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The Effect of Traditional Clog Games in Improving Balance, Agility, and Coordination of Early Childhood Children at the Educare Center Kindergarten in Medan

Safran[1], Fatma Gustina[2]
[1] *Sekolah Tinggi Ilmu Tarbiyah Ar-Raudhah, Indonesia*
[2] *Universitas Islam Negeri Sumatera Utara Medan, Indonesia*
Corresponding Author: fatmagustina@stitarraudhah.ac.id

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ABSTRACT

This study aimed to determine the effect of the traditional bakiak game on improving the gross motor skills of children aged 5–6 years at Erwita Educare Centre Kindergarten in Medan. Gross motor development is an essential aspect of early childhood education because it supports children's physical growth, coordination, balance, and participation in learning activities. This study employed a quantitative pre-experimental method using a one-group pretest–posttest design. The participants were 10 children aged 5–6 years, consisting of six girls and four boys. Gross motor skills were assessed before and after the treatment through observations of four indicators: speed, agility, flexibility, and balance. The treatment was conducted by engaging children in the traditional bakiak game, which requires coordinated body movements, cooperation, and balance control. The findings showed a significant improvement in children's gross motor skills after the intervention. The average pretest score increased from 45.0 to 85.0 in the posttest. Improvements were found in all measured aspects, with average increases of 35 points in speed, 38 points in agility, 35 points in flexibility, and 35 points in balance. The Wilcoxon Signed Rank Test yielded a significance value of 0.001, which was lower than 0.05, indicating a significant difference between pretest and posttest scores. Therefore, the traditional bakiak game was effective in improving the gross motor skills of early childhood children.

Key Word *Gross Motoric, Traditional, Clogs*
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INTRODUCTION

The term "motor" comes from the English word "motor ability," which means the ability to move. The word "motor " refers to an important human activity: through movement, a person can achieve goals or realise their desires. Motor skills can also be defined as the initiation of a movement by an individual (Hojdeger & Faust, 2004). Motor skills are the ability to control and

coordinate body movements. These involve the nervous, muscular, and skeletal systems working together. Motor skills develop gradually as the body and nerves mature. They enable people to move in a directed, coordinated, and efficient way. This process includes regulating movement, balance, pressure, strength, and agility during activities (Hanum & Rohita, 2021).

Motor skills are the development of a person's maturity in controlling body movements, with the brain as the control centre. These movements are divided into two: gross motor skills, which involve large muscles and require energy (e.g., walking, running, jumping), and fine motor skills, which involve small muscles and require eye-hand coordination (e.g., folding, cutting, or stringing). A child's environment, especially the one around the home, plays a crucial role in the development of motor skills. This is because motor development is a process that involves coordinated, organised, and integrated responses between muscles, nerves, and the brain to move.

Gross motor skills require coordination of large muscles, nerves, physical maturity, and brain control to optimise movement (Fauziah Nasution et al., 2023). Meanwhile, fine motor skills require concentration and eye-hand coordination, such as in drawing or stringing. The brain plays a crucial role in motor development. When brain development is optimal, nerve and muscle coordination will also develop well. Every movement, even simple ones, is the result of a complex interaction between the brain, nervous system, and muscles. The central nervous system, controlled by the brain, has control centres that simultaneously and continuously regulate a child's physical activity. Therefore, children need a variety of physical activities to help them learn to move. A child's success in a physical activity can increase self-confidence and encourage participation in subsequent physical activities. Children should also be allowed to choose activities that suit their interests and developmental stage (Kumalasari & Wati, 2019).

Nurkholishoh & Da'warul Choiro (Nurkholishoh & Da'warul Choiro, 2022), in their study entitled "The Role of Traditional Clog Games in Improving Gross Motor Skills in Children Aged 3–4 Years," conducted a descriptive qualitative study to examine how clog games can develop gross motor skills in early childhood. This study was conducted at the Al Ilmu Maindu Montong Tuban Kindergarten with playgroup children as subjects. The results showed that clog games can improve various gross motor skills, including lifting and moving clogs, walking a set distance, maintaining balance, walking in a straight line, performing step rhythms, and overcoming obstacles. This improvement occurs because clog games stimulate body coordination, leg muscle strength, balance, and children's concentration.

Firmansyah et al. (Firmansyah et al., 2023) conducted a study entitled "Traditional Clogs Games for Children's Gross Motor Development," published in the Journal of Community Service Collaboration. This study aims to determine the effectiveness of clog games on the gross motor skills of elementary school children. The results showed that in the initial stage, most children were still in the Undeveloped and Beginning to Develop categories, especially in the ability to walk straight, turn, and maintain balance when using clogs. After improvements through live demonstrations, trial sessions, and increased motivation, there was a significant increase in the second stage. The majority of children reached the Developing As Expected to Very Well Developed categories, especially in maintaining balance, walking straight for 10 meters, and following a predetermined path.

Afria (Afria, 2023) conducted a study entitled "The Effectiveness of Traditional Clogs Games on Gross Motor Development in Group A Children of Bunda Kandung Kindergarten, Aceh Besar," which was compiled as a thesis at Bina Bangsa University, Getsempena. This study aims to determine the effectiveness of clog games in improving the gross motor skills of children aged 4-5 years and to analyze the implementation process and the obstacles that arise during learning activities. The study's results showed that children's gross motor skills remained low at the pretest stage. Many children were unable to maintain balance, move their bodies in a coordinated manner, or follow the game's path and rules. After treatment in the form of structured clog-playing activities, a posttest was conducted, and significant improvements were observed. Children began walking on the designated path in clogs, moving their bodies in a balanced manner, and working together with their group mates. Teachers also reported that clog games helped children become more focused, active, and confident.

Based on observations at the Erwita Educare Centre Kindergarten, children's gross motor development was shown to be influenced by the implementation of traditional games. Some teachers used hopscotch as a medium to train children's body movement coordination, balance, flexibility, and agility. However, some children were less enthusiastic when participating in motor development activities through gymnastics; they were reluctant to move their hands and feet simultaneously, refused to coordinate foot-hand-head movements, and showed less interest in physical games with specific rules.

Interestingly, at Erwita Educare Centre Kindergarten, traditional games have become a regular part of gross motor skills learning, thanks to teachers who regularly change the types of games. This aims to maintain children's

enthusiasm while stimulating their gross motor skills through a variety of movements. However, no research has specifically examined the effectiveness of traditional clog games in improving children's gross motor skills at this institution. Therefore, this study is novel in its location, subjects, and focus, namely the examination of the effect of clog games on the gross motor skills of early childhood at Erwita Educare Centre Kindergarten.

Play in Development Motoric Rough

Movements that demonstrate muscle activity are called motor skills. In the world of children, motor skills are divided into two groups: fine motor and gross motor skills. Gross motor skills are movements that are carried out using some of the large muscles of the body and require great strength (Yusuf et al., 2022). Gross motor skills are indeed essential for children so that they can sit, run, jump, climb stairs and so on (Saripudin, 2019). Meanwhile, Sujiono, et al (2014) say that gross motor skills are the ability Which need coordination part big from body child. Motoric rough work involves the use of large muscles, such as hand and leg muscles, as well as the whole body. work or activities involving muscles, such as motor, locomotor, and non-locomotor movements, are examples of movement skills (Humairah, 2024).

Development of Gross motor movements also requires coordination of certain groups of children's muscles so that they can jump, run, stand on one leg, ride a tricycle, and climb (Sujiono et al., 2014). Furthermore, Bambang Sujiono (Sujiono et al., 2014) also expressed his opinion about the development movement based on the process, where children get basic movements that are constantly developing based on:

1. Descendants also affect the process of nerve and muscle development.
2. As a result of previous movement experiences
3. Experience movement moment. This
4. Movement, which is explained through the relationship with pattern movement, which is determined.

Pattern movement base is a form of movement base, which is usually divided into three forms of movement, namely:

1. Movement Locomotor (movement from place to place) where certain parts of the body move or change places, for example, walking, running, jumping, etc.
2. Non-Motion Locomotor (movement) not moving place) where the movement is only carried out by certain parts of the body that move, but no movement to the other place, for example, interesting, twisting, pushing, bending.

3. Movement manipulative. Where there is something that moves, for example, throwing, catching, hitting, and others related to catching and throwing.

According to Bambang Sujiono (Sujiono et al., 2014) he stated that the indicators motor rough can obtained through: a) reflect ball big, medium ball and small ball (stay in place), b) bounce and catch the ball while walk or move, c) reflect ball big, or ball currently as well as small balls carried while walking or moving, d) catching and throwing large balls, medium balls and small balls, e) walking using heel while bring A burden, f) run run with while carrying the ball balanced and No fall, g) kick the ball to direction front and towards behind. Bambang Sujiono (Sujiono et al., 2014) expressed his opinion that the characteristics of gross motor development in children are as follows:

1. Show movement with rhythm that varies.
2. Hanging or climbing
3. Rolling or Melopathy ditch
4. Gymnastics (movements) free)
5. Run
6. Catch a ball and throw
7. Walk on the board
8. Walk with Miscellaneous style

The child's age determines the maturity of gross motor skills. However, gross motor skills can develop very quickly. Good children should be given a chance. This is also suitable for older people, the environment, and school teachers, and offers an opportunity that is very appropriate for something that develops optimally: method play, moving freely, and creating something with their games. In early childhood education, some games support gross motor development, especially in physical activities such as jumping, kicking, crawling, hopping, walking, dancing, breaking through, running, command gymnastics, fantasy gymnastics, and rhythmic and pantomime.

Playing outside or outside the classroom emphasises the development of gross motor skills, namely the coordination of leg and hand muscles and body flexibility. Usually, tools provided outdoors or in class include a globe, plank, compound ladder, slide, half ladder circle, bridge, swing, seesaw, rocking horse, tub with water, tub with sand, crawling board, and diving board.

A game can develop creative motor skills in a child

Every child has their own uniqueness alone, their own ability and activity, which are different, their own excess and talent, and their own interests. The child's age is early. Also, own characteristics. Which are typical: good physically, psychologically, socially, morally, spiritually, and emotionally. The

child's age is too young. Which is most appropriate for the form foundation and basic personality that will determine the child's future experiences? So that children become a superior generation ready to enter the era of globalisation and the internet.

Creativity can be seen in a child's activities, talents, interests, learning styles, and so on. Which of them can be reflected or can be seen from the games he likes. Games are activities that can be integrated into early childhood learning. Characterising the child currently playing enables a teacher to manage his/her learning. They must pay attention to several matters about the concept, goals, and conditions of the Game for children, the classification of children's play activities, appropriate gaming materials and tools for children's development, as well as the implementation and use of games and play tools in learning activities.

At the moment, children can express themselves, imagine, work, develop their talents, and find interests through play. So, in terms of games, teachers or people older than children only give good games for children to develop their right brain to function well. While children play, he can help himself and others. Child: Which activity can be seen from his behaviour in playing the reality? If this is done, it will be found that the limitations of their environment hamper children's play creativity. As for activity games, children can grow and develop. Among them, the traditional Clogs game can improve children's gross motor skills.

Gross motor skills are movements of body parts that require hard or rough strength, which require coordination of most of the child's body movements. That motor skill is the ability of children's body movements in walking, running, climbing, jumping, tiptoeing, leaping, throwing, catching, and reflecting a ball and hitting (Amalia et al., 2020). Several factors influence the intelligence level of motor rough children, including: maturity, experience, practice, sequence, and motivation (Ardiyansyah, 2022). Several indicator level achievement development physical in Permendikbud Number 137 attachment 1 2014 for children aged 5-6 years is:

1. Do body movements in a coordinated way to train flexibility, balance and agility
2. Do coordination movement, foot, hand, and head
3. Do Game physical with the rules as well as
4. Skilled use of the right and left hands (Khasanah, 2022; Sistiarini, 2021).

Game Traditional Clogs

Game race clogs is a Wrong One type game in outbound activities or outing-bound. It has an interesting competitive nature. Suitable for children or

mature individuals. Game: This is carried out in teams or groups that require cooperation and mutual assistance. This activity consists of 3 or 5 people.

Table 1.
Size Sandals Clogs that Can Used Riyazkia 2010
(Novita et al., 2021).

No	Amount group	Long	Wide	Thick	Heavy
1	3–4 person	14 1cm	10 cm	2.5 cm	4 kg pair
2	5- 6 person	235 cm	10 cm	2.5 cm	8 kg pair

The benefits of playing with clogs can train coordination of body parts because, in one moment, children play with y-involved simultaneous feet and feet, practice, and train. Clogs: It has effective cognitive and psychomotor values as a form of physical education for children. A child can exercise and use gross motor skills to play clogs.

Given these conditions, this study was conducted to determine whether gross motor stimulation in early childhood can be delivered through learning activities that are not only physically beneficial but also enjoyable and meaningful for children. The researchers were interested in examining the traditional bakiak game because it combines coordinated movement, balance, agility, cooperation, and rule-following in a single activity, making it relevant to the developmental needs of children aged 5-6 years. In addition, although traditional games have been implemented at Erwita Educare Centre Kindergarten, the specific effect of the bakiak game on children's gross motor skills has not been empirically investigated in this setting. Therefore, this study is important for providing evidence on the effectiveness of the bakiak game as a learning medium for gross motor development. The hypothesis of this study is that the traditional bakiak game has a significant positive effect on the gross motor skills of children aged 5-6 years at Erwita Educare Centre Kindergarten.

RESEARCH METHODE

This type of quantitative research uses a pre-experimental design method, namely, research that aims to determine the effect of a treatment on one group without a comparison group (Hakimah, 2023). The research subjects were children aged 5–6 years, so the design used was a one-group pretest-posttest design. In this design, researchers measured children's gross motor skills before treatment (pretest), provided treatment through games, and re-measured gross motor skills after treatment (posttest). Thus, the difference in pretest and posttest scores can indicate the effect of the treatment given (Sugiyono, 2017).

The population of this study consisted of children aged 5–6 years at Erwita Educare Centre Kindergarten, Medan. The sample consisted of 10 children, including six girls and four boys. This study used total sampling because all children in the target group were involved as research participants. Data were collected through observation of children's gross motor skills in the pretest and posttest stages after the implementation of the traditional *bakiak* game. The observed indicators included speed, agility, flexibility, and balance. The data were analyzed using descriptive statistics to identify the lowest, highest, and mean scores, and inferential statistics using the Wilcoxon Signed-Rank Test with SPSS to determine the significance of differences between pretest and posttest scores.

RESULT AND DISCUSSION

This study involved 10 children aged 5–6 years at Erwita Educare Centre Kindergarten, comprising six girls and four boys. Gross motor skills were measured twice: before treatment (pretest) and after treatment (posttest) in the form of a traditional clog game. The following table shows the results of speed, agility, flexibility, and balance measurements at both stages.

Table 2.
Pretest and Posttest Values of Children's Gross Motor Skills

No	Name	Speed (Pre)	Speed (Post)	Agility (Pre)	Agility (Post)	Flexibility (Pre)	Flexibility (Post)	Balance (Pre)	Balance (Post)
1	Aidil	50	80	50	90	50	80	50	85
2	Biva	50	80	40	80	50	80	50	85
3	Chandra	40	80	40	90	50	90	50	85
4	Fikri	50	90	50	80	40	90	50	90
5	Aisha	40	90	45	90	50	80	50	90
6	Novia	40	80	60	80	40	80	50	90
7	Lola	50	80	50	80	40	85	45	80
8	Irma	50	90	40	80	50	80	50	80
9	Yona	40	85	50	80	50	90	50	80
10	Zifa	40	80	40	80	50	80	50	80

Descriptive Statistics

Based on the calculation results, the average value of children's gross motor skills at the pretest stage was 45.0, with the lowest value being 40 and the

highest being 50. At the posttest stage , the average value increased to 85.0, with the lowest value being 80 and the highest being 90.

Table 3.
Average Pretest and Posttest Scores

Stage	Lowest Value	The highest score	Average
Pretest	40	50	45.0
Posttest	80	90	85.0

As presented in Table 3, the descriptive statistics indicate a marked increase in children's gross motor skills after the treatment. Before implementing the traditional bakiak game, the pretest scores ranged from 40 to 50, with a mean of 45.0. After the treatment, the posttest scores increased substantially, ranging from 80 to 90, with a mean of 85.0. These findings show that the children performed better after participating in the traditional bakiak game. The difference between the pretest and posttest mean scores suggests that the game was effective in improving children's gross motor performance.

Hypothesis Test Analysis with SPSS (Wilcoxon Signed Rank Test)

To determine the effect of the traditional clog game on children's gross motor skills, the Wilcoxon Signed-Rank Test was used because the data were paired and not normally distributed.

SPSS test results:

Testing Phase	p-value (Asymp. Sig. 2-tailed)	α (Significance Level)	Decision
Pretest – Posttest	0.001	0.05	H_0 rejected

Interpretation

Based on the results of the Wilcoxon Signed Rank Test, a significance value of $p = 0.001 < 0.05$ was obtained, so H_0 was rejected. This indicates a significant difference between the pretest and posttest results. Thus, the traditional clog game has been shown to improve the gross motor skills of children aged 5–6 years at Erwita Educare Centre Kindergarten. This improvement is clearly seen in all aspects of gross motor skills measured, namely:

1. Speed increased by an average of 35 points
2. Agility increased by an average of 38 points
3. Flexibility increased by an average of 35 points
4. Balance increased by an average of 35 points

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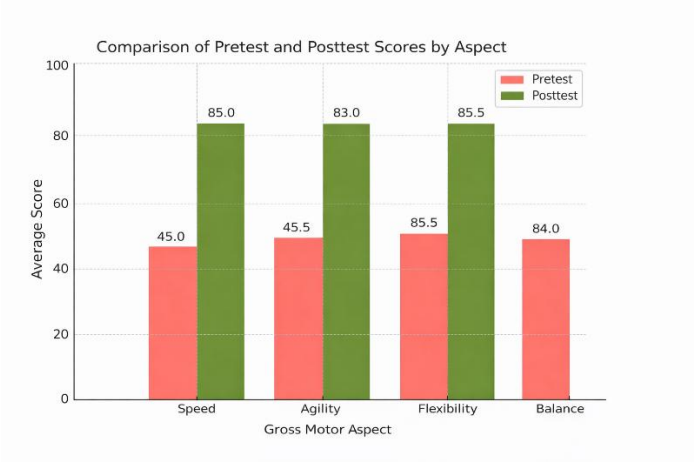

Discussion

The findings of this study indicate that *traditional clog play* significantly improves children's gross motor skills. Improved post-test scores compared to pre-test scores indicate that children performed better after participating in the intervention, particularly in speed, agility, flexibility, and balance. These findings suggest that *clog play* is not only a recreational activity but also an effective game-based learning medium for stimulating large muscle coordination in childhood. These results align with recent evidence suggesting that physical activity and fundamental motor skills are closely related and can be developed more effectively when children are provided with active, repetitive, and developmentally appropriate movement experiences (Liu et al., 2025; Nilsen et al., 2020).

One possible explanation for this improvement is that *clog play* requires children to coordinate their body movements simultaneously while maintaining rhythm, balance, and cooperation with peers. During the activity, children must adjust their steps, maintain proper posture, and synchronize their movement patterns to move together effectively. These movement demands likely stimulate neuromuscular coordination, dynamic balance, lower limb control, and flexibility simultaneously. Recent research supports this interpretation, with Wang and Zhou (2024) finding that exercise training focused on motor development produced significant positive effects on preschoolers' gross motor skills, and Quan et al. (2024) reporting that structured physical training significantly improved gross motor development and physical fitness in 4-5-year-old children. Furthermore, Liu et al. (2025) concluded that structured active play can be as effective as skill-oriented physical education in improving fundamental movement skills in preschoolers.

The current findings are also consistent with previous research on play-based interventions and traditional games. Ali et al. (2021) reported that a 10-week physical activity program in an early childhood education setting

improved fundamental movement skills in young children. In the Indonesian context, Yulianto et al. (2025). found, in a systematic literature review, that traditional Indonesian games such as *engklek, gobak sodor, fortan, congklak*, and *bekel* consistently improved agility, balance, coordination, muscle strength, and broader motor development in preschool children. These games were also reported to support sensorimotor learning, social interaction, and intrinsic motivation. Therefore, the positive effects of *clog games* found in this study are theoretically and empirically plausible because these games combine active movement, repetition, enjoyment, and social cooperation into a single culturally relevant activity.

From a theoretical perspective, this study supports the view that gross motor development in early childhood is strengthened through meaningful physical activity embedded in play. Play-based movement experiences provide children with opportunities to practice movement patterns in a natural, playful context, thereby increasing engagement and repetition during learning. From a practical perspective, this means that traditional games can be used by teachers as an affordable, accessible, and culturally relevant learning medium to stimulate gross motor development in kindergarten settings. These implications are also relevant to current global guidelines that emphasize regular physical activity and the reduction of sedentary behavior throughout childhood. However, the results of this study should be interpreted with caution because it used a single-group pretest-posttest design with a small sample and no control group. Recent reviews have also noted that many studies on traditional play in early childhood still use small samples and quasi-experimental designs, so future research should include larger samples and comparison groups to strengthen the evidence.

CONCULUSION

Based on research conducted on 10 children aged 5–6 years at the Erwita Educare Center Kindergarten, it was concluded that the traditional clog game significantly improved children's gross motor skills. Pretest and posttest results showed clear improvements in all gross motor skills measured, namely speed, agility, flexibility, and balance. The average gross motor skill score increased from 45.0 in the pretest to 85.0 in the posttest.

This finding was supported by a Wilcoxon Signed Rank Test analysis in SPSS, which showed a p-value of 0.001 (<0.05). This value indicates a significant difference in children's gross motor skills before and after exposure to clog games. This improvement in gross motor skills occurs because clog games involve coordinated movements between the feet and hands, and require body

balance. This activity directly trains considerable muscle strength, concentration, and cooperation among children. Thus, the traditional clog game can serve as a practical learning strategy to develop gross motor skills in early childhood while instilling values of togetherness, cooperation, and sportsmanship.

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