

USING TRADITIONAL GAMES IN PHYSICAL EDUCATION CLASSES IMPROVES FITNESS AND STABILIZES THE VESTIBULE FOR 10-11-YEAR-OLDS

USO DE JOGOS TRADICIONAIS NAS AULAS DE EDUCAÇÃO FÍSICA MELHORA A APTIDÃO FÍSICA E ESTABILIZA O VESTÍBULO PARA CRIANÇAS DE 10-11 ANOS

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RESUMO

Introdução: Jogos tradicionais oferecem uma maneira divertida e envolvente de promover a atividade física em crianças. Este estudo explora o potencial de integrar tais jogos no currículo de educação física (EF) para melhorar a aptidão física e a estabilização vestibular, um aspecto chave do equilíbrio e coordenação, em estudantes pré-adolescentes. **Problema:** A incorporação de jogos tradicionais nos programas de EF pode levar a maiores melhorias na aptidão física e estabilização vestibular em comparação com as atividades tradicionais de EF? **Abordagem:** Este estudo investiga o impacto de um programa de EF enriquecido com jogos tradicionais na aptidão física e estabilização vestibular de estudantes de 10-11 anos. **Materiais e Métodos:** Sessenta estudantes (de 10-11 anos) foram aleatoriamente designados para um grupo experimental (GE) participando de um programa de EF incorporando jogos tradicionais ou um grupo de controle (GC) seguindo um currículo de EF padrão. O estudo durou nove meses. Ambos os grupos foram submetidos a avaliações de aptidão física e estabilização vestibular antes e depois da intervenção. **Resultados:** Inicialmente, não foram encontradas diferenças significativas na aptidão física e estabilização vestibular entre os dois grupos. Após os nove meses de intervenção, ambos os grupos apresentaram melhorias. O GC exibiu melhorias modestas na aptidão física (2,15% a 8,56%) e uma melhoria de 6,50% no teste de estabilização vestibular "Giros no banco de ginástica". No entanto, o GE demonstrou melhorias significativamente maiores, com aumentos na aptidão física variando de 9,02% a 20,20% e uma melhoria notável de 28,98% no teste "Giros no banco de ginástica", um aumento de 4,5 vezes em comparação com o GC. **Discussão:** As melhorias substanciais observadas no GE destacam a eficácia da incorporação de jogos tradicionais em melhorar tanto a aptidão física quanto a estabilização vestibular em jovens estudantes. Estes achados sugerem que os jogos tradicionais proporcionam uma abordagem mais envolvente e benéfica em comparação com as atividades tradicionais de EF. **Conclusões:** Integrar jogos tradicionais no currículo de EF para estudantes de 10-11 anos pode melhorar significativamente tanto a aptidão física quanto a estabilização vestibular, superando os benefícios observados em atividades tradicionais de EF.

Palavras-chave: Jogos tradicionais. Educação física (EF). Aptidão física. Estabilização vestibular. Estudantes pré-adolescentes.

ABSTRACT

Introduction: Traditional games offer a captivating and enjoyable avenue for promoting physical activity in children. This study investigates the potential of integrating such games into physical education curricula to enhance physical fitness and vestibular stabilization—a crucial aspect of balance and coordination—in pre-teen students. **Problem Statement:** This research addresses the question: Can incorporating traditional games into physical education (PE) programs lead to greater improvements in physical fitness and vestibular stabilization compared to traditional PE activities alone? **Approach:** This study examines the impact of a PE program enriched with traditional games on the physical fitness and vestibular stabilization of students aged 10-11 years. **Materials and Methods:** Sixty students (aged 10-11 years) were randomly assigned to either an experimental group (EG) participating in a PE program incorporating traditional games or a control group (CG) following a standard PE curriculum. The study spanned nine months, with both groups undergoing assessments for physical fitness and vestibular stabilization before and after the intervention. **Results:** While both groups demonstrated improvements in physical fitness and vestibular stabilization following the intervention, the EG exhibited significantly greater enhancements. The CG showed modest improvements (2.15% to 8.56% in fitness and 6.50% in vestibular stabilization), while the EG achieved substantial gains, with fitness improvements ranging from 9.02% to 20.20% and a remarkable 28.98% improvement in vestibular stabilization—a 4.5-fold increase compared to the CG. **Discussion:** The substantial improvements observed in the EG underscore the effectiveness of incorporating traditional games in enhancing both physical fitness and vestibular stabilization in young students. **Conclusions:** This study provides compelling evidence that integrating traditional games into PE curricula for students aged 10-

11 years can significantly enhance both their physical fitness and vestibular stabilization, surpassing the benefits observed in traditional PE activities.

Keywords: Traditional games. Physical education (PE). Physical fitness. Vestibular stabilization. Pre-teen students.

Introduction

Physical education plays a crucial role in the overall development of primary school students¹⁻⁴. However, various issues, such as a lack of interest in the subject and insufficient resources, can hinder the effectiveness of these classes. To address these concerns, incorporating traditional games into the curriculum can significantly improve the learning experience for students^{2,5}. Primary school students often face a significant reduction in their daily physical activity during the study period, highlighting the importance of a focused physical preparation for school studies. This preparation can promote not only physical fitness but also intellectual, emotional, and social development.

The existing PE curriculum in schools often faces challenges, such as a lack of tools and equipment, which can hinder its effectiveness⁶. To address this issue, incorporating classic games into the curriculum could generate greater interest and enhance the overall experience for students aged 10 to 11^{3,6,7}. Traditional games offer a unique approach to engaging with students, catering to individual differences in development stages^{1,7,8}.

The purpose of PE is to promote physical health, fitness, and the development of essential skills. Incorporating classic games into the curriculum can contribute to these objectives by providing a fun and engaging learning environment⁹. These games can help students develop various abilities, including perception, emotional-volitional, psychological, physiological, and motor skills. Furthermore, the use of classic games can help invigorate the spirit, activate the muscles and bones, and strengthen the body, allowing students to learn basic methods of physical fitness and continue improving themselves throughout their lives.

The current study aims to investigate the impact of incorporating traditional games into PE sessions on the physical fitness and vestibular stability of 10 to 11-year-old primary school students. According to the study, children aged 10 to 11 would exhibit enhanced vestibular stability and physical fitness indicators if traditional games are incorporated into PE sessions. To test this hypothesis, a controlled experimental design was implemented. The study involved two groups: an EG that participated in PE classes incorporating traditional games, and a CG that followed the standard PE curriculum. Various tests were conducted to measure physical fitness and vestibular stability in both groups before and after the intervention. Physical fitness was assessed using standard fitness tests, while vestibular stability was measured using the "Turns on the gym bench" test. The results from both groups were then compared to determine the effectiveness of traditional games in improving these parameters.

Methods

This study, conducted from September 2023 to May 2024, investigated the impact of integrating traditional games into physical education classes on the physical fitness and vestibular stabilization of 60 students (30 boys, 30 girls) aged 10-11 years. All procedures adhered to the ethical guidelines outlined in the 1964 Helsinki Declaration and received approval from the national research committee, with informed consent obtained from all parents.

Participants: Sixty healthy students (30 boys, 30 girls) aged 10-11 years from GIS primary and high school international schools in Mekong Delta, Vietnam, were randomly assigned to either an experimental group (EG, n=30) or a control group (CG, n=30).

Intervention: Both groups received standard PE classes twice a week for 35 minutes, following the curriculum mandated by the Vietnamese Ministry of Education and Training. In addition to the standard curriculum, the EG participated in two traditional games during their PE classes:

Inclusion Criteria: Participants were primary school students aged 10 to 11 years; Both male and female students were included; Participants who provided parental consent were eligible; Students attending physical education classes regularly.

Exclusion Criteria: Students with medical conditions or physical disabilities that prevent them from participating in physical activities; Students who were absent from school for more than two weeks during the study period; Participants without parental consent.

Traditional Game 1: Conducted within the school gymnasium, this game involved three large squares (1.6m x 1.6m), each containing nine smaller squares (0.4m x 0.4m) marked with letters "A" to "I". Students hopped between the smaller squares in alphabetical order, then reversed the sequence. The teacher shuffled the letter arrangements before each round, promoting adaptability and coordination. (Figure 1)

Traditional Game 2: This game, held on the field outside the gymnasium, utilized a similar setup to Game 1, but with Roman numerals "I" to "IX" replacing the letters. Students navigated the squares in numerical order and then reversed the sequence, emphasizing agility and speed. (Figure 2)

Measurements: The study assessed physical fitness using four tests: Shuttle run 4x10m (seconds), Running 30m (seconds), Standing long jump (centimeters), and Handgrip strength (kilograms)¹⁰⁻¹³. Vestibular stabilization was evaluated using the "Turns on the gym bench" test, which measured the number of successful turns performed¹⁰⁻¹³.

Data were analyzed using SPSS 20.0 software, with Microsoft Excel employed for statistical processing. The t-student parameter was used, with the reliability of the results considered to be $P < 0.05$ ¹⁰⁻¹⁴. The authors utilized AI-powered grammar and language tools to ensure the clarity and accuracy of the manuscript.

Square 1			Square 2			Square 3		
F	H	D	G	D	F	F	C	G
E	B	G	C	H	B	E	D	B
A	I	C	G	E	A	I	A	H

Figure 1: Traditional game 1 exercise.

Source: authors.

Square 1			Square 2			Square 3		
VI	VIII	IV	VII	IV	VI	VI	III	VII
V	II	VII	III	VIII	II	V	IV	II
I	IX	III	IX	V	I	IX	I	VIII

Figure 2: Traditional game 2 exercise.

Source: authors.

Results

Before the experimental study, all children participated in the tests "Shuttle run 4x10m" (an indicator of coordination abilities), "Running 30m, (s); Standing long jump (cm); Handgrip test right, (kg)", (indicators of physical fitness), and test "Turns on the gym bench" (indicators

of vestibular stability). The results of the tests with the mean value were similar between EG and CG, (with $p>0.05$) not statistically significant. After the end of the trial, the difference between the physical fitness and vestibular stabilization indices in both groups changed, EG improved significantly better than CG (see Table 1).

Table 1. The vestibular stabilization, physical fitness, coordination abilities of children 10-11 years old.

Tests	CG				EG			
	$M_1 \pm SD$	$M_2 \pm SD$	%	P	$M_1 \pm SD$	$M_2 \pm SD$	%	P
Turns on the gym bench (number of times)	11.9 \pm 1.4	12.7 \pm 1.2	6.50	>0.05	12.1 \pm 1.2	16.2 \pm 1.4	28.98	<0.05
Shuttle run 4x10 m (s)	14.1 \pm 0.7	13.8 \pm 0.6	2.15	>0.05	13.9 \pm 0.4	12.7 \pm 0.5	9.02	<0.05
Running 30m, (s)	6.57 \pm 0.48	6.36 \pm 0.41	3.20	>0.05	6.66 \pm 0.57	5.96 \pm 0.47	11.10	<0.05
Standing long jump (cm)	145.50 \pm 10.43	155.48 \pm 10.38	6.63	>0.05	144.49 \pm 14.34	171.47 \pm 10.65	17.10	<0.05
Handgrip test right, (kg)	16.55 \pm 1.52	18.03 \pm 1.52	8.56	>0.05	16.45 \pm 1.48	20.15 \pm 1.42	20.20	<0.05

Note: M_1 -mean value before experiment, M_2 -after experiment, SD-standard deviation.

Source: authors.

Table 1 shows that at the end of the experiment, the stats of both CG and EG were improved. However, the increase in the results is different. CG did not significantly improve their performance in test "Shuttle run 4x10 m(s)", an indicator of coordination abilities (14.1 ± 0.7 to 13.8 ± 0.6), 2.15% ($P > 0.05$), physical fitness tests "Running 30m, (s); Standing long jump (cm); Handgrip test right, (kg)" increase was very limited (3.20 to 8.56%), and in the "Turns on the gym bench" vestibular stabilization test, this index of CG children only improved 6.50% ($P > 0.05$). The CG results show the effectiveness of using the current PE program for primary school children 10-11 years old. However, the training results of EG children showed outstanding effectiveness in PE lessons with the introduction of traditional game into each lesson. This result confirmed the effectiveness of the traditional game, the index of EG children in the test (an indicator of coordination abilities) was improved from (13.9 ± 0.4 to 12.7 ± 0.5), 9.02%, with ($P < 0.05$), fitness test "Running 30m, (s); Standing long jump (cm); Handgrip test right, (kg)" increased significantly from (11.10% to 20.20%) and the vestibular stabilization index in the "Turns on the gym bench" test improved 28.98%, this index, increased 4.5 times CG. ($P < 0.05$). Thus, the traditional game not only helps children develop physical fitness and coordination abilities more effectively but also improves vestibular stabilization of 10-11-year-olds.

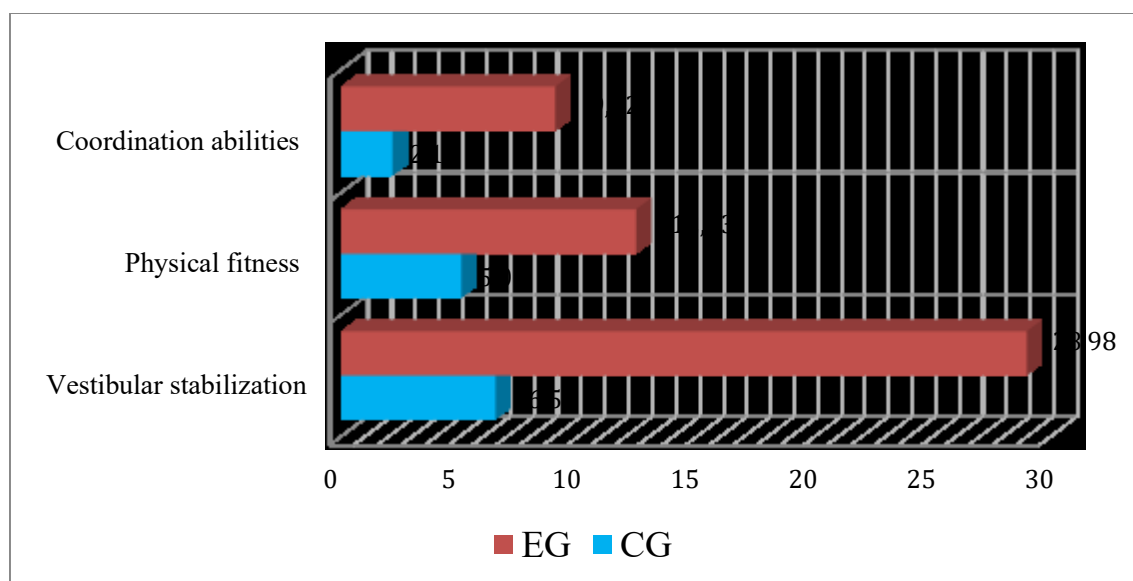


Figure 3: Improvement in Motor Skills: CG vs. EG.

Source: authors

According to Figure 3, the markers increased after EG: physical fitness increased 2.5 times, vestibular stability increased 4.5 times, and coordination skills increased 4.2 times when compared to CG.

Discussion

This study aimed to investigate whether integrating traditional games into PE classes can enhance physical fitness and vestibular stabilization in children aged 10-11 years. The original objective was to determine if traditional games could yield greater improvements compared to conventional PE activities.

The findings from this study contribute to the growing understanding of the relationship between physical fitness and vestibular stabilization¹⁴. Previous research has highlighted the importance of developing motor skill competence in maintaining adequate physical fitness into adulthood¹⁴, as well as the potential benefits of vestibular rehabilitation for individuals with balance and vestibular disorders^{10,12}. Furthermore, research has emphasized the need for normative data on measures used in vestibular rehabilitation, and the examination of the relationship between self-reported symptoms, neurocognitive, and balance performance¹².

The findings of the study confirm the significant benefits of incorporating traditional games on both physical fitness and vestibular stabilization among the EG compared to the CG. The experimental group exhibited impressive improvements ranging from 9.02% to 20.20% in physical fitness tests, and a remarkable 28.98% improvement in the "Turns on the gym bench" test, which evaluates vestibular stabilization^{15,16}. In contrast, the control group showed more modest gains, with improvements between 2.15% and 8.56% for physical fitness and 6.50% for vestibular stabilization. These results align with the existing literature on the benefits of virtual reality exercise and traditional game-based physical activities for individuals with physical and vestibular disorders^{15,17}. Previous studies have found that virtual reality interventions can have positive effects on physical fitness, muscle strength, balance, and extremity function. Furthermore, virtual reality training has been shown to improve rehabilitative outcomes, leading to significant physiological and psychological improvements in patient populations¹⁸. The findings of this study suggest that incorporating traditional games into physical activity programs may be an effective strategy for enhancing both physical fitness

and vestibular stabilization, particularly for individuals who may benefit from more engaging and motivating forms of exercise^{10,16,18,19}.

Recent literature supports the benefits of active, engaging PE curricula. Traditional games, by promoting dynamic and enjoyable activities, align with findings that active engagement enhances motor skills and physical health in children^{2,3}. Moreover, previous research has highlighted the need for PE programs to foster not only physical fitness but also skills such as coordination and balance, which are critical during developmental years^{1,14,17}. The current study provides empirical evidence that integrating traditional games into PE classes can effectively address these priorities, leading to improved physical fitness and vestibular stabilization^{10,12,14,16}.

A significant finding of this study is the substantial improvement in vestibular stabilization in the experimental group, with a 4.5-fold increase compared to the control group. This suggests that traditional games offer a more holistic approach to developing physical skills, encompassing both fitness and balance^{1,17,20,21}. This dual benefit is unique and underscores the potential of traditional games as a superior method in PE programs. The development of traditional games can stimulate and motivate learning, as movement in games encourages children to think and understand the *why* and *how*²¹. Traditional games played with joy and earnestness can effectively train emotional stability and facilitate the development of self-adjustment, understanding, and willingness to accept unexpected conditions^{17,21}. The purpose of this study is to empirically examine the added value of integrating traditional games into PE curricula, beyond the well-documented benefits of physical activity on children's health. PE has long been recognized as a critical component of a child's overall development, contributing to improved physical fitness, motor skills, and overall well-being¹. However, conventional PE programs have faced challenges in consistently engaging students and delivering tangible outcomes¹⁷. The current study posits that the strategic integration of traditional games into PE can offer a practical solution to these challenges, leading to enhanced physical fitness and vestibular stability outcomes. Traditional games, which are often deeply rooted in local cultural practices, have the potential to captivate students' interest, fostering a sense of cultural identity and emotional investment in the learning process. By leveraging the intrinsic motivational appeal of these games, PE can become a more holistic and impactful experience for students.

Existing research has highlighted the role of PE in developing students' overall well-being, including their physical, emotional, and social capacities³. Traditional games, in particular, have been shown to contribute to the development of self-adjustment, understanding, and emotional stability, all of which are crucial for a child's healthy development.²¹

The findings of this study underscore the value of incorporating traditional games into PE curricula, as they can lead to significant improvements in both physical fitness and vestibular stabilization among young students²²⁻²⁵. The substantial gains observed in the experimental group, particularly in the vestibular stabilization measure, suggest that traditional games offer a more holistic approach to physical education, addressing not only fitness but also balance and coordination²⁶⁻³¹.

The implications of this study are twofold. First, it provides empirical evidence to support the integration of traditional games into PE programs as an effective strategy for enhancing physical fitness and vestibular stabilization among children. This approach can be particularly beneficial for students who may be less motivated by conventional PE activities, as the engaging and culturally relevant nature of traditional games can foster increased participation and enjoyment^{22, 32}.

Second, the study highlights the potential of traditional games to contribute to a more well-rounded PE curriculum, addressing not only physical fitness but also the development of critical motor skills, emotional stability, and cultural identity³².

Limitations of the Study

This study had a few limitations. Firstly, the sample size was relatively small, with only 60 participants. A larger sample size would have increased the statistical power of the study and allowed for more robust conclusions. Secondly, the study was conducted over a relatively short duration of 9 months. A longer intervention period may have provided additional insights into the long-term effects of integrating traditional games into PE classes.

Future Research and Implications:

Building on the findings of this study, several avenues for future research emerge. First, it would be valuable to replicate the study with a larger and more diverse sample, potentially across different cultural contexts, to further validate the effectiveness of traditional games in enhancing physical fitness and vestibular stabilization.

Additionally, investigating the long-term impacts of this approach, including potential carry-over effects on overall academic performance and psychosocial well-being, could provide a more comprehensive understanding of the benefits of integrating traditional games into PE curricula.

In conclusion, this study offers compelling evidence that the strategic integration of traditional games into PE classes can lead to significant improvements in the physical fitness and vestibular stabilization of young students. By leveraging the inherent appeal and cultural relevance of these games, PE can become a more engaging and impactful experience, fostering holistic development and instilling a sense of cultural identity in students.

Conclusion

The integration of traditional games into PE curricula for pre-teen students has been shown to significantly enhance physical fitness and vestibular stabilization, surpassing the benefits observed in traditional PE activities alone. This study demonstrated that the experimental group, which participated in a PE program enriched with traditional games, exhibited notable improvements in both physical fitness and vestibular stabilization compared to the control group, which followed a standard PE curriculum.

Specifically, the experimental group showed physical fitness improvements ranging from 9.02% to 20.20% and an impressive 28.98% improvement in the "Turns on the gym bench" vestibular stabilization test. In contrast, the control group exhibited more modest gains in physical fitness (2.15% to 8.56%) and a 6.50% improvement in vestibular stabilization.

These findings underscore the effectiveness of traditional games in creating a more engaging and beneficial PE environment for young students. Traditional games not only promote physical activity but also foster balance, coordination, and overall physical development. The significant improvements observed in the experimental group highlight the potential of incorporating traditional games as a superior method for enhancing both physical fitness and vestibular stabilization in PE programs for pre-teen students.

In conclusion, traditional games provide a valuable addition to PE curricula, offering a holistic approach to physical education that effectively improves fitness and balance in young learners. These results support the adoption of traditional games in PE programs to foster a more dynamic, engaging, and effective physical education experience for students aged 10-11 years.

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