



Traditional games and motor and cognitive development in children with disabilities: A narrative review

Permainan tradisional dan perkembangan motorik serta kognitif pada anak penyandang disabilitas: Tinjauan literatur naratif

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ABSTRACT

Background: Indonesian traditional games have potential as culturally relevant learning activities in adapted physical education for children with disabilities. However, evidence regarding their contributions to motor and cognitive development remains fragmented.

Objective: This review aimed to examine and synthesize evidence on the role of Indonesian traditional games in supporting motor and cognitive development among children with disabilities.

Methods: A narrative literature review was conducted using a thematic narrative synthesis. Relevant literature was identified through Google Scholar, Scopus, and reference screening. Six primary studies published between 2014 and 2025 were examined according to participant characteristics, game types, study designs, outcome measures, and empirical findings.

Results: Four studies employed research and development designs, one used classroom action research, and one adopted a qualitative approach. The findings indicated favorable trends in gross motor skills, particularly locomotor performance, balance, and coordination. A study involving the traditional Sikodoka game reported an increase in motor skill achievement from 38% at baseline to 95% after the second intervention cycle. Another study reported a reduction in running test time from 11.12 to 9.24 seconds following a traditional game-based intervention. However, most studies had methodological limitations, and none directly assessed cognitive function using specific validated measures.

Conclusion: Indonesian traditional games show promise for supporting motor development and providing culturally relevant activities in adapted physical education. Nevertheless, evidence regarding cognitive benefits remains insufficient. Future research should employ controlled designs, validated motor and cognitive assessments, and longitudinal follow-up.

ABSTRAK

Latar belakang: Permainan tradisional Indonesia berpotensi digunakan sebagai media pembelajaran pendidikan jasmani adaptif untuk mendukung perkembangan anak penyandang disabilitas. Namun, bukti mengenai kontribusinya terhadap kemampuan motorik dan kognitif masih beragam dan belum terintegrasi secara memadai.

Tujuan: Penelitian ini bertujuan meninjau dan menyintesis bukti mengenai peran permainan tradisional Indonesia dalam mendukung perkembangan motorik dan kognitif pada anak penyandang disabilitas.

Metode: Penelitian menggunakan pendekatan narrative literature review dengan sintesis naratif-tematik. Literatur ditelusuri melalui *Google Scholar*, *Scopus*, dan pemeriksaan referensi yang relevan. Enam penelitian utama yang diterbitkan pada 2014–2025 ditelaah berdasarkan karakteristik peserta, jenis permainan, desain penelitian, indikator hasil, dan temuan empiris.

Hasil: Empat penelitian menggunakan desain pengembangan, satu penelitian tindakan kelas, dan satu penelitian kualitatif. Sintesis menunjukkan kecenderungan positif pada keterampilan motorik kasar, terutama kemampuan lokomotor, keseimbangan, dan koordinasi. Penerapan permainan Sikodoka menunjukkan peningkatan persentase pencapaian motorik dari 38% pada prasiklus menjadi 95% pada siklus kedua. Penelitian lain melaporkan penurunan waktu tes berlari dari 11,12 menjadi 9,24 detik setelah penerapan model permainan tradisional. Namun, sebagian besar penelitian memiliki keterbatasan desain, dan belum ditemukan pengukuran fungsi kognitif secara langsung.

Kesimpulan: Permainan tradisional Indonesia berpotensi mendukung perkembangan motorik dan menjadi alternatif pembelajaran adaptif berbasis budaya. Bukti mengenai manfaat kognitif masih belum memadai. Penelitian selanjutnya diperlukan dengan desain terkontrol, instrumen tervalidasi, dan evaluasi jangka panjang.

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Highlights

- ✓ Indonesian traditional games show promising benefits for gross motor development in children with disabilities, particularly locomotor skills, balance, and coordination.
- ✓ Adaptations to game rules, movement demands, and instructional support facilitate the use of traditional games in adapted physical education.
- ✓ Evidence of cognitive benefits remains insufficient, highlighting the need for controlled studies using validated motor and cognitive assessments.

Introduction

Inclusive education requires instructional approaches that accommodate the diverse characteristics, needs, and abilities of learners, including children with disabilities. One of the major challenges in educating this population is providing learning activities that not only promote participation but also support motor and cognitive development. Children with intellectual disabilities or certain developmental disorders may experience difficulties with motor coordination, balance, motor skill acquisition, attention, decision-making, and everyday activities. Addressing these challenges requires adaptive instructional strategies that account for individual characteristics, task demands, and learning environments. [An et al. \(2024\)](#) demonstrated that adapted physical activity interventions for children with disabilities target multiple domains, including body functions, activities, and participation. Similarly, [Lai et al. \(2020\)](#) highlighted the potential benefits of physical activity interventions for this population while acknowledging limitations in the generalizability and long-term sustainability of their effects. These findings underscore the continuing need to develop inclusive, adaptable, and developmentally appropriate instructional approaches within adapted physical education.

Motor and cognitive development are closely related domains that contribute to children's learning abilities and everyday functioning. Motor development encompasses gross and fine motor skills that enable children to perform activities such as walking, running, jumping, maintaining balance, and coordinating body movements. Cognitive development, meanwhile, involves mental processes such as attention, working memory, inhibitory control, cognitive flexibility, and problem-solving. In a systematic review of motor skill interventions involving children and adolescents with intellectual disabilities, [Maïano et al. \(2019\)](#) reported positive findings, particularly for balance and overall fundamental movement skills, although evidence regarding locomotor skills remained inconsistent. Regarding cognitive outcomes, [Shi et al. \(2024\)](#) conducted a meta-analysis of 23 studies involving 990 children with neurodevelopmental disorders and found that physical exercise significantly improved inhibitory control, working memory, and cognitive flexibility. Similarly, [Leahy et al. \(2025\)](#), in a meta-analysis of 33 studies involving 1,454 children and adolescents with disabilities, reported a positive effect of school-based physical activity interventions on cognitive outcomes (Hedges' $g = 0.42$; 95% CI: 0.22–0.62). Collectively, these findings suggest that appropriately designed physical activities may support motor development and specific aspects of cognitive functioning, although their benefits may vary depending on participant characteristics, activity types, and outcome measures.

Game-based learning represents a promising instructional approach for supporting motor skill development. This

approach allows children to acquire and refine movement skills through structured, enjoyable activities tailored to their abilities. [Darussalam et al. \(2025\)](#) conducted a quasi-experimental study involving 36 primary school students to compare individually delivered fun games, group-based fun games, and conventional instruction. Following a seven-week intervention, both game-based groups demonstrated significant improvements in gross motor skills compared with the control group ($p < 0.05$), with outcomes varying according to how the activities were delivered. Further evidence was provided by [Schiff and Supriady \(2026\)](#), who implemented an eight-week jump-rope play program involving 30 preschool children. Their findings revealed an increase in mean locomotor skill scores from 23.30 to 27.87, representing a 19.61% improvement following the intervention. Despite these encouraging findings, neither study specifically involved children with disabilities or directly assessed cognitive outcomes. Consequently, although these studies provide empirical support for the potential of game-based learning to enhance motor development, their findings cannot be directly generalized to children with disabilities.

Another development in game-oriented pedagogy is gamification, which involves incorporating game-design elements into learning environments to enhance motivation, engagement, and educational experiences. Through a bibliometric analysis of 47 Scopus-indexed publications examining gamification and social skills in physical education, [Rusdiyanto and Kurniawan \(2025\)](#) identified five major research clusters: gamification in education, digital game-based learning, collaborative learning, emerging technologies, and motivation. Their findings highlighted the need for further research into game-oriented approaches in physical education, particularly research that considers learner diversity and sociocultural factors. More recently, [Cereda \(2026\)](#) conducted a cluster randomized controlled trial involving 210 Italian adolescents to evaluate a 12-week gamified physical education intervention. Compared with conventional instruction, the intervention produced greater improvements in perceived sports competence ($d = 0.65$), physical self-worth ($d = 0.58$), and enjoyment of physical activity ($d = 0.82$). Although gamification differs conceptually and practically from traditional games, these studies emphasize the importance of enjoyable, engaging, and participatory learning experiences in contemporary physical education. Nevertheless, the extent to which these pedagogical principles apply to traditional games involving children with disabilities remains insufficiently understood.

In Indonesia, traditional games represent an important component of cultural heritage and offer considerable potential as instructional activities in adapted physical education. Games such as engklek, bentengan, gobak sodor, and lompat tali incorporate movement tasks that require coordination, balance, motor control, rule comprehension, decision-making, and social interaction. Their characteristics also allow adaptations through modifications to rules, equipment, playing areas, task difficulty, and instructional support. [Ardiyanto and Sukoco \(2014\)](#) developed a traditional game-based instructional model designed to support gross motor development among children with mild intellectual disabilities. Similarly, [Setyaningsih et al. \(2023\)](#) implemented a modified version of engklek to enhance motor skills in children with intellectual disabilities. These studies suggest that Indonesian traditional games have pedagogical value beyond cultural preservation, providing potentially adaptable movement-based learning experiences for children with disabilities.

Previous empirical studies have provided preliminary evidence regarding the application of traditional games among children with disabilities. [Ardiyanto and Sukoco \(2014\)](#) developed eight traditional game-based instructional models for children with mild intellectual disabilities through a research and development approach involving small- and large-scale trials. Expert evaluations and teacher assessments indicated that the proposed models were suitable for teaching gross motor skills. Subsequently, [Setyaningsih et al. \(2023\)](#) investigated a modified engklek game using a single-group pretest–posttest design. Their study reported statistically significant improvements in motor performance among children with intellectual disabilities, although the absence of a control group limited causal interpretation. In contrast, [Aflahudin and Nurharsono \(2023\)](#) employed a qualitative approach to explore the social behavior of children with special educational needs during traditional games, including engklek, bentengan, watu pitu, klerengan, jombretan, and kalengan. Their findings highlighted social interaction and communication; however, the study did not directly assess changes in motor performance or cognitive functioning. More recently, [Mustara et al. \(2025\)](#) developed a traditional game-based instructional model targeting fundamental running skills in students with mild intellectual disabilities. Their effectiveness evaluation revealed a significant improvement in running performance following the intervention ($t = 4.388$; $p < 0.05$). Taken together, these Indonesian studies suggest that traditional games may offer valuable opportunities for adapted learning. Nevertheless, existing research has primarily focused on specific motor outcomes, instructional model development, and social behavior rather than providing integrated evidence of motor and cognitive development.

International research offers additional evidence regarding the benefits of structured physical activities for children with disabilities. [Zolghadr et al. \(2024\)](#) evaluated an eight-week mini-basketball training program involving 30 children with intellectual disabilities and developmental coordination disorders. Compared with regular physical education, the intervention produced a significant difference in overall motor coordination scores ($F = 27.37$; $p = 0.001$). Similarly, [Punar and Şevgin \(2024\)](#) conducted a randomized controlled trial involving 38 children with specific learning difficulties to examine the effects of goal-directed perceptual-motor exercises. Their findings demonstrated significant improvements in attention ($p < 0.001$; Cohen's $d = 1.080$) and motor skills ($p < 0.001$; Cohen's $d = 1.091$) within the intervention group. These studies indicate that structured movement activities may support motor performance and selected cognitive outcomes among children with developmental difficulties. However, neither intervention specifically involved Indonesian traditional games. Therefore, their findings do not directly explain how the distinctive characteristics, activity adaptations, and sociocultural contexts of Indonesian traditional games may relate to motor and cognitive development in children with disabilities.

Despite these encouraging findings, several research gaps remain. First, studies examining traditional games among children with disabilities in Indonesia have generally investigated instructional model development, motor performance, and social behavior as separate outcomes ([Ardiyanto & Sukoco, 2014](#); [Setyaningsih et al., 2023](#); [Aflahudin & Nurharsono, 2023](#); [Mustara et al., 2025](#)). Studies directly assessing cognitive functioning in the context of Indonesian traditional games remain insufficiently represented in the literature identified. Second, although game-based interventions have demonstrated positive motor outcomes among children without disabilities ([Darussalam et al., 2025](#); [Schiff & Supriady, 2026](#)), differences in participant characteristics limit the direct applicability of these findings to children with disabilities. Third, international studies have documented improvements in motor coordination, attention, motivation, and selected psychological outcomes following physical activity and game-

oriented interventions ([Zolghadr et al., 2024](#); [Punar & Şevgin, 2024](#); [Cereda, 2026](#)). However, these interventions do not specifically reflect the characteristics of Indonesian traditional games. Fourth, although [Rusdiyanto and Kurniawan \(2025\)](#) mapped research trends in gamification and social skills within physical education, their bibliometric analysis did not specifically evaluate empirical evidence concerning traditional games and motor and cognitive development among children with disabilities. These gaps highlight the need for a literature review that integrates findings from Indonesian traditional game studies with international evidence on motor and cognitive development while critically examining the relevance, limitations, and transferability of findings across populations and educational contexts.

The distinctive contribution of the present study lies in its narrative synthesis of research on Indonesian traditional games, integrating three interconnected dimensions: game characteristics, instructional adaptations for children with disabilities, and motor and cognitive developmental outcomes. Unlike previous studies that have primarily focused on developing or evaluating individual games, this review seeks to compare findings across different investigations and identify the developmental domains supported by empirical evidence. Importantly, it distinguishes directly measured motor and cognitive outcomes from social skills, which may represent additional benefits of game-based activities. International literature on physical activity interventions, game-based learning, and gamification is also incorporated as a comparative framework to clarify the potential applications and limitations of these approaches within the cultural context of Indonesian traditional games. Through this perspective, the review aims to advance understanding of traditional games not merely as cultural practices but as potentially valuable instructional resources in adapted physical education.

Accordingly, this study aims to review and synthesize the literature on the role of Indonesian traditional games in supporting motor and cognitive development among children with disabilities through a narrative literature review. Specifically, it seeks to identify the types of traditional games employed, the characteristics of the populations studied, the instructional adaptations implemented, the motor and cognitive outcomes assessed, and the consistency and limitations of existing evidence. The review is expected to contribute theoretically by providing a more integrated understanding of the relationships between traditional game characteristics and developmental outcomes. From a practical perspective, its findings may inform physical education teachers, inclusive education practitioners, and instructional program developers in selecting and adapting traditional games to meet individual learning needs. Furthermore, the review seeks to identify priorities for future research, particularly controlled intervention studies that employ validated motor and cognitive assessments, account for disability-related characteristics, and adopt more rigorous methodological designs.

Materials and Methods

Study Design

This study employed a narrative literature review approach to examine and synthesize research findings on the use of traditional games as instructional activities to support motor and cognitive development in children with disabilities. This approach was selected because it allows for the integration, interpretation, and critical examination of evidence from studies with diverse participant characteristics, research designs, interventions, and outcome measures. Unlike systematic literature reviews, which emphasize comprehensive literature searches and study selection procedures guided by predefined protocols, narrative reviews focus on developing conceptual understanding, identifying patterns across studies, and critically interpreting the available evidence ([Grant & Booth, 2009](#); [Ferrari, 2015](#)). The review was informed by the quality assessment principles outlined

in the Scale for the Assessment of Narrative Review Articles (SANRA), particularly those concerning the justification and objectives of the review, literature search methods, referencing accuracy, scientific reasoning, and the appropriate presentation of supporting evidence (Baethge et al., 2019).

Literature Sources and Search Strategy

Relevant literature was identified through searches of Google Scholar and Scopus, focusing on publications addressing traditional games, adapted physical education, motor development, and cognitive functioning in children with disabilities. The database searches were supplemented by screening the reference lists of relevant publications to identify additional studies. ResearchGate was used as a supplementary platform to locate publications and facilitate access to full-text articles rather than as a primary bibliographic database. Searches were conducted using combinations of English-language keywords, including traditional games, indigenous games, play-based learning, adaptive physical education, children with disabilities, special educational needs, intellectual disabilities, motor skills, motor development, cognitive skills, and cognitive development. Indonesian search terms included *permainan tradisional*, *anak penyandang disabilitas*, *anak berkebutuhan khusus*, *pendidikan jasmani adaptif*, *perkembangan motorik*, and *kemampuan kognitif*. Search terms were combined using the Boolean operators AND and OR, with search strategies adapted to the characteristics and search functions of each database. The literature search was conducted up to August 15, 2025. No strict publication-year restrictions were applied to ensure that foundational studies on Indonesian traditional games could be considered alongside more recent research. Publications were selected based on their relevance to the review objectives, source traceability, and scientific contribution, consistent with recommendations for conducting narrative literature reviews (Green et al., 2006; Ferrari, 2015).

Literature Selection Criteria

The literature was classified into two categories: primary studies and supporting literature. Primary studies comprised original research articles that directly investigated or described the application of Indonesian traditional games among children with disabilities, including those with intellectual disabilities and other clearly identified developmental conditions. Priority was given to studies reporting participant characteristics, types of traditional games or game modifications, instructional procedures, and motor and/or cognitive outcomes. Experimental, quasi-experimental, descriptive, qualitative, and research and development studies were considered eligible when their objectives and findings aligned with the scope of the review. Studies that did not involve children with disabilities, did not examine traditional games, or failed to provide relevant outcome information were excluded from the primary study category. Supporting literature included international research on adapted physical activity, game-based learning, motor development, cognitive functioning, and gamification. These publications were used to establish the conceptual framework, explore potential underlying mechanisms, and contextualize the findings rather than as direct evidence of the effectiveness of Indonesian traditional games among children with disabilities.

Literature Selection and Data Extraction

Literature selection was conducted in stages by screening titles, abstracts, and full texts to assess their relevance to the review objectives. Duplicate records, publications that did not meet the target population criteria, and studies unrelated to the primary research focus were excluded from the primary study set. Eligible publications were subsequently examined to extract relevant methodological characteristics and reported outcomes. Extracted information included author names and publication years, study designs, participant characteristics and sample sizes,

disability types, traditional games examined, instructional adaptations, assessment instruments, and research findings. Where available, quantitative data, including means, changes in scores, test statistics, effect sizes, and significance levels, were extracted as reported in the original publications. Information not explicitly provided by the original authors was neither assumed nor reconstructed. The review also considered the methodological appropriateness of the conclusions drawn in each study, particularly by distinguishing between research and development studies, descriptive investigations, and intervention studies.

Data Analysis and Narrative Synthesis

The extracted evidence was analyzed using a descriptive qualitative approach through a thematic narrative synthesis. Findings were organized into three primary themes: (1) the characteristics and implementation of traditional games as adapted instructional activities, (2) motor development outcomes, and (3) cognitive development outcomes. Findings related to social skills, motivation, and student engagement were considered supplementary outcomes when they contributed to understanding the educational applications of traditional games. Within each theme, studies were compared in terms of participant characteristics, intervention types, research designs, assessment instruments, and consistency of findings. The synthesis aimed to identify similarities, differences, potential underlying mechanisms, and limitations of the available evidence rather than merely summarizing the conclusions of individual studies. This approach is consistent with the principles of narrative reviewing, which emphasize the integration and critical interpretation of evidence from diverse sources (Green et al., 2006; Grant & Booth, 2009). Motor and cognitive outcomes were examined separately to avoid conflating improvements in movement performance, changes in social behavior, and directly measured cognitive development. As the review was not designed as a meta-analysis, no statistical pooling of effect sizes was performed. Conclusions were formulated by considering the consistency of findings, the methodological strengths and limitations of the included studies, and the extent to which the evidence could be generalized across children with diverse disabilities.

Results

Study Characteristics

This narrative review identified six relevant studies examining the use of traditional games as instructional activities for children with disabilities. Published between 2014 and 2025, these studies comprised five journal articles and one conference proceeding. Regarding research design, four studies employed a research and development (R&D) approach, one used classroom action research, and one adopted a qualitative design. Most studies focused on children with intellectual disabilities, while one involved children with autism. The diversity of research designs indicates that existing research on traditional games in adapted physical education has primarily emphasized the development and implementation of instructional models, with limited evidence from controlled intervention studies.

The traditional games examined included engklek, Sikodoka, hadang, bentengan, and terompah panjang, alongside various modified traditional games tailored to learners' individual needs. Some studies investigated specific games, whereas others developed instructional models incorporating multiple traditional activities. The assessed outcomes predominantly focused on gross motor skills, including walking, running, jumping, balance, and motor coordination. Variations in participant characteristics, game types, research designs, and assessment methods highlight the heterogeneity of the available evidence, which should be considered when interpreting the findings. The characteristics and key findings of the included studies are summarized in Table 1.

Table 1

Characteristics and Key Findings of Studies on Traditional Games among Children with Disabilities

Study (year)	Study design and participants	Traditional games	Outcomes assessed	Key findings
Ardiyanto & Sukoco (2014)	R&D; 6 children with mild intellectual disabilities in the small-scale trial and 12 in the large-scale trial	Eight games: <i>balap sarung</i> , <i>lempar karet</i> , <i>dorong ban</i> , <i>engkling</i> , <i>pukul balon</i> , <i>layang-layang</i> , <i>lompat tali</i> , and <i>pesawat terbang</i>	Feasibility of a traditional game-based instructional model for gross motor development	Expert and teacher evaluations indicated that the model was suitable for teaching gross motor skills
Oedjoe & Bunga (2016)	Classroom action research involving 3 children aged 7–9 years with intellectual disabilities	<i>Sikodoka</i>	Jumping, balance, throwing, and grasping skills	Motor skill achievement increased from 38% at baseline to 61% in Cycle I and 95% in Cycle II
Sari et al. (2020)	R&D; 10 children in the small-scale trial and 12 in the large-scale trial, involving children with mild intellectual disabilities	<i>Hadang</i> , <i>bentengan</i> , <i>istata</i> , and <i>terompah panjang</i>	Model feasibility and fundamental movement skills, particularly running	Mean running time decreased from 11.12 to 9.24 seconds following implementation of the model
Aziz et al. (2023)	Qualitative study involving young children with autism; sample size not clearly reported	<i>Dengklek</i>	Gross motor activities, including throwing, jumping, walking, and object retrieval	Observational findings suggested potential benefits for gross motor activity; no quantitative pre-post comparison was reported
Setyaningsih et al. (2023)	R&D with a single-group pretest-posttest assessment involving 7 children with intellectual disabilities	Modified <i>engklek</i> : zig-zag mountain and square patterns	Gross motor performance assessed through movement observation	Motor performance scores increased from 55% to 82% for the zig-zag pattern and from 49% to 84% for the square pattern
Mustara et al. (2025)	R&D; 50 participants across development stages, including 20 in the effectiveness assessment	Traditional game-based running activities	Running skill performance	Mean running skill scores increased from 60.0 to 64.9 points ($t = 4.388$; $p < 0.05$)

Table 2

Thematic Synthesis of Evidence on Traditional Games and Developmental Outcomes in Children with Disabilities

Theme	Relevant studies	Synthesis of findings	Limitations of evidence
Gross motor development	Oedjoe & Bunga (2016); Sari et al. (2020); Aziz et al. (2023); Setyaningsih et al. (2023); Mustara et al. (2025).	Several studies reported improvements in locomotor skills, including walking, running, jumping, and balance. Findings were based on performance assessments and qualitative observations.	Differences in study designs, assessment methods, and outcome measures limit comparability. Most studies lacked control groups, while qualitative studies did not quantify changes.
Development and adaptation of traditional games	Ardiyanto & Sukoco (2014); Sari et al. (2020); Setyaningsih et al. (2023); Mustara et al. (2025).	Traditional games were adapted through modifications to rules, movement patterns, task difficulty, equipment, and instructional support. Expert assessments and field trials supported their feasibility for specific populations.	Model feasibility does not necessarily establish intervention effectiveness. Evidence regarding long-term benefits and applicability across disability types remains limited.
Cognitive development	None of the six included primary studies directly assessed cognitive outcomes.	Traditional games may involve rule comprehension, attention, decision-making, and motor planning. However, these cognitive demands do not constitute evidence of improved cognitive functioning.	No direct assessments of attention, working memory, inhibitory control, cognitive flexibility, or other cognitive functions were reported in the included studies.
Social interaction as a supplementary outcome	Aziz et al. (2023); Aflahudin & Nurharsono (2023), as supporting literature.	Traditional games provided opportunities for social interaction, communication, and participation in group activities.	Findings were primarily descriptive. Social outcomes cannot be considered direct indicators of cognitive improvement.

Thematic Synthesis of Research Findings

The narrative synthesis of the included studies identified four key themes: gross motor development, the development and adaptation of traditional game-based instructional models,

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cognitive development, and social outcomes as supplementary findings. These themes were derived from the characteristics of the interventions, the outcomes assessed, and the findings reported across the included studies.

Overall, gross motor development was the most frequently investigated outcome. Several studies reported improvements in locomotor skills, balance, and motor coordination following participation in traditional games, while others provided evidence supporting the feasibility of modified instructional models tailored to learners' individual needs. In contrast, none of the six included primary studies directly assessed cognitive functioning. Therefore, the potential cognitive benefits of traditional games should be distinguished from the motor and social outcomes documented in the existing literature. The thematic synthesis of these findings is presented in [Table 2](#).

Motor Development Outcomes

The narrative synthesis indicates that gross motor skills have been the primary focus of research on traditional games involving children with disabilities. The available evidence suggests that traditional games incorporating locomotor movements and coordination tasks can be integrated into adapted physical education. Positive changes in motor performance have been reported following the implementation of Sikodoka, fundamental movement-based games, modified engklek, and traditional game-based running activities ([Oedjoe & Bunga, 2016](#); [Sari et al., 2020](#); [Setyaningsih et al., 2023](#); [Mustara et al., 2025](#)).

Although the reported findings generally indicate improvements in motor performance, direct comparisons across studies are limited by differences in assessment methods. [Oedjoe and Bunga \(2016\)](#) and [Setyaningsih et al. \(2023\)](#) reported percentage-based achievement scores, [Sari et al. \(2020\)](#) assessed running performance using completion time, and [Mustara et al. \(2025\)](#) evaluated running skills through performance scores. These differences in measurement scales and underlying constructs suggest that the findings should be interpreted as evidence of improvements in specific motor outcomes rather than as a single estimate of the overall effectiveness of traditional games across all motor skill domains.

Development and Adaptation of Traditional Games

Research and development studies suggest that implementing traditional games for children with disabilities requires adaptations tailored to participants' individual characteristics and abilities. Such modifications include adjustments to game structures, movement difficulty, equipment, and the provision of instructions and assistance during activities. [Ardiyanto and Sukoco \(2014\)](#) developed eight traditional game-based activities, whereas [Sari et al. \(2020\)](#), [Setyaningsih et al. \(2023\)](#), and [Mustara et al. \(2025\)](#) developed instructional models targeting specific movement skills.

Across studies, the findings indicate that developing game-based instructional models involves more than introducing variations in traditional games; it also requires aligning movement demands with participants' functional abilities. The feasibility of these models was generally evaluated through expert validation, teacher assessments, and field trials. However, not all studies incorporated comparison groups or follow-up assessments. Consequently, the available evidence provides stronger support for the feasibility of traditional games as adapted instructional activities than for establishing their causal effectiveness in improving motor outcomes.

Cognitive Development Outcomes

In contrast to motor development, evidence concerning cognitive outcomes remains limited. None of the six included primary studies directly assessed cognitive functioning using specific measures of attention, working memory, inhibitory control, cognitive flexibility, or problem-solving. Although certain traditional games involve understanding rules, making decisions, recalling movement sequences, and responding to changing game situations, engaging in these processes does not necessarily

demonstrate improvements in cognitive functioning following an intervention.

The absence of direct cognitive assessments highlights a gap between the theoretical potential of traditional games and the available empirical evidence. Accordingly, this review cannot establish whether traditional games produce measurable improvements in cognitive functioning among children with disabilities or identify which games may be most appropriate for targeting specific cognitive domains.

Social Outcomes as Supplementary Findings

Beyond motor development, several studies have highlighted the opportunities that traditional games may provide for social participation among children with disabilities. [Aziz et al. \(2023\)](#) reported enthusiasm and engagement among children with autism during dengklek activities. Similarly, [Aflahudin and Nurharsono \(2023\)](#) described social behaviors observed among children with special educational needs during traditional games, including peer interaction and communication.

These findings suggest that traditional games provide social learning opportunities relevant to adapted physical education. However, because the reported findings were primarily based on descriptive observations, the extent to which improvements in social skills can be attributed to the interventions remains unclear. Furthermore, social interaction and cognitive functioning represent distinct constructs and should therefore be evaluated using appropriate, domain-specific assessment methods.

Summary of the Narrative Synthesis

Overall, the reviewed studies indicate that Indonesian traditional games have been incorporated into instructional activities for children with disabilities, particularly those with intellectual disabilities. The strongest available evidence relates to the development of instructional models and gross motor outcomes. Several studies reported improvements in movement performance following traditional game-based activities, while research and development studies provided evidence supporting the feasibility of adapting these activities for use in adapted physical education.

Nevertheless, differences in study designs, participant characteristics, and outcome measures, together with the limited use of control groups, restrict conclusions regarding intervention effectiveness. Furthermore, the included primary studies did not provide sufficient direct evidence of improvements in cognitive functioning. These findings highlight the disparity between the empirical support for motor and cognitive outcomes and provide a basis for further critical examination in the Discussion section.

Discussion

This narrative review suggests that Indonesian traditional games have the potential to support motor development in children with disabilities, particularly locomotor skills, balance, and motor coordination. The findings also highlight the importance of adapting game-based activities to accommodate individual abilities and learning needs in adapted physical education. However, evidence regarding cognitive development remains limited, as none of the included primary studies directly assessed cognitive functioning. Traditional games may also provide opportunities for social interaction and participation in group activities, although these outcomes should not be interpreted as evidence of cognitive improvement. These findings underscore the need to distinguish between motor, cognitive, and social outcomes when evaluating the educational benefits of traditional games.

Motor Development through Traditional Games

The findings concerning motor development are consistent with those of [Oedjoe and Bunga \(2016\)](#), [Sari et al. \(2020\)](#), [Setyaningsih et al. \(2023\)](#), and [Mustara et al. \(2025\)](#), who reported

improvements in various motor skill indicators following traditional game-based activities. These findings align with the systematic review by Maïano et al. (2019), which reported improvements in balance and fundamental movement skills following motor interventions among children with intellectual disabilities, although evidence for certain locomotor skills remained inconsistent. Similarly, Zolghadr et al. (2024) demonstrated improvements in motor coordination following a structured mini-basketball program involving children with intellectual disabilities and developmental coordination disorders. Collectively, these findings suggest that structured movement activities may support motor development among children with developmental disabilities.

The potential motor benefits of traditional games may be explained by opportunities for repetitive movement practice, postural control, and coordination in response to game-specific demands. For example, engklek involves jumping and maintaining balance, whereas running-based games provide opportunities to practice locomotor skills. Indirect support for the value of play-based motor activities comes from Darussalam et al. (2025), who reported improvements in gross motor skills following fun game-based instruction, and Schiff and Supriady (2026), who observed improvements in locomotor performance after a jump-rope intervention. However, both studies involved children without disabilities, limiting the applicability of their findings to the population considered in this review. Furthermore, most included primary studies lacked control groups, meaning that the observed motor improvements may also have been influenced by maturation, physical activity outside the intervention, or previous learning experiences. Accordingly, these findings should be interpreted as preliminary evidence of potential benefits rather than definitive causal evidence.

Development and Adaptation of Traditional Games as Instructional Activities

Studies by Ardiyanto and Sukoco (2014), Sari et al. (2020), Setyaningsih et al. (2023), and Mustara et al. (2025) demonstrate how traditional games can be modified to accommodate the learning needs of children with disabilities. These adaptations may include simplifying rules, adjusting distances and movement patterns, modifying equipment, and providing instructions progressively. Such adjustments enable children to participate according to their motor abilities, comprehension of instructions, and individual support needs. This perspective is consistent with An et al. (2024), who emphasized the importance of considering body functions, activities, and participation when designing adapted physical activity interventions. Nevertheless, the feasibility of an instructional model, as established through expert validation and teacher evaluations, does not necessarily demonstrate its effectiveness. Further controlled evaluations are therefore needed to determine whether traditional game-based interventions produce greater improvements in motor performance than conventional instruction.

Potential Contributions of Traditional Games to Cognitive Development

A key finding of this review is the lack of sufficient direct evidence regarding the effects of traditional games on cognitive development among children with disabilities. Theoretically, traditional games involve mental processes such as understanding rules, remembering movement sequences, inhibiting responses, and making decisions. Diamond (2013) identified inhibitory control, working memory, and cognitive flexibility as core components of executive functioning that contribute to behavioral regulation and task performance. Traditional games may therefore provide opportunities for cognitive engagement by combining movement demands with information processing. However, the involvement of cognitive processes during an activity does not, in itself, demonstrate improvements in cognitive functioning following an intervention.

International research suggests that structured physical activities can positively influence certain cognitive functions. Shi et al. (2024) reported beneficial effects of physical exercise on executive functioning among children with atypical development, while Punar and Şevgin (2024) found improvements in attention and motor skills following perceptual-motor training among children with specific learning difficulties. Similarly, Leahy et al. (2025) reported positive effects of school-based physical activity interventions on cognitive outcomes among children and adolescents with disabilities. Nevertheless, these interventions differed from Indonesian traditional games, and their findings cannot establish the effectiveness of traditional games in improving cognitive functioning. Future research should therefore incorporate validated assessments of attention, working memory, and cognitive flexibility that are appropriate for the characteristics and abilities of the participants.

Social Interaction and Student Engagement as Supplementary Outcomes

Traditional games also have a social dimension, as they often involve group activities, communication, and shared rules. Aflahudin and Nurharsono (2023) described social behaviors among children with special educational needs during traditional games, while Aziz et al. (2023) reported engagement among children with autism participating in dengklek. These findings can be considered alongside those of Rusdiyanto and Kurniawan (2025), who identified collaborative learning and motivation as prominent themes in research on gamification in physical education. Cereda (2026) also reported improvements in perceived physical competence and enjoyment following gamified physical education instruction. However, gamification and traditional games are conceptually distinct approaches and should not be treated as equivalent interventions. Overall, factors such as motivation, baseline ability, disability characteristics, teacher support, rule complexity, and intervention duration may influence children's responses to traditional game-based activities. These factors warrant closer consideration because they may affect motor outcomes and social participation but were not adequately controlled in most of the included primary studies.

Clinical implications

The findings have practical implications for adapted physical education teachers, pediatric physiotherapists, occupational therapists, and other professionals supporting children with disabilities. Traditional games such as engklek and modified locomotor activities may be considered supplementary approaches for promoting coordination, balance, and movement skills according to each child's abilities. Game selection should be informed by baseline assessments, safety considerations, individual support needs, and clearly defined learning objectives. Modifications to rules, equipment, task difficulty, and instructional assistance should be introduced progressively, with developmental progress monitored using appropriate assessment tools. However, given the limited evidence concerning clinical effectiveness and cognitive benefits, traditional games should be regarded as complementary educational and therapeutic activities rather than substitutes for established evidence-based interventions.

Study limitations

This review has several limitations. First, the narrative review approach is susceptible to literature selection bias and does not guarantee that all relevant studies were identified. Second, the included studies varied considerably in research design, participant characteristics, game types, and assessment methods, limiting direct comparisons across findings. Third, most studies involved children with intellectual disabilities and lacked control groups, restricting causal interpretation and generalizability to other disability populations. Finally, none of the included primary studies directly assessed cognitive functioning, preventing firm conclusions regarding cognitive benefits. Future studies should

employ controlled intervention designs, validated motor and cognitive assessment instruments, and longitudinal follow-up assessments to establish the effectiveness and sustainability of traditional game-based activities across different disability populations.

Conclusions

This narrative review suggests that Indonesian traditional games have the potential to serve as culturally relevant instructional activities supporting motor development among children with disabilities, particularly locomotor skills, balance, and motor coordination. Traditional games adapted to participants' individual characteristics and abilities have shown promising outcomes in adapted physical education. However, empirical evidence regarding cognitive development remains insufficient because the reviewed studies did not directly assess cognitive functioning using validated instruments. Moreover, heterogeneity in study designs, small sample sizes, and the limited use of control groups restrict the strength of conclusions regarding intervention effectiveness. Traditional games may therefore be considered inclusive, culturally grounded, and adaptable instructional approaches, provided that their implementation is tailored to individual learning needs. Future research should prioritize controlled experimental designs, more representative samples, validated motor and cognitive assessments, and long-term follow-up to determine the effectiveness and sustainability of traditional game-based interventions for children with disabilities.

Author contributions

Conceptualization: U.A.A. and F.A.I.; Methodology: U.A.A., C.R.H., and F.A.I.; Investigation (literature search and study selection): U.A.A. and C.R.H.; Data curation (literature extraction and organization): U.A.A. and C.R.H.; Formal analysis: U.A.A. and C.R.H.; Validation: C.R.H. and F.A.I.; Supervision: F.A.I.; Writing – original draft: U.A.A. and C.R.H.; Writing – review & editing: U.A.A., C.R.H., and F.A.I. All authors have read and approved the final version of the manuscript and agree to be accountable for the accuracy and integrity of the work.

Ethical statement

Ethical approval was not sought because this study was conducted as a narrative literature review based exclusively on previously published research. The review did not involve the recruitment of human participants, the collection of primary data, or access to personally identifiable information. Accordingly, institutional research ethics committee approval was not applicable. The authors maintained academic integrity by appropriately acknowledging the original sources and accurately representing the findings of the included studies.

Informed consent

Not applicable.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) to assist with English translation, academic language editing, proofreading, improving readability, and structuring and drafting selected manuscript sections. The authors are responsible for independently verifying the accuracy of the references, reported findings, and scientific interpretations. All AI-assisted content must be critically reviewed and revised by the authors before submission. The authors take full responsibility for the accuracy, integrity, and final content of the manuscript.

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Conflicts of interest

The authors declare no conflicts of interest.

Data availability

All data supporting the findings of this narrative review were obtained from previously published studies cited in the manuscript. No new datasets were generated or analyzed. The information used for the narrative synthesis is presented in the article and its accompanying tables. Additional details regarding the literature extraction process are available from the corresponding author upon reasonable request.

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