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The Influence of The Traditional Game Engklek On Gross Motor Development Of Children Aged 5-6 Years

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ABSTRACT

Gross motor development is a fundamental aspect of early childhood growth, particularly during the ages of 5–6 years, which represent a critical period for neuromuscular maturation and movement coordination. Appropriate stimulation through physical activity and play is essential to support optimal motor development. This study aimed to examine the influence of the traditional game engklek (hopscotch) on the gross motor development of children aged 5–6 years at PAUD Kemala Bhayangkari 16 Palu. The study employed a quantitative experimental approach using a one-group pretest–posttest design. The research population consisted of 72 children, from which 26 children aged 5–6 years were selected as the research sample. Gross motor development was measured using the Test of Gross Motor Development–Third Edition (TGMD-3), which assesses key motor components including balance, speed, and muscular strength. Data were analyzed using percentage analysis to describe developmental changes and a paired sample t-test to examine the significance of differences between pretest and posttest scores. The results revealed a notable improvement in children's gross motor skills following the implementation of the traditional engklek game. Statistical analysis demonstrated a significant difference between pretest and posttest results, with a significance value of 0.001 ($p < 0.05$), indicating that the engklek game had a significant positive effect on gross motor development. These findings provide empirical evidence that traditional movement-based games can serve as effective, culturally relevant learning strategies in early childhood education. In conclusion, the traditional engklek game significantly enhances gross motor development in children aged 5–6 years and can be recommended as an alternative learning approach to support physical development while preserving local cultural values within PAUD settings.

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A. Conception and design of the study;
B. Acquisition of data;
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INTRODUCTION

Gross motor development is one of the main foundations for the growth and development of early childhood, particularly between the ages of 5 and 6, known as the golden age. During this phase, children experience rapid acceleration in physical,

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neuromuscular, and motor coordination development, requiring appropriate, planned, and continuous stimulation (Trenggonowati, 2018; Diamond, 2015). However, the reality on the ground shows that learning in many early childhood education institutions is still dominated by static activities and early academics, while active play activities that stimulate gross motor skills have not been systematically optimized (Pyle & Danniels, 2017; Dianti, 2024).

On the other hand, modernization and digitalization have pushed early childhood into passive, device-based play patterns, resulting in decreased physical activity, muscle strength, balance, and motor coordination (Tremblay et al., 2017; Carson et al., 2020). This situation has the potential to hinder gross motor development as well as children's social-emotional aspects. Therefore, a learning approach is needed that is not only oriented toward cognitive achievement but also integrates meaningful physical activity through play contexts that are appropriate to the characteristics of early childhood.

Traditional games have emerged as a strategic alternative because they are contextual, easy to implement, possess cultural value, and are rich in movement activities. However, in early childhood education practices, traditional games have not been fully utilized in a structured manner as a medium for gross motor learning, particularly in formal early childhood education (PAUD) units.

Various recent studies confirm that traditional games make a significant contribution to children's motor, social, emotional, and character development (Rianto, 2021; Handoko, 2021; Kuswanto, 2022). Conceptually, traditional games are viewed as a form of play-based learning that stimulates children's active involvement through body movement, social interaction, and adherence to game rules (Whitebread et al., 2019; Hirsh-Pasek et al., 2020).

Empirical research shows that movement-based play activities can improve muscle strength, balance, agility, and coordination in early childhood (Logan et al., 2018; Robinson et al., 2015). Hopscotch, in particular, is a traditional game that requires single-leg hopping, postural control, hand-foot coordination, and concentration, making it theoretically highly relevant for gross motor development (Wiranti, 2018).

Recent studies support the effectiveness of hopscotch in improving gross motor skills in early childhood. Candra (2024) reported that children involved in hopscotch showed increased physical activity, discipline, and teamwork skills. Other studies have also found that jumping and balance games positively contribute to the development of fundamental movement skills, which form the foundation for later physical activity (Barnett et al., 2016; Brian et al., 2019).

However, most of the research is still descriptive or conducted in non-formal contexts, and has not specifically tested the impact of the traditional engklek game on certain PAUD institutions with clear and measurable age characteristics.

Based on the literature review, three main research gaps exist. First, there are still limited experimental or quasi-experimental studies that specifically examine the effect of the traditional game of engklek on the gross motor development of children aged 5–6 years in formal early childhood education (PAUD) settings. Second, many studies discuss traditional games in general without focusing on the analysis of a single game type and

systematically measuring gross motor indicators (balance, strength, coordination, and control). Third, empirical studies that integrate the local context of PAUD institutions as the basis for implementing traditional games are still relatively rare in reputable literature.

Thus, research is needed that not only confirms the conceptual benefits of traditional games but also presents strong, contextual, and relevant empirical evidence for PAUD learning practices in Indonesia.

Based on these research issues and gaps, this study aims to analyze the effect of the traditional game of engklek on improving the gross motor development of children aged 5–6 years in PAUD Kemala Bhayangkari 16 Palu. This research is expected to provide practical contributions for PAUD teachers in optimizing motor learning through a play-based approach based on local culture.

The novelty of this research lies in: (1) the empirical focus on one type of traditional game (engklek) as a gross motor learning intervention; (2) the use of specific and measurable gross motor development indicators in children aged 5–6 years; and (3) the context of implementation in formal PAUD institutions as a local wisdom-based learning model that is relevant to the challenges of early childhood education in the modern era.

METHODS

Research Design

This study employed a quantitative research approach using a one-group pretest–posttest design, which is widely applied to evaluate the effectiveness of an intervention by comparing participants' performance before and after treatment (Sugiyono, 2020; Creswell & Creswell, 2018). This design is considered appropriate for educational and developmental research involving early childhood, particularly when random assignment and control groups are limited due to ethical and institutional constraints (Shadish et al., 2017).

The research design consisted of three stages: (1) pretest (O_1) to measure children's initial gross motor development, (2) treatment (X) in the form of structured traditional engklek game activities, and (3) posttest (O_2) to assess changes in gross motor development following the intervention. This design allows for direct measurement of treatment effects within the same group, thereby reducing inter-individual variability (Fraenkel et al., 2019).

Participants and Research Setting

The study was conducted at PAUD Kemala Bhayangkari 16 Palu, Central Sulawesi, Indonesia. The research subjects consisted of 26 children aged 5–6 years, selected using total sampling, considering the relatively small population size and the homogeneity of participants' age and developmental characteristics. This age range is critical for gross motor development, as children experience rapid neuromuscular maturation and coordination improvement during this stage (Gallahue et al., 2019; Logan et al., 2018).

Ethical considerations were addressed by obtaining approval from the school and informed consent from parents or guardians prior to data collection, in line with ethical standards for research involving children (UNICEF, 2021).

Intervention Procedure

The intervention involved the traditional game of engklek (hopscotch), implemented systematically over several sessions. The game activities were structured to emphasize jumping on one foot, balance control, coordination, and movement accuracy, which are fundamental components of gross motor skills (Barnett et al., 2016; Brian et al., 2019). Teachers guided the children during the activities to ensure safety and adherence to game rules while maintaining a playful and enjoyable learning environment. Previous studies have shown that culturally embedded movement-based games effectively enhance children's physical engagement and motor competence (Hirsh-Pasek et al., 2020; Whitehead, 2019).

Research Instrument

Gross motor development was measured using the Test of Gross Motor Development–Third Edition (TGMD-3), a standardized and widely validated instrument for assessing motor competence in children aged 3–10 years (Ulrich, 2019). The TGMD-3 evaluates key components of gross motor skills, including strength, speed, and balance, which are essential indicators of children's motor development (Robinson et al., 2015).

The assessment results were categorized into four developmental levels: Very Well Developed (BSB), Developing as Expected (BSH), Beginning to Develop (MB), and Not Yet Developed (BB). The TGMD-3 has demonstrated high validity and reliability across diverse cultural contexts, including early childhood education settings in Indonesia (Ihsan, 2024; Valentini et al., 2018), making it suitable for this study.

Data Analysis

Data analysis was conducted using descriptive quantitative techniques. Pretest and posttest results were analyzed by calculating the percentage distribution of children in each developmental category using the formula:

$$P = \frac{F}{N} \, x \, 100\%$$

where P represents the percentage, F is the frequency of observed results, and N is the total number of participants. Percentage analysis is commonly used in early childhood research to describe developmental changes in a clear and interpretable manner (Sugiyono, 2020; Cohen et al., 2018). The comparison of pretest and posttest results provided empirical evidence of the influence of the traditional engklek game on children's gross motor development.

RESULTS AND DISCUSSION

Result

The results of the study showed an increase in gross motor development that was observed.through aspects of balance, speed, and strength. The results of the recapitulation of children's gross motor skills before and after treatment can be seen in the following table.

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Table 1.
Recapitulation of children's gross motor skills before and after treatment

Category	Initial Observations(Q_1)						Final Observations(Q_2)					
	Balance		Speed		Strength		Balance		Speed		Strength	
	F	%	F	%	F	%	F	%	F	%	F	%
(BSB)	2	7.69	1	3.85	2	7.69	9	34.62	11	42.31	12	46.15
(BSH)	4	15.38	4	15.38	3	11.54	11	42.31	12	46.15	10	38.46
(MB)	12	46.15	13	50.00	12	46.15	4	15.38	2	7.69	3	11.54
(BB)	8	30.77	8	30.77	9	34.62	2	7.69	1	3.85	1	3.85

According to table 1.1, it is known that of the 26 children who were the research sample before the treatment in the form of traditional hopscotch games in the aspect of children's balance, 2 children (7.69%) were in the Very Well Developed (BSB) category, 4 children (15.38%) were in the Developing According to Expectations (BSH) category, 12 children (46.15%) were in the Starting to Develop (MB) category, 8 children (30.77%) were in the Not Yet Developed (BB) category. In the aspect of children's speed, there were 1 child (3.85%) in the Very Well Developed (BSB) category, 4 children (15.38%) were in the Developing According to Expectations (BSH) category, 13 children (50.00%) were in the Starting to Develop (MB) category, 8 children (30.77%) were in the Not Yet Developed (BB) category. In terms of children's strengths, there are 2 children (7.69%) in the Very Well Developed (BSB) category, 3 children (11.54%) in the Developing According to Expectations (BSH) category, 12 children (46.15%) in the Starting to Develop (MB) category, 9 children (34.62%) in the Not Yet Developed (BB) category.

Furthermore after the treatment in the form of traditional hopscotch games, it was found that in the aspect of children's balance, there were 9 children (34.62%) in the Very Well Developed (BSB) category, 11 children (42.31%) in the Developing According to Expectations (BSH) category, 4 children (15.38%) in the Starting to Develop (MB) category, 2 children (7.69%) in the Not Yet Developed (BB) category. In the aspect of children's speed, there were 11 children (42.31%) in the Very Well Developed (BSB) category, 12 children (46.15%) in the Developing According to Expectations (BSH) category, 2 children (7.69%) in the Starting to Develop (MB) category, 1 child (3.85%) in the Not Yet Developed (BB) category. In terms of children's strengths, there are 12 children (46.15%) in the Very Well Developed (BSB) category, 10 children (38.46%) in the Developing According to Expectations (BSH) category, 3 children (11.54%) in the Starting to Develop (MB) category, 1 child (3.85%) in the Not Yet Developed (BB) category. The pre-test and post-test graphs can be seen as follows.

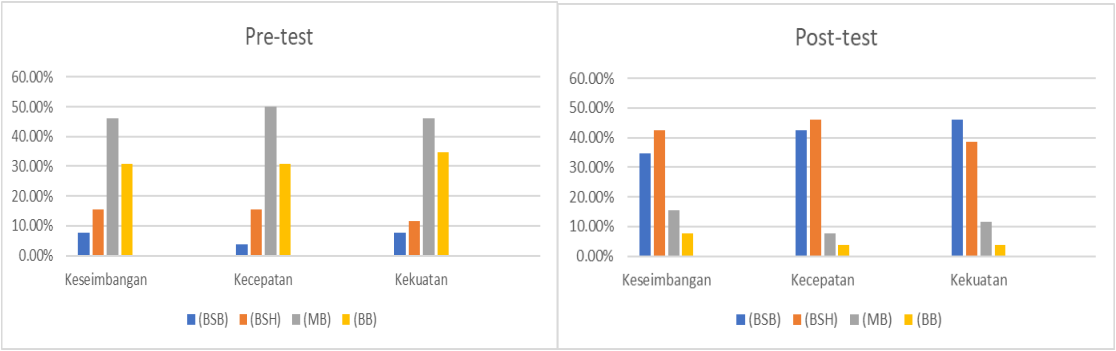

Figure 1.
Pre-test and post-test graphs

Table 2.
Results of the t-test calculation

	Paired Differences					t	df	Significance	
	Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
				Lower	Upper				
Before Treatment (Pre-Test) - After Treatment (Post-Test)	3,731	1,687	.331	3,050	4,412	11,279	25	<.001	<.001

From the results of the t-test in table 1.2, it can be seen that the calculated t-value is 11.279, which is greater than the t-table value, so the value11.279 > 1.708, it can be concluded that the traditional engklek game method has an effect on the development of gross motor skills of early childhood aged 5-6 years at PAUD Kemala Bhayangkari 16 Palu. Based on the sig level of 0.001 < 0.05 in accordance with the basis of decision ability in the paired samples test, it can be concluded that the traditional engklek game method has a significant effect on the development of gross motor skills of early childhood aged 5-6 years at PAUD Kemala Bhayangkari 16 Palu.

Discussion

The findings of this study reinforce the fundamental role of physical activity as a cornerstone in supporting children's gross motor development during early childhood. Physical activity is widely recognized as a critical determinant of motor competence, physical health, and long-term movement behavior (Satriawan, 2024; Carson et al., 2020). At the age of 5–6 years, children experience rapid neuromuscular maturation, making this period highly sensitive to movement-based stimulation that enhances strength, balance, coordination, and locomotor control (Wahyuningsih, 2023; Gallahue et al., 2019).

Gross motor skills involve the coordinated use of large muscle groups to perform fundamental movements such as jumping, standing, running, and balancing (Ifalahma, 2023). The improvement observed after the implementation of the traditional engklek game indicates that structured play activities can effectively stimulate these motor components. This finding aligns with previous studies emphasizing that early motor development requires consistent and meaningful stimulation through play and exercise to achieve optimal developmental outcomes (Dianti, 2024; Logan et al., 2018).

The traditional game of engklek (hopscotch) proved to be an effective medium for enhancing gross motor development, particularly in aspects of balance, strength, and movement control. Conceptually, engklek integrates repeated single-leg hopping, directional movement, and postural control, which directly engage the lower limb muscles and challenge children's balance systems. Such movement patterns are closely associated with the development of fundamental movement skills that form the basis for more complex physical activities and sports participation later in life (Barnett et al., 2016; Brian et al., 2019).

Empirically, this study supports earlier findings that traditional games function not only as cultural play activities but also as purposeful physical exercises that contribute to children's motor competence (Rianto, 2021; Indriyani, 2021). Children participating in

engklek activities demonstrated better engagement, higher movement intensity, and improved coordination, which are key indicators of effective motor learning in early childhood (Robinson et al., 2015; Valentini et al., 2018). These results also resonate with the concept of play-based learning, where learning occurs naturally through enjoyable and meaningful physical interaction (Hirsh-Pasek et al., 2020).

From a physical condition perspective, components such as balance, speed, agility, and strength are interrelated and collectively contribute to gross motor performance (Neviantoko, 2020; Pano-Rodriguez et al., 2020). The engklek game inherently combines these elements, requiring children to move quickly between squares, maintain balance on one foot, and generate sufficient leg strength to hop accurately. This multidimensional movement demand explains the observed improvements in gross motor development following the intervention.

Moreover, the effectiveness of engklek in this study aligns with contemporary literature highlighting that movement-based games emphasizing agility and balance can enhance neuromotor efficiency and postural stability in young children (Rudd et al., 2016; Jaakkola et al., 2019). Improved balance and coordination are particularly important during early childhood, as they are strongly associated with children's confidence in movement and willingness to participate in physical activities (Stodden et al., 2014).

However, motor development is not influenced solely by physical activity. Supporting factors such as nutritional status, health condition, and appropriate movement stimulation play a significant role in shaping children's motor outcomes (Oktiningrum, 2021; World Health Organization, 2020). In this context, the positive results of the engklek intervention may also reflect a conducive learning environment at PAUD Kemala Bhayangkari 16 Palu, where children's basic health and nutritional needs were sufficiently met, allowing them to fully benefit from the physical stimulation provided.

Importantly, this study highlights the pedagogical value of traditional games as culturally responsive learning tools in early childhood education. Integrating engklek into PAUD learning activities not only supports motor development but also contributes to the preservation of local cultural heritage, fostering children's social interaction, rule-following behavior, and enjoyment of physical activity (Whitehead, 2019; Tremblay et al., 2017). This dual benefit strengthens the argument for reintroducing traditional games as structured learning strategies within formal early childhood education settings.

Despite its positive findings, this study has certain limitations. The use of a one-group pretest–posttest design without a control group limits causal generalization. Additionally, the sample size was relatively small and confined to a single PAUD institution. Future research is recommended to employ experimental designs with control groups, larger samples, and longer intervention durations to further validate the effectiveness of traditional games on children's motor development.

Overall, the findings confirm that the traditional engklek game is an effective, low-cost, and culturally relevant intervention for enhancing gross motor development in children aged 5–6 years. These results provide empirical support for educators and policymakers to integrate traditional movement-based games into early childhood curricula as a sustainable strategy for promoting children's physical development and well-being.

CONCLUSION

The findings of this study provide strong conceptual and empirical evidence that the traditional game of engklek (hopscotch) has a significant positive influence on the gross motor development of children aged 5–6 years at PAUD Kemala Bhayangkari 16 Palu. Conceptually, engklek represents a form of movement-based play that integrates fundamental motor components, particularly balance, speed, and muscular strength, which are essential for optimal motor development in early childhood. The repetitive hopping movements, postural control, and directional changes inherent in the game effectively stimulate large muscle groups and enhance neuromuscular coordination.

Empirically, the statistical analysis demonstrated a significant difference between pretest and posttest scores, indicated by a significance value of 0.001(< 0.05). This result confirms that the implementation of the traditional engklek game contributed meaningfully to improvements in children's gross motor skills following the intervention. The findings support previous research emphasizing the effectiveness of traditional games as practical and culturally relevant tools for enhancing physical development in early childhood education.

Overall, this study highlights that integrating traditional games such as engklek into early childhood learning activities offers a low-cost, enjoyable, and developmentally appropriate strategy to promote gross motor competence. In addition to improving physical abilities, the use of traditional games also supports the preservation of cultural values within educational contexts. Therefore, educators are encouraged to incorporate traditional movement-based games systematically into PAUD curricula to foster holistic child development.

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