Stimulation of physical fitness through traditional games in elementary school students: A systematic review in Indonesia

Review Article

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Abstract.

Background Physical fitness plays a crucial role in supporting elementary school students' ability to engage in learning activities without experiencing excessive fatigue. Adequate fitness levels enable students to maintain concentration and participate actively in school tasks. In Indonesia, information regarding the physical fitness of elementary school children remains limited, despite its importance for promoting overall health and learning readiness.

Objectives This systematic review aims to examine the existing scientific literature on the role of traditional games as a learning strategy to improve physical fitness among elementary school students in Indonesia.

Methods A systematic search was conducted across four major databases—ScienceDirect, Scopus, Google Scholar, and PubMed. The search strategy employed a combination of keywords, including ("traditional games" OR "play model") AND "physical fitness" AND "students" AND "elementary school." The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, including screening, eligibility assessment, and data extraction from relevant studies.

Results The findings indicate that traditional games positively contribute to improving students' physical fitness. These games are typically designed using a play-based approach and incorporate activities aligned with children's fundamental motor skills and developmental stages. Improvements occur because traditional games encourage active participation, increase movement engagement, and support effective fitness development within physical education settings.

Conclusion Traditional games represent an effective and culturally relevant strategy for enhancing physical fitness among elementary school students in Indonesia. Their integration into physical education classes can promote active learning and contribute to better health outcomes. This review provides comprehensive evidence on the pedagogical value of traditional games in improving children's physical fitness, highlights their relevance for culturally grounded physical education practices, and offers insights for researchers, educators, and policymakers seeking to optimize school-based fitness interventions.

Keywords: traditional games, physical fitness, elementary school, Indonesian school

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INTRODUCTION

Physical activity is widely recognized as a fundamental component for maintaining and improving overall health and quality of life. Participation in sports supports multiple dimensions of physical fitness, including strength, aerobic capacity, balance, and flexibility, which help individuals overcome physical limitations and enhance functional performance (Angulo et al., 2020; Suryadi, Suganda, et al., 2023). Although sports activities often involve high physiological demands and the risk of injury due to repetitive high-intensity movements such as jumping and sprinting (Read et al., 2016), regular participation has consistently been shown to improve overall fitness levels (Septianto et al., 2024). Individuals who engage in exercise more frequently tend to achieve better physical fitness and experience faster recovery from fatigue (Rubiyatno et al., 2023).

In childhood, physical fitness is crucial not only for supporting students' stamina and resistance to fatigue but also for maintaining cognitive focus and engagement in learning activities. Children

inherently possess the capacity to improve cardiovascular and respiratory function through continuous physical activity (Tettero et al., 2018), especially when they are regularly involved in structured exercise routines (Athaya et al., 2023). Engaging in sports has been found to promote better physical health and overall well-being among children (Mashud et al., 2024). Within this context, physical education (PE) holds a central role in schools as it contributes to children's motor development, physical health, and lifelong healthy behavior.

Physical education is considered an essential subject across educational levels—ranging from early childhood to senior high school—as it provides structured opportunities for children to learn and engage in physical activity (Aziz, Okilanda, Permadi, et al., 2023; Suryadi et al., 2024). Through PE, students develop healthy habits and gain foundational knowledge of physical activity that supports long-term quality of life (Samodra et al., 2023; Harianto et al., 2023; Suryadi, Samodra, et al., 2023). By integrating physical activity into learning, PE serves not only to improve physical fitness but also to shape positive attitudes and behaviors related to health.

Play-based approaches are frequently used in PE to enhance engagement and physical fitness (Cocca et al., 2020). Play activities offer meaningful opportunities for movement and enjoyment, enabling students to become more active and physically capable (Griban et al., 2020; Suryadi et al., 2024). Such approaches align well with the developmental characteristics of children, who naturally prefer learning through active and playful experiences (Septianto et al., 2024). As a result, play-centered PE becomes an effective strategy for improving health and fitness outcomes among elementary school students.

Despite these efforts, studies indicate that the physical fitness levels of elementary school students in Indonesia remain below optimal standards and require further improvement (Rubiyatno et al., 2023). Physical fitness is an essential component of children's growth and development, influencing their endurance, muscular strength, balance, and motor competence (Suganda et al., 2023). Therefore, identifying effective instructional strategies that stimulate physical activity and motor engagement in school settings is crucial.

Traditional games have emerged as a promising and culturally relevant method for enhancing children's physical fitness. Research shows that traditional games contribute positively to physical literacy and motor development, offering engaging and movement-rich learning experiences (Gustian, 2021; Merino-Campos & Del Castillo Fernández, 2016). Traditional games naturally attract children's interest because they reflect familiar activities from their cultural environment and daily life. Moreover, such games can preserve and promote local wisdom while fostering cooperation, enjoyment, confidence, and fundamental movement skills (Goodway et al., 2019; Haïdara et al., 2023).

Teachers play a critical role in selecting and adapting appropriate games that match students' developmental characteristics and learning needs (Aziz, Okilanda, Permadi, et al., 2023; Mashud et al., 2024; Tantri et al., 2023; Umar et al., 2023). With a play-based learning approach, educators can integrate core learning materials into enjoyable and meaningful physical activities, ultimately improving learning outcomes (Harianto et al., 2023). Although previous studies have conducted literature reviews on game-based learning models in Indonesia, these reviews primarily focused on motor skills rather than physical fitness (Suryadi et al., 2024). Furthermore, traditional games differ across regions and cultures, making their application diverse and contextually significant. Therefore, a focused systematic review on traditional games and their impact on the physical fitness of elementary school students in Indonesia is needed to address this gap.

METHOD

Search Strategy

The search strategy in this systematic review employed four major academic databases: ScienceDirect, Scopus, Google Scholar, and PubMed. The process began with ScienceDirect, followed by Scopus, Google Scholar, and finally PubMed, as these databases are widely recognized and frequently used by researchers worldwide for scholarly indexing and citation retrieval. The search utilized a combination of predefined keywords, including: ("traditional games" OR "play model") AND "physical fitness" AND "students" AND "elementary school". All searching procedures adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Mohamed Shaffril et al., 2019). PRISMA provides standardized reporting principles for systematic reviews, initially developed for randomized controlled trials but widely applicable to various research designs (Moher et al., 2009).

Exclusion Criteria

The exclusion criteria applied in this study were as follows: (1) Articles not published in journals indexed in Garuda, Scimago Journal Rank (SJR), or Web of Science. (2) Articles written in languages other than English. (3) Articles published outside the five-year range (2019–2024). (4) Articles that did not explicitly address the use of traditional games to enhance physical fitness among elementary school students in Indonesia.

Procedure

A total of 2.301 publications were initially identified across the selected databases, consisting of 1.101 articles from ScienceDirect, 1.200 from Scopus, After applying the exclusion criteria, only 4 articles met all eligibility requirements. The majority of excluded studies were removed because they did not directly discuss traditional games in relation to physical fitness among Indonesian elementary school students. All articles were imported into Mendeley Reference Manager to remove duplicates and organize the final dataset for analysis.

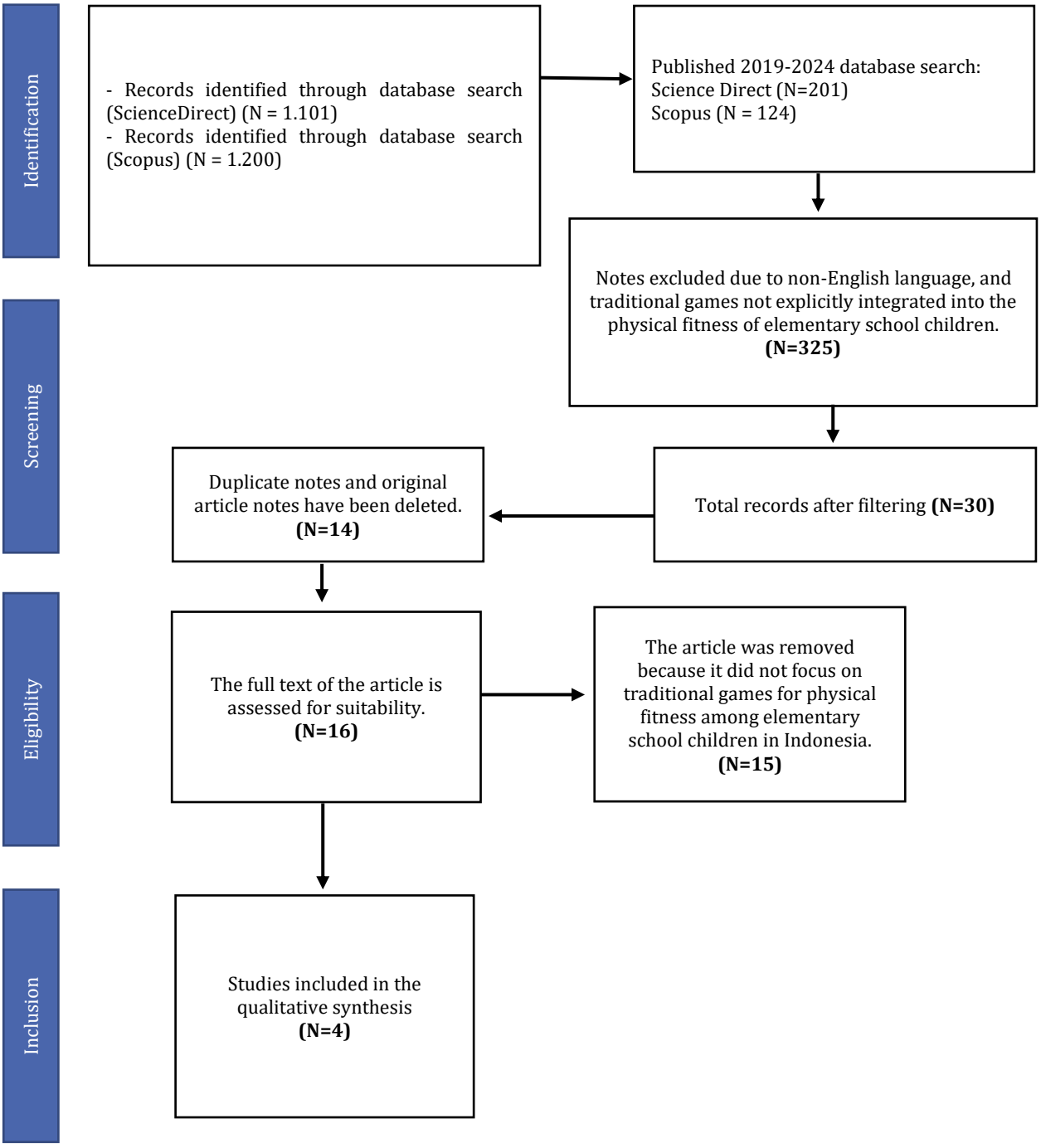

Figure 1. PRISMA Research Flow Diagram

RESULTS AND DISCUSSION

Results

Five analytical categories—excluding author and publication year—were used to organize the characteristics of the included studies. These categories consisted of: (1) research methods and study design, (2) content focus, (3) research objectives, (4) and key findings, as summarized in Table 1. The country category was omitted because all selected studies were conducted in Indonesia. A detailed summary of the articles reviewed is presented in Table 1.

Table 1. Summary of Articles on Traditional Games for Physical Fitness

Authors	Method and Research Design	Content	Research Purpose	Findings
Septianto et al. (2024)	Quantitative, experimental, one-group pretest–posttest	Traditional games: *gerobak sodor*, *jaring ikan*, and *balap balon*	To improve students' abilities and enhance physical fitness using traditional games	Significant improvements in students' physical fitness after participating in traditional game–based learning
Agus Riyadi et al. (2021)	Quantitative, experimental, two experimental groups	Traditional games: *gobak sodor* and *bentengan*	To examine the effects of *gobak sodor* and *bentengan* training on physical fitness among grade V and VI elementary students	Both games significantly improved physical fitness, with *bentengan* showing greater effectiveness
Yovira et al. (2023)	Quantitative, experimental, 2×2 factorial design	Traditional games vs. small games	To determine which game-based method is more appropriate for developing PE learning programs targeting physical fitness	Both methods positively influenced physical fitness, but modified small games produced greater improvement
Rizki et al. (2022)	Quantitative, classroom action research	Traditional game: *bentengan*	(1) To describe the implementation of *bentengan* in PE instruction, and (2) to evaluate its contribution to students' physical fitness	Implementation of *bentengan* improved student fitness, rising from 86% in Cycle I to 90% in Cycle II

Discussion

Traditional games have long been integrated into physical education practices in Indonesia and continue to play a strategic role in promoting children's physical fitness and fundamental motor development. Recent studies have implemented a variety of traditional game–based learning models, including gerobak sodor, jaring ikan, and balloon racing (Septianto et al., 2024); gobak sodor and bentengan (Agus Riyadi et al., 2021); traditional and small-game designs (Yovira et al., 2023); and the benteng game (Rizki et al., 2022). Despite this diversity, the overall consensus indicates that traditional games constitute an effective learning approach for enhancing children's physical fitness. However, previous evidence also suggests that not all interventions generate equally valid or significant outcomes. Earlier findings noted improvements in students' motor skills, body balance, and physical fitness (Kusuma et al., 2021), which may be attributed to the collaborative and enjoyable nature of traditional games, their use of simple equipment, and the embedded cultural values that support meaningful learning experiences (Suryadi et al., 2024).

Traditional children's games are believed to contain movement elements that align with developmental needs, particularly in fostering fundamental motor skills (Suryadi et al., 2024). This aligns with pedagogical recommendations emphasizing that learning activities for elementary-age children must be grounded in developmental appropriateness (Kostelnik, Soderman, & Whiren, 2017). The literature further highlights that traditional games not only enhance physical fitness but also contribute to motor skill development and movement proficiency (Harianto et al., 2023). For example, interventions using gerobak sodor, jaring ikan, balloon racing, gobak sodor, and bentengan have consistently shown significant post-treatment improvements in students' fitness levels (Septianto et al., 2024; Agus Riyadi et al., 2021). Comparative evidence even indicates that bentengan training yields greater improvements than gobak sodor, although both games positively influence students' fitness (Agus Riyadi et al., 2021).

Additional studies broaden the discussion by examining the effectiveness of traditional games versus small-game designs. While both approaches improve physical fitness, modified small-game designs appear to be more impactful because they allow adaptation to students' characteristics and

needs (Yovira et al., 2023). Similarly, the implementation of the bentengan game has demonstrated substantial learning gains, with student fitness scores increasing from 86% in the first cycle to 90% in the second cycle (Rizki et al., 2022). These findings collectively illustrate that traditional games remain a relevant and pedagogically rich approach for physical education in Indonesia.

This article aims to systematically review scientific literature focusing on elementary school students' physical fitness outcomes through traditional game–based learning in Indonesia. To achieve this objective, the review categorizes findings based on (i) authors and publication year, (ii) research methods, (iii) learning content, (iv) research objectives, and (v) research outcomes. A country-based category is excluded because all included studies were conducted in Indonesia. Prior studies further reinforce the value of traditional games, highlighting their capacity to enhance students' understanding, movement skills, and enjoyment (Gustian, 2021). Other documented benefits include increased body awareness, spatial awareness, movement quality, and the relationship between bodily capabilities and movement (Abels & Bridges, 2010), improved academic achievement mediated by cognitive development (Tandon et al., 2016), and better physical fitness, psychological health, and mental well-being (Lobstein et al., 2015).

Overall, the reviewed evidence underscores the strong potential of traditional games as an instructional model to stimulate physical fitness among children. Other researchers have also demonstrated that game-based instructional designs can promote game performance (Harianto et al., 2023), enhance physical fitness (Ahmad et al., 2023), and support children's motor development (Samodra et al., 2023). Game-based learning approaches have additionally shown benefits for children with special needs (Salam et al., 2023). However, this review acknowledges a key limitation related to database coverage, as the search was limited to a narrow set of indexed sources. Many reputable databases—such as Web of Science (WoS), Emerald, ERIC, and EBSCO (SPORTDiscus; Psychology & Behavioral Sciences Collection)—were not included, potentially restricting the comprehensiveness of the literature pool.

CONCLUSION

Based on the studies reviewed, various traditional games—such as gerobak sodor, jaring ikan, balloon racing, and bentengan—have been widely implemented in Indonesia through traditional game–based learning models. These games consistently contribute to improving students' physical fitness. This improvement is largely attributed to the characteristics of traditional games, which allow children to engage in cooperative play, utilize simple equipment, embrace culturally embedded values, and participate in enjoyable activities without pressure. Traditional games also contain movement elements that align with developmental needs, making them suitable for enhancing fundamental motor skills. Furthermore, game-based learning using traditional games has been shown to support the development of game performance, improve physical fitness, and generate positive effects on children's motor development. However, this review acknowledges a limitation regarding the databases used. A broader range of reputable sources—such as Web of Science (WoS), Emerald, ERIC, and EBSCO (SPORTDiscus and Psychology & Behavioral Sciences Collection)—could provide a more comprehensive evidence base. Therefore, future studies should continue to expand this line of inquiry through global literature reviews or mapping studies (including bibliometric and scientometric analyses), as well as further investigations into the application of traditional game–based models and their impacts.

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AUTHOR CONTRIBUTION STATEMENT

DS is responsible for the article manuscript and conducting data searches in various databases, while DIV and ZZ assist in analyzing and separating data and finalizing data.

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