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The Effect of Traditional Engklek on Gross Motor Development in 5–6-Year-Old Children at TK Pertiwi VII B

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Abstract

Gross motor development is a fundamental component of early childhood education because it reflects children's physical, cognitive, and socio-emotional readiness. This study aims to investigate the effect of the traditional *engklek* game on improving the gross motor skills of children aged 5–6 years. This quantitative study employed a pre-experimental one-group pretest–posttest design and was conducted at TK Pertiwi VII B, involving 15 Group B children. Data were collected through structured observation and documentation by focusing on four indicators: jumping on one foot, maintaining balance, body movement coordination, and agility. The *engklek* game intervention was implemented over six sessions. The results of the descriptive comparative analysis showed a positive shift in children's developmental categories after the intervention. Before the intervention, most children were below the expected developmental standard, with 4 children categorized as Not Yet Developing and 5 children categorized as Starting to Develop. After the intervention, no children remained in the Not Yet Developing category, the Starting to Develop category decreased to 3 children, while 8 children reached the Developing as Expected category and 4 children reached the Developing Exceptionally Well category. This study

concludes that the traditional *engklek* game can be effectively used as a physical stimulation medium to optimize gross motor development among young children. The findings contribute to early childhood education by highlighting the pedagogical value of traditional games as culturally relevant, engaging, and active learning media that may also help reduce the effects of sedentary lifestyles.

Keywords: Gross Motor Development; Early Childhood Education; Traditional Games; *Engklek* Game; Physical Stimulation

INTRODUCTION

Early Childhood Education (*Pendidikan Anak Usia Dini*/PAUD) occupies a strategic position as a foundation for optimizing child development during the golden age. Among the various aspects focused on stimulation, gross motor development is a fundamental domain that serves as the initial foundation for developing physical independence, cognitive maturity, and social and emotional adaptation (Amelia, 2024; Anggraini & Dwi, 2022). This development includes the child's ability to control large muscles to perform locomotor, non-locomotor, and manipulative movements in a coordinated manner (Amini *et al.*, 2020; Valensia *et al.*, 2025). For children aged 5–6 years, mastery of gross motor skills is an essential instrument for interacting with the environment and exploring space independently (Hurlock, 2014). Furthermore, the ability to control posture and maintain balance also has a correlation with children's readiness to learn at the elementary school level, considering that adequate physical activity contributes directly to focus and concentration on learning (Li *et al.*, 2022; Yusran *et al.*, 2026).

Although the urgency of gross motor development has been widely recognized, the current reality shows a decline in physical activity in early childhood due to the massive use of digital learning technology (Wahyuni *et al.*, 2024). This lifestyle change triggers a tendency towards sedentary behavior (sedentary lifestyle), where children spend more time in front of screens (screen time) and do less physical activity outdoors (Widiana *et al.*, 2022). This condition results in decreased body balance, weak motor coordination, and low levels of agility in children in responding to their surroundings (Hadi et al., 2023; Purwanto & Baan, 2022). If this physical activity deficit is left without structured pedagogical intervention, children are at risk of experiencing delays in gross motor development, postural abnormalities, and an increased risk of obesity from an early age (Wiriawan, 2022; Wouters *et al.*, 2020).

As an effort to mitigate the impact of a sedentary lifestyle, the use of traditional games has emerged as an alternative learning solution that is theoretically and culturally relevant (Kurniati, 2016). Traditional games represent play-based learning that preserves local wisdom while also demanding the involvement of comprehensive physical movement (Harianti *et al.*, 2024). One form of traditional game that suits the gross motor stimulation needs of children aged 5-6 years is hopscotch (Adpriyadi, 2017). This game is designed through a series of jumping routes using one foot and landing with two feet on a certain picture pattern (Sam et al., 2021). Repetitive activities in hopscotch effectively train body balance and maintain the center of gravity (Darmawati & Widyasari, 2022). In addition, the rules for throwing the game tool (gacuk) into the target box train eye, hand and foot coordination, as well as agility in maneuvering (Rais & Sit, 2024; R. N. Yusuf et al., 2022). Thus, hopscotch can function as a structured physical education instrument to train children's stability and movement agility.

Various previous literature has documented the effectiveness of traditional games in early childhood education. Qualitative research by Darmawati and Widyasari (2022) found that hopscotch specifically facilitates children's balance and physical endurance. Furthermore, Zuhra et al. (2022) used Research and Development (R&D) methods to prove the validity of the hopscotch circuit model in improving average physical development outcomes.

However, a literature review shows that most studies still focus on proving the effectiveness of hopscotch in general (macro) or are oriented towards developing the feasibility of learning media products. There is a research gap regarding the need for descriptive quantitative studies that specifically capture the dynamics of shifts in individual child development categories from Not Yet Developed (*Belum Berkembang*/BB) to Very Well Developed (*Berkembang Sangat Baik*/BSB) levels on specific kinesic indicators such as jumping, balance, coordination, and agility. Therefore, this study was designed to objectively describe the transition of gross motor development categories in children aged 5–6 years after the implementation of hopscotch game interventions in Pertiwi VII B Kindergarten. Practically, the results of this study are expected to enrich the empirical literature on local wisdom-based motor stimulation and serve as a reference for educators in revitalizing traditional games as functional physical activities in early childhood education institutions.

METHODS

This study used a quantitative approach designed to map changes in the level of gross motor skills in early childhood objectively and measurably. The experimental design applied was a Pre-Experimental Design with a One Group Pretest-Posttest Design. This design allows researchers to compare the level of children's kinesthetic skills before and after the intervention in a single experimental group, so that the changes that occur can be observed directly without using a control group (Cresswell, 2012; A. . Yusuf, 2016).

The research location was at Pertiwi VII B Kindergarten. This location was chosen based on initial observations that identified an urgent need to stimulate students' kinesthetic skills, characterized by unsteady body postures and a lack of equilibrium stability during locomotor activities. The research subjects involved 15 children in group B (preschool-ready age) with an age range of 5 to 6 years.

Primary data collection was conducted using two main instruments: observation and visual documentation. Observations were conducted in a structured manner using a gross motor development checklist focused on four specific mechanical indicators: (1) the ability to jump on one leg; (2) the ability to control body balance (center of gravity) statically and dynamically; (3) agility in jumping and changing direction; and (4) the ability to coordinate upper and lower body movements holistically. Documentation was used as a complementary technique to record the treatment process and provide visual evidence of the child's motor adaptation (Sugiyono, 2019, 2022).

The research procedure was carried out in three sequential phases. The first phase was the pretest, which was an initial measurement of the gross motor skills of 15 children using an observation sheet before the treatment was administered. The second phase was the treatment phase, in which the traditional hopscotch game activity was actively implemented into the children's daily physical routine (see Figure 1). This treatment was executed intensively and programmed over six regular meeting sessions. The repetitions during these six sessions were deemed sufficient to facilitate movement adaptation and habituation to the biomechanical loading demands of the hopscotch game rules (Abadi & Nugroho, 2024). The third phase is the Posttest, which is a re-assessment using an observation instrument identical to the pretest, carried out immediately after all interventions are completed to legally record the child's final achievements.

Figure 1. Geometric path pattern of the traditional hopscotch game and initial demonstration before children practice it independently.

The collected data was analyzed using descriptive statistics, specifically through percentage calculations and categorical shift comparisons. Achievement data from the observation sheets were converted into four strata of PAUD standard development categories: Not Yet Developing (*Belum Berkembang*/BB), Beginning to Develop (*Mulai Berkembang*/MB), Developing as Expected (*Berkembang Sesuai Harapan*/BSH), and Developing Very Well (*Berkembang Sangat Baik*/BSB). (Zuhra *et al*., 2022). The analysis focuses on comparative statistical descriptions of subject shift transitions between categories before and after treatment. Given the methodological limitation of the lack of individual numerical interval score data and a control group, this study did not apply inferential statistical tests, but rather was conducted entirely as a purely descriptive analysisto evaluate developmental category shifts objectively.

RESULTS

Gross motor skills measurements of 5-6 year-old children at Pertiwi VII B Kindergarten were conducted to map shifts in developmental outcomes before and after the traditional hopscotch game intervention. Based on observational data on indicators such as jumping on one leg, maintaining balance, motor coordination, and agility, positive changes were observed in the 15 study subjects. Table 1 presents a compilation of quantitative data related to these developmental outcomes.

Table 1. Distribution of Gross Motor Development Categories of Children Aged 5-6 Years Before and After Treatment

Development Category	Pretest (Before Treatment)	Posttest (After Treatment)	Gross Change (Number of Children)
Not Yet Developed (Belum Berkembang/BB)	4 children	0 child	Decrease (-4)
Beginning Developed(Mulai Berkembang/MB)	5 children	3 children	Decrease (-2)
Developing as Expected (Berkembang Sesuai Harapan/BSH)	4 children	8 children	Increase (+4)
Developing Very Well (Berkembang Sangat Baik/BSB)	2 children	4 children	Increase (+2)

Based on Table 1, the gross motor skill profile of children at the pre-test stage shows that the majority of subjects were still below the minimum developmental standard. Four children were in BB category and five in MB category. Mathematically, nine of the 15 children (60% of the population) had not demonstrated the expected basic postural stability or movement rhythm. At this stage, only four children achieved BSH category, and two children achieved the BSB category. Observation notes during the pretest indicated that the child's primary difficulty lay in his inability to support and balance his body weight while standing on one leg. This condition makes him prone to losing his upper body balance and hesitant when having to step or change direction agilely in a confined space.

After the hopscotch play intervention was implemented programmatically for six sessions, post-test data showed an increase in descriptive achievement. The number of children in BB category decreased to 0, indicating that all subjects had passed the lowest achievement threshold. The population in MB category also decreased to 3 children. Conversely, the population in the top two categories increased. The number of children meeting BSH criteria increased to 8 children, while the number of children achieving BSB category increased to 4 children. To specifically describe changes in children's gross motor behavior based on observational indicators. Table 2 illustrates a descriptive transition matrix before and after treatment. These observations are also supported by visual documentation of children's activities, which can be seen in Figure 2.

Table 2. Transition Matrix of Development Categories Based on Observation Indicators

Gross Motor Indicators	Description of Dominant Conditions During Pretest	Post-Treatment Transition Dynamics (6 Meetings)t Pretest	Pedagogical Observational Impact
Jumping on one leg	Most children are unsteady and often reflexively lower their second leg to find support so they don't fall.	The child is able to maintain a constant rhythm of one-legged jumps across several geometric squares.	There was an increase in lower leg muscle strength and repetitive motion endurance.
Maintaining balance	Children often stagger or lose their bearings when bending over, throwing or picking up toys (gacuk).	Stable upper body posture; the ability to control the body's center of mass while moving (dynamic balance) begins to form.	Reduction in BB category (to 0 children) indicates increased body balance control.
Coordination of body movements	The arm swing, eye gaze, and foot landing movements appear asynchronous (the jump misses the target).	Limb movement synchronization improves; child responds to hopscotch geometric patterns with appropriate steps.	The concentration of achievements in the BSH and BSB categories indicates an increase in bilateral coordination.
Agility of movement	Decisions to move between boxes are made slowly, hesitantly, and the execution of the movement looks stiff.	The body reversal maneuver and the completion time of the entire game pattern route are increased..	The level of joint flexibility and adaptive response time to changes in direction develop optimally.

Figure 2. Observation of motor achievement: Child demonstrates balance stability and leg muscle strength when jumping on one leg.

In aggregate, after the hopscotch intervention, a total of 12 children achieved optimal motor skills (a combination of the BSH and BSB categories). This achievement is an improvement compared to the pretest, where only 6 children were on the spectrum. This shift in data distribution provides descriptive evidence that structured physical stimulation through the traditional hopscotch game facilitates increased gross motor skill mastery in children aged 5–6 years.

DISCUSSION

The dynamics of the shift in the developmental category matrix presented in the research results reflect the motor adaptation capacity of children aged 5-6 years. The improvement of the majority of children in the substandard category (BB and MB) to being concentrated in optimal achievement (BSH and BSB) after six sessions, indicates that the hopscotch game effectively facilitates physical stimulation. Hopscotch has been proven to function not only as a means of recreation, but also works pedagogically in reconstructing and strengthening the foundation of children's gross motor skills that have not previously developed optimally (Zuhra *et al*., 2022). This discussion will examine the mechanisms for improving the four observation indicators of balance, one-legged hopping, motor coordination, and agility based on child development theory and contemporary research.

Improved Balance and Jumping Ability

The first analysis focused on indicators of maintaining body balance and the ability to jump on one leg. Based on initial observations, children in the BB category often failed when attempting to maintain posture while lifting one leg. This inability is thought to be related to the children's limited exposure to asymmetrical weight-bearing physical activity, which is common due to a predominantly sedentary lifestyle (Wahyuni *et al*., 2024).

When children regularly play hopscotch, they are pushed into a state of unstable equilibrium. The process of jumping from one square to another on one foot requires control of core muscle strength and joint stability to prevent falls (Dzakiyyah, 2024; Huzaifah, 2023). The repetition of the micro-adjustment process during these six sessions is focused on facilitating more efficient adaptation of the child's motor control (Ardiyanto & Mustafa, 2021; Valensia *et al*., 2025). This descriptive finding is in line with the research of Darmawati and Widyasari (2022) which emphasized that fulfilling the indicators for maintaining body equilibrium is the main achievement of playing hopscotch (Darmawati & Widyasari, 2022). The reduction in the population of children in the BB category to zero shows that this local play intervention is able to stimulate postural stability without causing psychological pressure on children (Sitepu *et al*., 2025).

Optimizing Motion Coordination and Spatial Navigation

Further analysis focused on improving indicators of body movement coordination. In the pretest, the majority of children exhibited asynchrony between arm swing, eye gaze, and foot landing. This indicates immaturity in bilateral coordination and the children's ability

to translate visual information into simultaneous muscle mechanical execution (Abadi & Nugroho, 2024; Amini *et al*., 2020; Valensia *et al*., 2025).

In the game of hopscotch, children are required to perform dual-tasking spatial navigation processing. First, they must throw the gacuk into a specific box, which stimulates visual-motor coordination between the eyes and hands. Second, they must plan a jump to avoid the box, ending with a 180-degree body rotation to land back on their feet (Rais & Sit, 2024; R. N. Yusuf et al., 2022). This mechanism requires integration between cognitive functions to remember rules and gross motor functions to control landing momentum (Sudaryanti *et al*., 2024; Wajib & Hamdiana, 2025). The success of 12 children in achieving the BSH and BSB passing levels post-intervention suggests the possibility that coordination barriers can be overcome through structured movement repetition. This finding supports the proposition that patterned locomotor physical stimulation facilitates more efficient movement rhythms in children (Sam *et al*., 2021) and reflects their increased spatial kinesthetic intelligence (Zuhra *et al*., 2022).

Developing Agility through Dynamic Play Activities

Substantial improvements were also seen in agility. At an early age, agility is a crucial locomotor prerequisite, serving to support independent exploration and prevent injury (Ardiyanto & Mustafa, 2021; Hadi *et al*., 2023; Puspitasari & Habibah, 2022; Valensia *et al*., 2025). The child's weak agility reflexes in the pretest stage are a reflection of passive behavior that limits the range of motion in the main joints (Wahyuni *et al*., 2024; Widiana *et al*., 2022).

Through hopscotch, children are stimulated to perform rapid transition maneuvers, such as changing their stance from a two-footed jump to a single footed one. The requirement to complete the game agilely without stepping on the line effectively trains the body's adaptive response. The decrease in the number of subjects in the MB category and the increase in the volume in the BSH and BSB categories provide empirical evidence that joint stiffness can be reduced through adequate movement intensity. This series of findings resonates with Kurniati's (2016) view that traditional games serve as a natural incubation space for the development of children's physical dexterity.

Practical Implications and Affective Aspects of Learning

The synthesis of these findings also needs to highlight the affective role of traditional games as instructional media (Sari & Silitonga, 2024; Wariyanti *et al*., 2022). The emotional involvement and joy of playing hopscotch act as intrinsic motivational drivers. The playful

elements and light competition encourage children to test their physical limits without tiring easily. It makes the retention of psychomotor learning more effective than formal gymnastics instruction, which often provokes resistance (Ayu *et al*., 2024; Baiti & Rahman, 2022; Hadi *et al*., 2023). It is what rationally explains why significant developmental category transitions can be achieved in just six consecutive treatment sessions.

Overall, this discourse strengthens the thesis that the implementation of traditional Indonesian games needs to be revitalized as a rational and functional physical education curriculum instrument to mitigate the degeneration of physical activity in future generations (Ardiyanto & Mustafa, 2021; Darmawati & Widyasari, 2022; Valensia *et al*., 2025). Empirical findings from a comparison of subject development at TK Pertiwi VII B demonstrate that providing a kinesthetic stimulation space through traditional games is a strategic educational step. This decision aligns with expectations for humanistic and holistic early childhood education (Amelia, 2024; Anggraini & Dwi, 2022).

CONCLUSION

This study shows that the implementation of the traditional game of hopscotch during six structured meetings has a positive and measurable impact on the gross motor skills of children aged 5–6 years at Pertiwi VII B Kindergarten, marked by the disappearance of subjects in the BB category, a decrease in MB category, and an increase in the number of subjects in BSH and BSB categories; these improvements are particularly visible in four essential indicators—jumping on one leg, maintaining balance, maneuvering agility, and bilateral coordination—confirming the pedagogical validity of traditional games as functional kinesthetic stimulation instruments to address movement deficits associated with a sedentary lifestyle, and indicating that local cultural heritage games can be empowered as physical activity interventions that are appropriate to the child's biological developmental stage; therefore, it is recommended that educators and Early Childhood Education (*Pendidikan Anak Usia Dini*/PAUD) institutions revitalize and integrate traditional active games into the daily curriculum as an economical, fun, and nature-oriented method of physical stimulation to build the foundation of children's overall motor skills.

REFERENCES

Abadi, A., & Nugroho, S. (2024). The effect of traditional game use on motor development: A meta-analysis. *International Journal of Physical Education, Sports and Health, 11*(4), 541–546. https://doi.org/10.22271/kheljournal.2024.v11.i4i.3470

Adpriyadi, A. (2017). Peningkatan Kemampuan Motorik Kasar melalui Permainan Tradisional Engklek pada Anak Kelompok B. *JPPM (Jurnal Pendidikan dan Pemberdayaan Masyarakat), 4*(2), 187–198. https://doi.org/10.21831/jppm.v4i2.10016

Amelia, N. R. (2024). *Upaya Meningkatkan Kemampuan Motorik Kasar melalui Permainan Tradisional Cak Engklek pada Anak Kelompok B TK Vita Sejahtera Sako Palembang* [Undergraduate thesis, Universitas Sriwijaya]. https://repository.unsri.ac.id/144732/

Amini, M., Sujiono, B., & Aisyah, S. (2020). *Hakikat Perkembangan Motorik dan Tahap Perkembangannya*. Pustaka UT. https://pustaka.ut.ac.id/lib/wp-content/uploads/pdfmk/PAUD4202-M1.pdf

Anggraini, D. D. (2022). *Perkembangan Fisik Motorik Kasar Anak Usia Dini*. CV Kreator Cerdas Indonesia.

Ardiyanto, D., & Mustafa, P. S. (2021). Upaya Mempromosikan Aktivitas Fisik dan Pendidikan Jasmani via Sosio-Ekologi. *Jurnal Pendidikan: Riset dan Konseptual, 5*(2), 169–177. https://doi.org/10.28926/riset_konseptual.v5i2.331

Ayu, A. N., Agustin, V. N., Fitriyani, A. I., Rafifah, R. A., Putri, D. Y., Puspitasari, W. O., & Nurrohim, A. (2024). Dampak Riba terhadap Pembangunan Ekonomi Berkelanjutan: Perspektif Islam dan Teknologi. *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial, 2*(5), 91–94. https://ojs.daarulhuda.or.id/index.php/Socius/article/view/1025

Baiti, N., & Rahman, M. A. (2022). Meningkatkan Kemampuan Motorik Kasar Anak melalui Kegiatan Senam Irama. *PrimEarly: Jurnal Kajian Pendidikan Dasar dan Anak Usia Dini, 5*(2), 112–119. https://doi.org/10.37567/prymerly.v5i2.1438

Creswell, J. W. (2012). *Research Design: Pendekatan Kualitatif, Kuantitatif, dan Mixed*. Pustaka Pelajar.

Darmawati, N. B., & Widyasari, C. (2022). Permainan Tradisional Engklek dalam Meningkatkan Motorik Kasar Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 6827–6836. https://doi.org/10.31004/obsesi.v6i6.3487

Dzakiyyah, D. M. N. (2024). Permainan Tradisional terhadap Perkembangan Motorik Kasar Anak pada Disibilitas Tuna Grahita. *e-SPORT: Jurnal Pendidikan Jasmani, Kesehatan dan Rekreasi, 4*(2), 73–83. https://doi.org/10.31539/e-sport.v4i2.8715

Fisher, D., Frey, N., & Almarode, J. (2020). *Student learning communities: A springboard for academic and social-emotional development*. ASCD.

Hadi, A. J., Komarudin, K., Suhartini, B., Budayati, E. S., & Sumaryanti, S. (2023). Bentuk-Bentuk Aktivitas Fisik untuk Meningkatkan Keterampilan Motorik Kasar serta Pencegahan Obesitas pada Anak: Literature Review. *Jurnal Pendidikan Jasmani Indonesia, 19*(2), 57–67. https://doi.org/10.21831/jpji.v19i2.67913

Harianti, N. P., Marbun, S., & Situmorang, S. M. A. (2024). Pengaruh Permainan Tradisional Engklek terhadap Motorik Kasar Anak Usia 5–6 Tahun di TK Amir Hamzah Medan. *Journal Education for All: Media Informasi Ilmiah Bidang Pendidikan Luar Sekolah, 13*(1), 33–40. https://doi.org/10.24114/jefa.v13i1.60255

Hurlock, E. B. (2014). *Perkembangan Anak* (Edisi ke-6, Jilid 1). Erlangga.

Huzaifah, H. (2023). Gambaran Motorik Kasar Halus pada Anak Down Syndrome melalui Media Permainan Tradisional. *JIIP: Jurnal Ilmiah Ilmu Pendidikan, 6*(7), 5355–5363. https://doi.org/10.54371/jiip.v6i7.2457

Kurniati, E. (2016). *Permainan Tradisional dan Perannya dalam Mengembangkan Keterampilan Sosial Anak*. Kencana.

Li, F., Yin, L., Sun, M., & Gao, Z. (2022). Examining relationships among Chinese preschool children's meeting 24-hour movement guidelines and fundamental movement skills. *Journal of Clinical Medicine, 11*(19), Article 5623. https://doi.org/10.3390/jcm11195623

Purwanto, D., & Baan, A. B. (2022). Pengaruh Aktivitas Pendidikan Jasmani terhadap Keterampilan Motorik Kasar Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 5669–5678. https://doi.org/10.31004/obsesi.v6i6.3158

Puspitasari, E., & Habibah, U. (2022). Pembelajaran Senam Irama untuk Meningkatkan Motorik Kasar Anak Kelompok A. *JECER (Journal of Early Childhood Education and Research), 3*(2), 80–86. https://doi.org/10.19184/jecer.v3i2.36717

Rais, S. S., & Sit, M. (2024). Meningkatkan Keterampilan Motorik Kasar Anak Usia 5–6 Tahun melalui Permainan Engklek. *Journal of Education Research, 5*(3), 3731–3739. https://doi.org/10.37985/jer.v5i3.1543

Sam, F. K., Pramono, P., & Astuti, W. (2021). Penerapan Permainan Engklek Fruit sebagai Stimulasi Kemampuan Motorik Kasar Anak Usia Dini. *JP2KG AUD (Jurnal Pendidikan, Pengasuhan, Kesehatan dan Gizi Anak Usia Dini), 2*(1), 1–8. https://doi.org/10.26740/jp2kgaud.2021.2.1.1-8

Sari, G., Silitonga, B. N., & Sitohang, R. R. B. (2024). Utilization of the traditional game "Engklek" to stimulate the development of children aged 3–6 years. In *Proceedings of the 7th International Conference on Learning Innovation and Quality Education (ICLIQE 2023)* (pp. 147–159). Atlantis Press. https://doi.org/10.2991/978-2-38476-301-6_16

Sitepu, J., Masitah, W., Rahimah, R., Jf, N. Z., & Setiawan, H. R. (2025). Optimalisasi Perkembangan Motorik Kasar Anak Usia Dini melalui Permainan Tradisional Berbasis Outdoor Learning di Era Digital. *Al-Hanif: Jurnal Pendidikan Anak dan Parenting, 5*(1), 28–35. https://doi.org/10.30596/al-hanif.v5i1.25666

Skinner, E. A., Pitzer, J. R., & Brule, H. A. (2014). The role of emotion in engagement, coping, and the development of motivational resilience. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 331–347). Routledge. https://doi.org/10.4324/9780203148211-19

Sudaryanti, S., Prayitno, P., Arifiyanti, N., & Maharani, O. (2024). Pengembangan Kemampuan Motorik dan Sosial Emosional Anak Usia Dini Menggunakan Permainan Tradisional. *Jurnal Pendidikan Anak, 13*(1), 114–125. https://doi.org/10.21831/jpa.v13i1.387

Sugiyono. (2019). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sugiyono. (2022). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Valensia, V., Nata, A. D., & Sanusi, R. (2025). The effect of physical activity and motor skills on social interaction in children aged 3–5 years. *Journal Physical Health Recreation (JPHR), 5*(2), 394–402. https://doi.org/10.55081/jphr.v5i2.3940

Wahyuni, D., Nasuka, N., Setyawati, H., Sulaiman, S., & Pratama, R. S. (2024). Factores que influyen en el comportamiento sedentario y su repercusión en la psicomotricidad de la primera infancia (Factors influencing sedentary behavior and its impact on early childhood psychomotor skills). *Retos, 61*, 130–140. https://doi.org/10.47197/retos.v61.108879

Wajib, M., & Hamdiana, H. (2025). Studi Literatur: Permainan Tradisional sebagai Media Alternatif Stimulasi Perkembangan Motorik Anak Usia Dini. *Seminar Nasional Prodi Magister dan Doktoral Pendidikan Olahraga FIK UNNES, 1*(1), 161–166. https://proceeding.unnes.ac.id/snpor/article/view/4818

Wariyanti, W., Nur, W., & Ananda, R. (2022). Perkembangan Aspek Sosial Emosional dan Sains Anak Usia Dini melalui Permainan Tradisional Engklek. *Jurnal Basicedu, 6*(3), 5351–5361. https://doi.org/10.31004/basicedu.v6i3.2848

Widiana, W., Rusdiyani, I., & Kusumawardani, R. (2022). Penggunaan Gawai terhadap Perkembangan Motorik Kasar Anak Usia 5–6 Tahun. *Jurnal Pendidikan Anak Usia Dini Undiksha, 10*(3), 440–448. https://doi.org/10.23887/paud.v10i3.51352

Wiriawan, O. (2022). Physical fitness level and weight status in children and adolescents: Comparison between students of Surabaya city and Sidoarjo regency. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran, 8*(2), 293–313. https://doi.org/10.29407/js_unpgri.v8i2.18499

Wouters, M., Evenhuis, H. M., & Hilgenkamp, T. I. M. (2020). Physical fitness of children and adolescents with moderate to severe intellectual disabilities. *Disability and Rehabilitation, 42*(18), 2542–2552. https://doi.org/10.1080/09638288.2019.1573932

Yusran, R., Martuty, A., Syawal, S., Darfin, S. A., & Usman, U. (2026). Obstacle jump game in stimulating gross motor skills of early childhood. *Ihya Ulum: Early Childhood Education Journal, 4*(1), 670–684. https://doi.org/10.59638/ihyaulum.v4i1.807

Yusuf, A. M. (2016). *Metode Penelitian Kuantitatif, Kualitatif & Penelitian Gabungan*. Prenada Media.

Yusuf, R. N., Qomariah, D. N., & Hamidah, S. H. (2022). Menstimulus Keterampilan Motorik Kasar Anak melalui Permainan Tradisional Engklek di Kelompok B TK Armawiyah 1. *Jurnal PAUD Agapedia, 6*(1), 21–30. https://doi.org/10.17509/jpa.v6i1.48059

Zuhra, N., Dewi, R., & Syarifah, S. (2022). Pengembangan Permainan Engklek Sirkuit untuk Meningkatkan Capaian Perkembangan Motorik Kasar Anak Usia 5–6 Tahun. *Jurnal Basicedu, 6*(5), 8047–8060. https://doi.org/10.31004/basicedu.v6i5.3658