

Educational Pom-Pom Ball Game to Improve Fine Motor Skills of Children Aged 4–5 Years

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ABSTRACT

This study aims to examine the fine motor skills of children aged 4–5 years before and after playing activities using the educational play tool (APE) pom-pom ball at RA Al-Ikhlas Minasa Upa, as well as to analyze the improvement in fine motor skills following the implementation of this activity. The research employed a quantitative approach with a pre-experimental method using the One Group Pretest-Posttest Design. The population consisted of all 94 students at RA Al-Ikhlas Minasa Upa, with 10 children selected as the research sample. The instrument used was an assessment sheet to evaluate children's developmental progress. Data analysis included prerequisite tests using normality and hypothesis testing. The results showed that the average fine motor skill score of children before the treatment was 26.1, which increased to 44.1 after the treatment. The obtained significance value was $\text{sig. (2-tailed)} = 0.001 < 0.05$, indicating a significant improvement in the fine motor skills of early childhood students after engaging in play activities using the pom-pom ball educational tool at RA Al-Ikhlas Minasa Upa.

Keywords: *Educational Game Tools Pom-Pom Ball, Fine Motor Skills, Early Childhood*

1) INTRODUCTION

Early childhood refers to a group of children who are in a unique stage of growth and development. The learning process at this stage should be designed to provide meaningful basic concepts for children through real experiences that allow them to demonstrate optimal activity and curiosity (Rini & Ilham, 2024). The life of a young child is like the morning weather, which can predict how the day will unfold. A cloudy morning may indicate the possibility of rain, although clouds do not always bring rain. Therefore, Mulyasa (2014) interprets Early Childhood Education (ECE) as an effort to instill faith and belief, discipline, the formation and habituation of positive behavior, as well as the development of potential possessed by children. Thus, early childhood refers to individuals aged 0–6 years who are undergoing a rapid and fundamental developmental process that significantly influences later life.

Indonesia has a relatively high rate of developmental delays among children, with approximately 5–10% of children experiencing developmental delays, and 16% of toddlers in Indonesia experiencing fine and gross motor disorders (Rahayuningrum & Wahyuni, 2021). Therefore, every aspect of a child's fine motor development needs careful attention, as delays in fine motor skills can also hinder other areas of development. It is thus crucial for parents to be aware of their children's abilities and developmental progress (Mahdalena et al., 2020).

In the process of developing fine motor skills, various fundamental issues are often encountered, which may affect the achievement of fine motor competence. These problems may arise due to several factors such as prenatal exposure to alcohol, caffeine, tobacco, and aspirin, all of which can affect the fine and gross motor performance of four-year-old children (Barr et al., 1990). This indicates that a child's fine motor development is not only influenced by postnatal stimulation but can also be affected by prenatal factors.

Delays in fine motor development may lead to several developmental disorders, such as cerebral palsy, attention deficit, and hyperactivity disorders (Panzilion et al., 2020). For instance, a preschool child experiencing delayed fine motor development may not yet be able to hold crayons or follow instructions properly. Hence, the roles of parents and teachers are crucial in providing stimulation through early screening and developmental detection (Yuniati, 2018), so that children's education can proceed optimally. The ages of 0–6 years are referred to as the *golden age* for child growth and development, which covers eight aspects of development.

Several factors contribute to delays in children's fine motor development. First, limited opportunities to explore their environment from an early age and overprotective parenting styles that fail to provide adequate learning facilities and stimulation. Second, the lack of freedom given to children to perform tasks independently, which results in their dependence on others to meet their needs (Primayana, 2019).

Each child has different fine motor abilities. Fine motor skills involve hand–eye coordination and finger dexterity, which serve to stimulate children's development in alignment with the maturity of their nervous and muscular systems. Every activity performed by a child involves interaction controlled by the brain. Growth and development vary among children since each child has distinct developmental stages. For example, some children may show slower fine motor development while others progress faster in other areas. Therefore, children's growth and development differ from one

another. Appropriate stimulation from parents can help optimize children's developmental aspects (Alawiyah & Attamim, 2020)

Parents can take various actions to support children's development at home. For instance, while children are playing, parents can observe their progress by providing play tools and monitoring the results. Based on these observations, parents can identify and address issues when children do not meet developmental milestones. Fine motor skills play an important role in personal adjustment (Wahyuningtyas et al., 2019). Thus, engaging in play activities using learning media can enhance fine motor development. As previously noted, Aminah et al., (2022) giving instructions to children can help coordinate their finger muscles during motor-related tasks. Fine motor skills involve the ability to coordinate the eyes, hands, and small muscles of the fingers, wrists, and arms, which are used for various activities (Setyaningsih & D.H., 2015).

Fine motor skills in children must be stimulated from an early age, as they have a significant impact on their adult life. Providing the right stimulation early helps develop finger muscle maturity, which is controlled by the brain. Therefore, parents and teachers play a vital role in supporting children's growth and development in daily life. Proper stimulation enhances muscle function in children's hands, as children grow and develop rapidly during this stage. As they enter preschool age, their fine motor skills should begin to develop, forming the foundation for optimal future growth and development (Hanafiah et al., 2023).

Essentially, the golden age is a critical period during which appropriate stimulation from both parents and teachers is necessary, as it significantly affects fine motor skills. Since every child develops differently, stimulation should be adjusted according to their developmental stage or initial abilities, which can be observed during task performance. Physical motor development can also be measured through children's sensory abilities. When children's motor organs and physical functions develop according to their age, overall development in other areas also becomes more optimal. Physical motor development is vital in children's daily lives because it involves the use of muscles and the nervous system, enabling them to perform activities such as eating, writing, drawing, and dressing (Rachilda & Mawaddah, 2022)

Educational games are tools used by children to play and learn. Their purpose is to provide benefits, stimulate, and educate simultaneously. Fine motor skills develop more optimally according to age stages when children learn through play using educational tools. As previously noted, learning

through play has a positive impact on early childhood development. The type of game used should align with the child's needs; otherwise, the growth process may be hindered and development may not progress optimally. There are many types of media or educational tools available to stimulate children's development more effectively (Lisa et al., 2020).

Media serve as tools or objects that facilitate children's play activities. Therefore, media are essential environmental components that stimulate learning activities (Syawalia et al., 2021). In play media, attractive colors are important since colorful materials capture children's attention and help them understand what they observe (Hidayat et al., 2022). Consequently, teachers need to design creative and innovative learning processes—for instance, in selecting strategies, tools or media, types and formats of instruction, and evaluation instruments—so that learning becomes more engaging, fosters curiosity, and motivates children to think critically and explore new ideas (Pura & Asnawati, 2019).

Based on preliminary observations at RA Al-Ikhlas Minasa Upa, several students still showed underdeveloped fine motor skills, particularly in eye-hand coordination. Thus, stimulation of fine motor skills is essential. Accordingly, children's fine motor development in coordination between the eyes and fingers can be further optimized. Interviews conducted with teachers at RA Al-Ikhlas Minasa Upa revealed that while educational play tools have been used in early childhood learning, the pom-pom ball medium has never been applied. Therefore, the researcher concluded that an engaging and colorful educational tool could potentially increase children's enthusiasm for learning. To determine whether the use of pom-pom ball media positively impacts children's fine motor development, the outcomes can be analyzed from research findings. Numerous studies have explored fine motor development in early childhood, such as the research by Nafiqoh & Fauziyah (2021) which used play activities to enhance children's visual intelligence; Damayanti & Aini (2020), who used paper folding games to improve fine motor skills; Asmurita & Pransiska (2019) who investigated improvement through pom-pom creation in kindergarten; and Rakimahwati et al. (2018), who examined the effect of kirigami on children's fine motor skills. Thus, various approaches have been carried out to help stimulate children's fine motor development and support their overall growth.

2) METHODS

The type of research used in this study is quantitative research employing a pre-experimental method with a One Group Pretest-Posttest Design. Quantitative research with a pre-experimental method focuses more on data collection and data analysis in measuring and calculating research results in numerical form. The population in this study consisted of all students at RA Al-Ikhlâs Minasa Upa, totaling 94 children, with 10 children selected as the research sample. The research was conducted at the Early Childhood Education (PAUD) school RA Al-Ikhlâs Minasa Upa, located at Jl. Minasa Upa No. 10, Gn. Sari, Rappocini District, Makassar City, South Sulawesi. The instrument used was an assessment sheet designed to evaluate children's developmental progress. The study focused on prerequisite testing using normality and hypothesis tests.

3) RESULTS AND DISCUSSION

RESULTS

Description of Children's Fine Motor Development Before Treatment

Pretest data on the educational pom-pom ball game were obtained from 10 students in Group A1. The results of these data can be seen in the following table:

Table 1. *Pretest Data Results*

No	Child's Initials	Assessment Points															Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	AX	2	1	1	1	1	2	1	2	1	2	2	2	2	1	1	22
2	HD	2	2	1	2	1	1	1	2	2	1	1	2	1	1	1	21
3	ME	2	1	1	2	2	1	2	1	2	1	1	2	2	2	1	23
4	MH	2	2	1	2	1	2	1	1	2	1	2	1	1	1	2	22
5	MI	2	2	2	1	2	1	3	3	2	2	1	1	1	1	1	25
6	MK	2	3	1	3	2	2	2	3	2	3	2	3	2	2	1	33
7	MR	2	2	2	2	2	1	3	2	2	1	2	1	1	2	1	44
8	TR	2	1	2	3	2	2	2	3	2	2	2	1	2	2	3	31
9	AM	1	2	1	2	1	1	2	2	1	2	1	1	2	1	2	22

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	QA	1	1	1	2	1	1	1	2	1	2	1	1	1	1	1	18
Total																	26,1
Average																	26,1

From the table above, the highest score obtained was 44 with the lowest score being 18, while the average score obtained was 26.1. Based on the pretest data, it shows that the improvement of the pom-pom ball educational toy among students was in the moderate category, meaning that the pom-pom ball educational toy has not yet reached the expected level.

Table 2. *Categorization of Children's Fine Motor Development*

Category Limit	Interval	Frequency	Category	Persentase
$X < M - 1SD$	$X < 21,1$	1	Low	10%
$M - 1SD \leq X < M + 1SD$	$21,1 \leq X < 31,1$	7	Medium	70%
$M + 1SD \leq X$	$31,1 \leq X$	2	High	20%
Total	-	100	-	100%

Overview of Children's Fine Motor Development after Treatment

The improvement in the educational pom-pom ball game among students can be seen from the post-test results. The post-test data on the improvement in the educational pom-pom ball game was obtained from 10 students in group A1. After obtaining the post-test data, the results can be seen in the following table:

Table 3. *Post-test Data Results*

N o	Child's Initials	Assessment Points															Score
		2	3	4	7	9	10	11	12	13	14	16	18	19	20	21	
1	AX	3	2	3	2	2	2	3	4	4	3	3	4	2	2	3	42
2	HD	4	3	2	3	3	3	2	4	3	2	3	2	3	2	3	60
3	ME	4	3	2	4	4	4	4	3	2	3	3	4	2	2	1	45

4	MH	3	4	4	4	2	2	3	3	3	2	3	3	3	2	4	45
5	MI	3	4	4	4	3	4	4	3	4	4	2	3	3	2	3	50
6	MK	4	3	2	3	3	2	2	3	3	3	2	3	2	2	3	40
7	MR	2	3	3	2	2	4	3	4	2	2	2	3	2	2	3	39
8	TR	2	2	2	3	4	2	2	3	2	2	2	4	2	2	4	38
9	AM	3	2	2	2	3	3	2	2	4	2	4	4	3	3	2	41
10	QA	3	3	2	2	3	4	4	2	3	2	3	2	3	3	2	41
Total																	441
Average																	44,1

From the table above, the highest score obtained was 60, while the lowest score was 38, with an average score of 44.1. Based on the posttest data, it shows that the improvement in students' performance using the educational pom-pom ball tool is in the high category, meaning that the educational pom-pom ball tool has not yet reached the expected level.

Table 4. *Categorization of Children's Fine Motor Development*

Category Limit	Interval	Frequency	Category	Persentage
$X < M - 1SD$	$X < 39,1$	2	Low	20%
$M - 1SD \leq X < M + 1SD$	$39,1 \leq X < 49,1$	-	Medium	-
$M + 1SD \leq X$	$49,1 \leq X$	8	High	80%
Total	-	10	-	100%

Normality Test

The results of the data normality test can be seen in Table 5.

Table 5. *Normality Test*

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
<i>Pretest</i>	.265	10	.162	.825	10	.029
<i>Posttest</i>	.246	10	.088*	.810	10	.019

Based on the results in the output table of the One-Sample Kolmogorov-Smirnov Test shown in Table 4.12 from SPSS above, it can be seen that the significance value (Sig.) of the pretest is $0.162 > 0.05$, meaning that 0.162 is greater than 0.05, and the significance value (Sig.) of the posttest is $0.088 > 0.05$, meaning that 0.088 is greater than 0.05. Therefore, both the pretest and posttest data are normally distributed, in accordance with the decision rule for the normality test on pretest and posttest data. Thus, the assumption of data normality has been fulfilled.

Meanwhile, for the Shapiro–Wilk test, the significance value (Sig.) of the pretest is $0.029 > 0.05$, meaning that 0.029 is greater than 0.05, and the significance value (Sig.) of the posttest is $0.019 > 0.05$, meaning that 0.019 is greater than 0.05. Therefore, both the pretest and posttest data are normally distributed.

Paired Samples T-Test

The results of the Paired Samples T-Test can be seen in Table 6.

Table 6. *Paired Sample T-Test*

		Paired Differences					Significance			
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
Pair 1	Pretest	-18.000	12.166	3.847	-26.703	-9.297	-4.679	9	<.001	<.001
	Posttest									

Based on the results of the data analysis in the table above, it is known that the significance value (2-tailed) is $0.001 < 0.05$. According to the decision-making criteria, it can be concluded that there is a difference between the results before and after the treatment using the educational play tool with pom-pom balls in classroom learning. Each child experienced an improvement in fine motor skills after being given treatment using the educational pom-pom ball tool. Therefore, the use of the educational pom-pom ball tool in learning is considered appropriate to help enhance the fine motor skills of children aged 4–5 years.

DISCUSSION

Overview of Fine Motor Development of Children Before Playing Activities Using Pom-Pom Balls

Motor development refers to everything related to body movements during the developmental process. These three elements muscles, nerves, and the brain can be considered the determining factors in the body's motor system. Each factor plays its own role in a positive interaction, where all elements are interdependent, mutually supportive, and complementary, thereby achieving more optimal motor conditions. Children with brain impairments tend to be less flexible in moving their bodies. Fine motor skills are activities involving smooth muscles, such as the ability to manipulate

objects with the fingers, requiring good coordination between the senses of sight and touch (Wahyuningrum & Watini, 2022).

Fine motor skills are an important aspect of children's developmental stages, as almost every activity involves fine motor coordination. Therefore, children's fine motor skills must be properly stimulated because they significantly influence daily activities, especially in children aged 4–5 years. Before the use of the educational toy pom-pom ball, several children were still in the “not yet developed” category, meaning that they had not reached the expected developmental level. This condition occurred because the A1 group had never used the pom-pom ball as an educational tool to develop fine motor skills. Thus, during the pretest, when the researcher introduced the educational toy, children could only observe, listen, and ask about the toy. In fact, it is crucial for children to engage directly by handling the toy to practice grasping and manipulating it. Ardini & Lestarinigrum (2018) also emphasize that allowing children to handle educational tools is important because it trains their fine motor skills through grasping activities. Hence, introducing and utilizing educational toys in fine motor stimulation is essential.

After the pretest was conducted using educational tools, it was expected that children would better understand how playing with such tools could help stimulate finger coordination. This finding aligns with the idea that educational toys play a role in children's developmental growth. However, such tools must still be introduced through various methods so that children can better understand the nature of play. In line with Yuniarti et al. (2016), it is essential to continually introduce play activities to children, as this helps them understand their environment and sharpen their abilities.

Overview of Fine Motor Development of Children After Playing Activities Using Pom-Pom Balls

After the treatment, children's development could be observed while they played the pom-pom ball clipping game whether they showed improvement or not. When the researcher demonstrated how to play, the students enthusiastically tried to imitate the demonstration. This was supported by the increase observed in the posttest results of group A1. The game was conducted by giving instructions before playing, as demonstrated by the researcher.

Playing with educational tools is an activity aimed at stimulating various aspects of child development. Since play is central to children's lives, exploring interesting games helps them learn naturally. While educational play has long been used to support fine motor development, using pom-pom balls as a medium is a relatively new and effective approach. Pom-poms are typically used as decorations or crafts, but over time, they have proven useful as learning tools to enhance fine motor coordination.

Play serves as one of many alternative methods that can be used to improve children's understanding and abilities. Therefore, it is essential to determine whether the pom-pom ball is an effective tool for stimulation. Children at different developmental stages exhibit diverse growth patterns. Those in the preoperational stage (ages 2–5) need exposure to concrete experiences to stimulate their fine motor skills. These are often referred to as *hand-eye coordination* skills. Activities that involve physical movement—such as play—train muscle function, which in turn benefits fine motor development. Examples include inserting cardboard shapes into matching slots, pouring water into cups, and threading beads. Such activities can serve as indicators of developmental milestones in early childhood.

Fine motor movements begin to develop rapidly around age three. At this age, children can imitate how adults hold a pencil, though their grip is still close to the pencil tip, and their hand movements remain stiff. By age four, children can hold crayons or colored pencils for drawing. Upon entering school, they must use fine motor skills for writing and drawing. However, fine motor abilities vary even among children of the same age. For example, Dede, a four-year-old girl, still needs assistance dressing and preparing for a bath, while her peers like Anto can play catch easily. Meanwhile, Adi, aged five, still struggles to catch a thrown ball. These examples illustrate that some children continue to face challenges in fine or gross motor coordination.

Overview of Fine Motor Development of Children Before and After Playing Activities Using Pom-Pom Balls

Based on the results of the study conducted on the fine motor development of group A1 children at RA Al-Ikhlas Minasa Upa, Rappocini District, Makassar City, it was proven that children's fine motor skills improved after playing with pom-pom balls. Previously, this group had never engaged in such activities using the pom-pom ball clipping game. When the researcher first introduced the activity, both students and teachers showed enthusiasm and curiosity about how to use the tool.

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Figure 1. *Pretest*

During the pretest, the researcher instructed children to hold the clip and the pom-pom ball, as shown in the figure. The purpose was to introduce the educational tool and familiarize children with grasping objects, as grasping involves fine motor control. When presented with the pom-pom balls, the children were excited because they had never seen them before. They asked questions such as “What is this?” and “How do we play this?” The researcher then explained the name and function of the toy. Each child wanted to feel the texture of the pom-pom, so the researcher distributed one to each child for hands-on exploration.

The researcher encouraged children to name the colors of the pom-poms they were holding. During the pretest, one child was in the low category, eight were in the medium category, and one in the high category. Three children were especially active and reluctant to share the toy, showing strong interest. After being told that the game was turn-based, they learned to take turns. Some children also eagerly answered questions, though not always accurately.



Figure 2. *Posttest*

During the posttest, each child received a clip and pom-pom ball and was instructed to use the clip to pick up pom-poms of matching colors. The posttest results revealed improved understanding one child remained in the low category, eight in the medium category, and one in the high category. Compared with the pretest, the results showed a positive increase.

During both tests, children were active and inquisitive about the pom-poms, asking questions while playing. The researcher answered their questions, and the children listened attentively. They enjoyed the activity so much that some were reluctant to stop playing even after the allotted time ended.

Playing with educational tools proved effective and enjoyable for stimulating fine motor skills. Children loved playing because it helped develop multiple aspects of growth with guidance from parents and teachers (Pahrul & Amalia, 2021). Similarly, Yulianti et al. (2019) found that using educational toys allows children to imitate activities directly, making learning more engaging and enjoyable rather than monotonous. Thus, educational play encourages both teachers and parents to further support fine motor development.

Through fine motor development, children learn and gain knowledge. Knowledge is not something acquired passively but rather a tool for problem-solving, built through experience (Pura & Asnawati, 2019). Fine motor skills in children consist of four main aspects: pinching, holding, concentration, and hand-eye coordination. Through play with media or educational tools, these aspects can be enhanced. Essentially, children are individuals undergoing a rapid and fundamental developmental process essential for their future lives (Agustina et al., 2018).

From the explanations above, it can be concluded that fine motor development in children must be continuously improved from an early age, one effective way being through play. Playing with educational tools is highly favored by children because it is enjoyable, motivating, and prevents boredom. Therefore, learning through play is considered an effective approach to enhancing fine motor development in 4–5-year-old children in group A1 at RA Al-Ikhlas Minasa Upa.

4) CONCLUSIONS

This section summarizes your research. You also may give suggestions and implications. Based on the results of the thesis entitled “The Use of Educational Play Tools (Pom-Pom Balls) on the Fine Motor Development of Early Childhood in Group A1 at RA Al-Ikhlas Minasa Upa, Rappocini District, Makassar City”, the conclusions can be summarized as follows: (1) The description of

children's fine motor skills before engaging in educational play using pom-pom balls in Group A1 at RA Al-Ikhlas Minasa Upa, Rappocini District, Makassar City, showed the highest score of 44, the lowest score of 18, with an average score of 26.1 and a standard deviation of 5; (2) The description of children's fine motor skills after engaging in educational play using pom-pom balls in Group A1 at RA Al-Ikhlas Minasa Upa, Rappocini District, Makassar City, showed the highest score of 60, the lowest score of 38, with an average score of 44.1 and a standard deviation of 5; (3) There is a positive difference between the pretest and posttest results of children's fine motor skills through educational play using pom-pom balls in early childhood Group A1 at RA Al-Ikhlas Minasa Upa, Rappocini District, Makassar City, indicating that the use of educational play tools is effective in stimulating children's growth and development in accordance with their developmental stages.

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