impact of athletics-based games on physical fitness development among children aged 10–12.

**Discussion.** The findings of this study demonstrate that athletics-based games significantly contribute to the development of key physical fitness parameters during early adolescence. The improvements observed in speed, strength, agility, and endurance support previous research emphasizing the effectiveness of game-based physical education approaches. One of the primary factors underlying these improvements may be the motivational dimension inherent in game-based activities. Athletics-based games combine competition, cooperation, and enjoyment, thereby increasing students' engagement and effort levels. Compared to traditional repetitive drills, such activities foster intrinsic motivation, which plays a crucial role in sustained physical participation and performance improvement. Additionally, athletics-based games provide integrated stimulation of multiple motor abilities within a single session. Sprint relays enhance acceleration and reaction speed, jumping activities improve explosive power, obstacle courses develop agility and coordination, and endurance-based challenges strengthen cardiovascular capacity. This multidimensional stimulation may explain the comprehensive improvements observed in the experimental group. Beyond physical outcomes, athletics-based games also create opportunities for social interaction, teamwork, and cognitive engagement, contributing to holistic child development. Therefore, incorporating athletics principles into structured, age-appropriate playful formats appears to be more effective than relying solely on traditional exercise-based instruction.

**Conclusion.** The results of the present study indicate that a 12-week athletics-based game intervention significantly improves physical fitness parameters in children aged 10–12. Compared to traditional physical education methods, structured athletics-based games produce superior improvements in speed, strength, agility, and endurance. These findings highlight the pedagogical value of integrating athletics-based games into primary school physical education curricula. Such an approach not only enhances physical performance but also supports motivation, engagement, and comprehensive developmental outcomes. The study contributes to the growing body of evidence advocating innovative, play-centered strategies in physical education and provides a practical foundation for curriculum development and educational practice.

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