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Traditional Indonesian Games as a Medium for Enhancing Gross and Fine Motor Skills in Preschool Children: A Systematic Literature Review

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Abstract

Early motor skill development is essential for socioemotional development, cognitive development, and physical preparedness. However, children's chances for sufficient motor stimulation have decreased in Indonesia due to shifting activity patterns and constrained play areas. A culturally grounded educational alternative that gives organic and comprehensive motor experiences is traditional Indonesian games. This study aims to summarize evidence on the potential of traditional games as inclusive and sustainable methods to support Indonesian children's development. This study used a Systematic Literature Review (SLR) in accordance with PRISMA 2020, looking for articles published between 2015 and 2025 using Scopus, Web of Science, ScienceDirect, and Google Scholar. Ten of the 1,222 records that were found satisfied the requirements for inclusion following screening and quality evaluation using the JBI checklist. Research demonstrates that games like engklek, gobak sodor, bentengan, congklak, and bekel regularly improve hand-eye coordination, muscular strength, agility, balance, and coordination. Significant improvements were seen in both the gross and fine motor domains throughout interventions spanning 4–8 weeks with two–three weekly sessions. Additionally, traditional games promote sensorimotor learning, social interaction, and intrinsic drive. Traditional games are an efficient, affordable, and culturally appropriate way to assist preschool motor development, despite the fact that many studies used quasi-experimental techniques with small sample sizes. These findings offer compelling evidence for its incorporation into national curricular efforts and early childhood education practices.

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INTRODUCTION

Early childhood (ages 3–6) motor development is a crucial basis for socioemotional, cognitive, and physical development. Children›s play, social interaction, and subsequent academic learning are supported by fundamental motor competence, which includes gross motor abilities (balance, coordination, agility, speed) and fine motor skills (manual dexterity, hand-eye coordination) (Artiluhung, 2025). Research shows that getting enough motor stimulation during this delicate time encourages lifetime physical activity and self-assurance when moving. (Risyanto, 2025). On the other hand, a lack of opportunities for vigorous play can impede the growth of balance, coordination, and spatial awareness (Rusandi et al. 2025).

In Indonesia, early childhood development faces challenges arising from reduced physical activity, urbanization, limited play spaces, and increasing screen dependency (Afriyuandi et al. 2025). These changes in behavior limit the opportunities for natural movement that are necessary for motor development. Preschool curriculum now prioritize character and cognitive abilities, but physical literacy and embodied learning are still underrepresented (Suhendra, Satria, and Nur, n.d.). This imbalance risks producing children with adequate academic readiness but limited movement competence a critical foundation for overall development (Satria, 2019).

Traditional Indonesian games offer an authentic and culturally grounded means of promoting holistic motor development (Satria 2018). These games such as engklek (hopscotch), gobak sodor, congklak, bekel, and egrang batok involve diverse movement challenges requiring running, jumping, balancing, throwing, and fine manipulation (Mudzakir et al. 2025). Children engage socially and emotionally while developing their coordination, agility, balance, and dexterity in playful circumstances. Traditional games are culturally transmitted types of play that foster communal identification, empathy, and teamwork (Yulianto 2025).

From a theoretical standpoint, the Dynamic Systems Theory of motor development provides a valuable framework for understanding how traditional play enhances motor competence (Mutohir 2004). This perspective argues that motor skills emerge from continuous interactions among neurological, musculoskeletal, perceptual, and environmental subsystems (Yulianto and Herdiyana 2025). Conventional games provide rich affordances for adaptive motor learning because they naturally generate a variety of movement demands, spatial dynamics, and social interactions. Similarly, traditional play naturally incorporates repetition, variability, and feedback three fundamental concepts of the Motor Learning Framework (Newell, 2020).

Empirical studies increasingly document the benefits of traditional games for improving gross and fine motor abilities in preschool children (Shorouk et al. 2025). 5–6-year-olds› balance and coordination have been proven to be significantly impacted by activities like hadangan and jump rope. However, it has been discovered that games like Bekel and Engklek improve hand-eye coordination and fine manipulation. Traditional games support social cohesiveness and emotional self-regulation in addition to their physical benefits, which is consistent with the integrated learning principles highlighted in the national early childhood curriculum (Komaludin et al. 2025).

The body of available literature is still dispersed and lacks a thorough synthesis, despite the increasing number of investigations. Drawing broadly applicable conclusions is challenging due to variations in research methodology, sample characteristics, and assessment procedures. The effects of traditional Indonesian games on toddlers› gross and fine motor development have not yet been compiled into a systematic review. The lack of synthesis makes it more difficult for educators and legislators to create evidence-based recommendations for incorporating cultural play into early learning settings. Furthermore, a lot of research lacks a clear theoretical foundation and primarily concentrates on results rather than the fundamental processes of motor learning. Because of this mismatch, research is less applicable to pedagogical practice and less in line with national curriculum frameworks. To map, evaluate, and interpret the available data in a rigorous and repeatable way, a systematic review that follows PRISMA 2020 guidelines is crucial (Page et al. 2021).

Therefore, the purpose of this study is to perform a thorough Systematic Literature Review (SLR) investigating the function of traditional Indonesian games in promoting the development of gross and fine motor skills in preschoolers between the ages of three and six. The review aims to achieve four main goals: (1) to determine which traditional games have been empirically studied; (2) to examine the features and results of the interventions; (3) to record theoretical and methodological trends; and (4)

to identify research gaps and their implications for educational practice (Asar et al. 2016). By including physical, social, and emotional learning through play, the review ultimately aims to improve culturally relevant motor-learning approaches that are in line with the objectives of the national early childhood curriculum. This study intends to educate educators, curriculum designers, and legislators on the potential of traditional games as inclusive, sustainable, and developmentally appropriate methods for promoting active, healthy, and talented Indonesian children by summarizing the available data. The novelty of this study lies in its systematic synthesis of empirical evidence from 2015–2025 using PRISMA 2020 and rigorous JBI quality appraisal, its detailed mapping of the specific motor contributions of various traditional games, and its identification of additional sensorimotor, social, and motivational benefits. This evidence-based perspective positions traditional games as culturally relevant and underexplored yet promising interventions for early childhood education.

METHOD

This study employed a Systematic Literature Review (SLR) design following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al. 2021). This form was used to offer a thorough, comprehensive, and organized synthesis of studies examining the ways in which traditional Indonesian games aid in the development of gross and fine motor abilities in preschoolers between the ages of three and six.

Four major academic databases-Scopus, Web of Science, ScienceDirect, and Google Scholar were thoroughly searched for publications published between January 2015 and October 2025. Boolean operators (AND, OR) were used to create the following keyword combinations: (”traditional games” OR ”folk games” OR ”traditional play” OR ”local games”) AND (”gross motor skills” OR ”fine motor skills” OR ”motor development”) AND (”preschool children” OR ”early childhood” OR ”3–6 years”) AND (”Indonesia” OR ”Southeast Asia”). This approach was created to guarantee thorough yet targeted coverage of research investigating traditional games as an intervention to promote early childhood motor skill development (**Table 1)**.

The selection of studies followed a structured three-stage process:

1. Identification: All retrieved records were compiled, and duplicate entries were removed.
2. Screening: Titles and abstracts were examined according to the predefined inclusion and exclusion criteria.
3. Eligibility: Full-text articles were reviewed to determine their methodological and contextual suitability.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Empirical research articles (quantitative, qualitative, or mixed-methods).	Conceptual or theoretical papers without empirical data.
Participants are preschool-aged children (3–6 years).	Studies involving populations outside preschool age (e.g., elementary students, adolescents).
Interventions involve traditional games (Indonesian or culturally similar).	Studies that do not explicitly measure motor skill variables.
Outcomes include gross motor skills and/or fine motor skills.	Duplicate articles or grey literature (theses, non–peer-reviewed proceedings).
Published in Scopus-, DOAJ-, or equivalent-indexed journals, in English or Indonesian.	

1,222 documents were found by searching Scopus, Web of Science, ScienceDirect, and Google Scholar. 987 distinct articles moved on to the first screening stage after duplicates were eliminated. 696 of these were eliminated during the title and abstract screening process because they did not correspond with the objectives of the study. After a full-text evaluation of the remaining 291 papers, 281 of them were disqualified for reasons such using inappropriate study methodologies, targeting people outside of the 3–6 age range, or not clearly operationalizing traditional games and motor-skill results. Ten papers ultimately satisfied all inclusion requirements and were added to the final review. **Figure 1** (PRISMA 2020 Flow Diagram) shows the entire selection process.

Formal ethical approval was not necessary because this study is a systematic review and does not directly include human or animal participants. Nevertheless, all phases of the review were conducted in accordance with the values of responsible research practice, academic honesty, and scientific transparency (Risyanto 2018). The review followed established ethical standards for the appropriate use, interpretation, and reporting of secondary data, ensuring methodological rigor, accuracy, and full respect for the contributions of original authors.

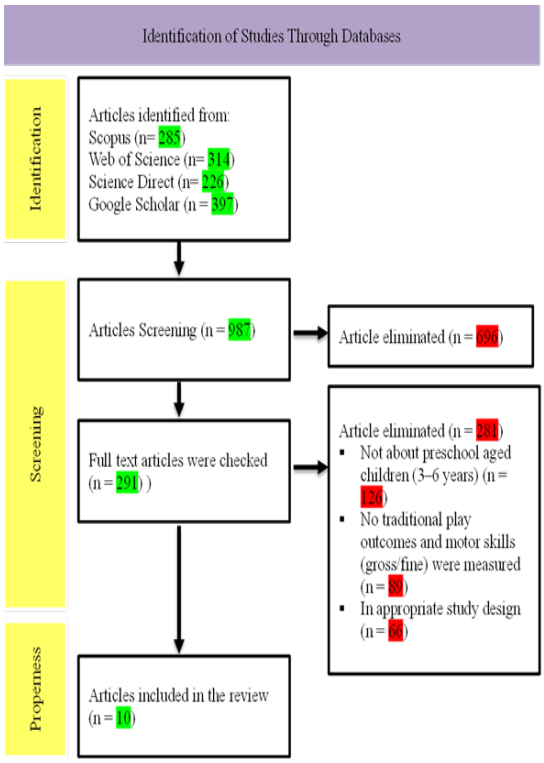

Figure 1. PRISMA Flow Diagram

RESULTS AND DISCUSSION

This systematic review compiles empirical research on how preschool-aged children's gross and fine motor skills are strengthened by traditional Indonesian games. Culturally based physical play was consistently found to be an effective and developmentally appropriate intervention in all ten of the studies that were examined. The body of research indicates that traditional games have a significant potential to assist basic motor development throughout a formative stage of childhood, despite differences in specific game genres, intervention duration, and research methodology.

It has been repeatedly demonstrated that classic whole-body games like Engklek, Gobak Sodor, Bentengan, Lompat Tali, and Galasin improve important gross motor skills like balance, agility, response time, power, and general coordination (Fadillah, Pos, and Azzahrawani 2024). These outcomes reflect well-established developmental principles emphasizing the value of dynamic, rhythmical, and sensorimotor-rich activities for neuromuscular development in early childhood (Risyanto 2024). Notably, the enhan-

Table 2. Results Summary of Findings from 10 Studies on Indonesian Traditional Games and Preschool Motor Development

Reference (Author, Year, journal)	Type of Traditional Game	Sample (Age)	Intervention Duration & Frequency	Motor Skill Parameters Measured	Key Findings
Litiloli (2025), Jurnal Penelitian, Pendidikan dan Pengajaran: JPPP	Engklek (hopscotch variant)	30 children aged 4–5	6 weeks, 3×/week	Dynamic balance, body coordination	Significant improvements in balance ($p < 0.05$) and bilateral coordination.
Fadillah (2024), Jurnal Intelek Dan Cendikiawan Nusantara (JICN)	Gobak Sodor (tag-based game)	28 children aged 5–6	8 weeks, 2×/week	Agility, running speed	Agility increased by 18%; reaction speed improved significantly.
Pratiwi (2020), VISI : Jurnal Ilmiah Pendidik dan Tenaga Kependidikan Pendidikan Non Formal	Congklak/Dakon (mancala-type game)	25 children aged 4–6	5 weeks, 3×/week	Fine motor skills (finger precision, grip control)	Significant increase in fine finger manipulation ($p < 0.01$).
Yuli Tri Andini (2022), JP2KG AUD (Jurnal Pendidikan, Pengasuhan, Kesehatan, dan Gizi Anak Usia Dini)	Jump Rope	32 children aged 4–5	6 weeks, 3×/week	Lower-limb power, timing & rhythm	Leg power improved by 22%; rhythmic coordination enhanced.
Divanie Normayulia Herlambang (2025), Hikmah: Jurnal Pendidikan Anak Usia Dini	Bekel (ball-and-jack game)	27 children aged 5–6	4 weeks, 3×/week	Fine motor skills (finger speed, hand–eye coordination)	Significant improvements in ball manipulation speed and hand–eye coordination.
Annisa Fathoni Abidah (2019), Kumara Cendekia: Jurnal Penelitian Pendidikan Anak Usia Dini	Bentengan (team-chase game)	35 children aged 5–6	6 weeks, 2×/week	Agility, speed, movement endurance	Improved agility; average running speed increased by 0.4 seconds.

Nuraya (2022), Jurnal Ilmiah Profesi Pendidikan	Traditional Bead-Stringing	22 children aged 4–5	5 weeks, 2×/ week	Fine motor skills (finger precision, wrist stability)	Significant improvements in finger precision and wrist control.
Elma Arlina (2022), JIIP (Jurnal Ilmiah Ilmu Pendidikan)	Gpbak sodor	40 children aged 5–6	8 weeks, 2×/ week	Eye–body coordination, reaction speed	Eye–body coordination increased by 15%.
Siti Mahyuni Harahap (2019). Jurnal Mutiara Pendidikan Indonesia	Mini Tug of War for Preschoolers	26 children aged 5	4 weeks, 3×/ week	Gross muscle strength, body stability	Significant increase in gross muscle strength ($p < 0.05$).
Melia Muslida Febri (2023), Jurnal Pendidikan Aura	Ular Naga (cooperative chase game)	33 children aged 4–6	6 weeks, 2×/ week	Agility, balance, social–motor interaction	Improvements in agility and balance; enhanced social–motor interaction.

cements in balance and coordination linked to Engklek therapies show how repeated hopping patterns increase postural control and proprioceptive regulation (Litiloli and Aisyah 2025). Such patterned movement sequences require anticipatory control, bilateral limb integration, and sustained balance all crucial for the development of more advanced locomotor abilities (Masudi, Oktori, and Humaira 2024). Similarly, the cognitive motor demands of Gobak Sodor and Bentengan activities rapid direction changes, constant opponent monitoring, and quick decision making have been shown to increase agility and response time (Beik and Dehghanizade 2021). These characteristics support emerging evidence that cognitively enriched movement tasks yield more effective motor learning than repetitive, isolated drills (Sutapa 2022).

Fine motor gains were most prominent in games centered on object manipulation such as Congklak, Bekel, and traditional bead-stringing activities (Triyaningsih 2025). These games demand bilateral hand use, fine finger control, and coordinated sequencing all necessary for scholastic skills like writing, cutting, and drawing. The enhancements in fine motor accuracy support the usefulness of culturally embedded manipulatives as reasonably priced and efficient substitutes for specialized fine motor training equipment (Guru 2013). Gains in hand eye coordination observed in Bekel and Congklak likely result from the need to synchronize visual tracking with rapid finger actions, enabling smoother performance of daily functional and early academic activities (Pratiwi 2020). Crucially, these activities may be used in a variety of preschool environments and require nothing in the way of resources. Some games foster social motor skills in addition to improving individual motor skills. For example, Ular Naga therapies improved interpersonal engagement, cooperative behavior, and group problem solving, illustrating the wider socio-emotional benefits of traditional play (Herman and Bachtiar 2018).

Intrinsic motivation seems to be a major mechanism behind these games' efficacy. They are entertaining and culturally recognizable, which promotes regular engagement and repeated practice conditions necessary for motor development. Even during comparatively brief intervention periods, the significant developmental gains may be explained by the high engagement rates recorded across trials (Ahmad et al. 2020).

However, a number of methodological constraints need to be taken into account. The strength of causal explanations is limited because the majority of studies used quasi-experimental designs without randomization. Small sample numbers further diminish statistical power and generalizability, underscoring the need for more thorough research in the future (Purwanto and Susanto 2018). Another problem is measurement inconsistencies. While some researchers employed proprietary instruments with little proof of validity or reliability, others used established motor tests. Such variability restricts the viability of performing meta-analyses and makes cross-study comparisons more difficult. Furthermore, it is challenging to ascertain if results were caused by the game itself or by contextual implementation factors due to inconsistent reporting of intervention fidelity, including facilitator training, adherence to protocols, and session quality. Transparency and replicability could be greatly improved by implementing reporting systems like TIDieR or CONSORT (Risyanto, n.d.).

Cultural distinctiveness has both benefits and drawbacks. The results are in favor of incorporating traditional games from Indonesia

into local curricula, but they might need to be modified for use in different cultural situations. Nevertheless, the motor skills used in these games jumping, grasping, chasing, and balancing are universal and might be applied to similar, culturally relevant activities in other contexts (Purnobasuki et al. 2024).

The review highlights the pedagogical value of traditional games from an educational standpoint. They provide developmentally appropriate physical challenges, promote active, multisensory engagement, and fit in well with play-based learning. In early learning settings, their cultural significance also promotes intergenerational continuity and identity formation. The results align with international guidelines from WHO and UNESCO, which emphasize the importance of culturally sensitive pedagogies and moderate-to-intense physical activity in early life. Conventional games meet both requirements, which makes them an effective tool for developing motor skills in early learning environments.

To sum up, traditional games from Indonesia are a flexible, captivating, and culturally relevant teaching tool that consistently improves preschoolers' gross and fine motor skills. The consistency of results across several research shows their potential as practical and long-lasting methods for promoting early motor development, even while methodological limitations require careful interpretation.

CONCLUSION

This systematic review provides compelling and consistent evidence that traditional games from Indonesia are useful and culturally appropriate ways to help preschool-aged children develop their gross and fine motor abilities. Improvements in balance, agility, coordination, hand-eye integration, muscular strength, and fine motor control were consistently reported in all ten of the included investigations. These results highlight how crucial it is to include culturally relevant play in early childhood education, particularly in resource-constrained environments. The overall findings demonstrate the instructional usefulness of traditional games even though the current body of data is limited by methodological problems such small sample sizes, non-randomized study designs, and inconsistent motor skill assessment techniques. To further understand how these games promote the development of motor skills, more research utilizing randomized controlled trials, standardized motor evaluation techniques, and more transparent reporting of intervention fidelity is required. All things considered, traditional games from Indonesia provide a useful, entertaining, and developmentally appropriate way to help young children acquire their fundamental motor skills.

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