



THE EFFECT OF GRAIN MOSAIC MEDIA ON FINE MOTOR DEVELOPMENT IN 5-YEAR-OLD CHILDREN AT SHANDY PUTRA TELKOM KINDERGARTEN IN BENGKULU CITY

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Abstract

Fine motor development in early childhood is essential for supporting hand–eye coordination, independence, and learning readiness. According to UNICEF 2020, 5–25% of children worldwide experience fine motor developmental delays, while in Indonesia, approximately 16% of children face brain and nerve disorders that contribute to such delays. Bengkulu Province contributes 8.3% of national fine motor delay cases. Grain mosaic media provides a low-cost, engaging, and effective alternative to stimulate fine motor development through activities that enhance grip strength, accuracy, and focus. This study aimed to analyze the effect of grain mosaic media on fine motor development among 5-year-old children at TK Shandy Putra Telkom, Bengkulu City. This quantitative study applied a pre- experimental one group pretest–posttest design with total sampling. Thirty children aged five years were included. Fine motor development was assessed using the Kuesioner Pra-Skrining Perkembangan (KPSP) and observational checklists. Data were analyzed using the Wilcoxon test. The average fine motor score increased from 7.50 (pre-test) to 9.00 (post-test), with a mean difference of 1.50. The Wilcoxon test revealed a significance value of $p = 0.000$ (<0.05), confirming that grain mosaic media had a significant effect on fine motor development. Grain mosaic media effectively improves children’s fine motor skills, particularly in hand–eye coordination, grip strength, accuracy, and concentration. Teachers and parents are encouraged to apply this media as an enjoyable and accessible stimulation tool both at school and at home

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INTRODUCTION

The United Nations Children's Fund (UNICEF) states that around 10 million children worldwide experience developmental disorders, with approximately 5-25% generally facing delays in fine motor development. Research in the United States found that about 4.1% to 4.7% of children experience developmental delays. Additionally, in Thailand, 24% and in Argentina, 22% of children face delays in fine motor skills (UNICEF, 2020).

Fine motor skills refer to the ability to perform small, controlled movements typically involving the small muscles of the hands, fingers, and wrists, such as gripping and writing (Ministry of Health Indonesia, 2020).

The impact of delayed fine motor development in children under five years old in Indonesia is significant. Approximately 16% suffer from brain and nerve development disorders, resulting in impairments in intelligence, hearing, fine motor skills, reduced self-confidence, learning difficulties, and lack of courage (Ministry of Health Indonesia, 2017). In Bengkulu Province, fine motor development disorders account for 8.3% of such cases (Ministry of Health Indonesia, 2024).

Mosaic art is one form of artistic expression that has existed since ancient times, using various materials such as ceramics and glass to create images or patterns. In modern development, mosaics are not only appreciated as art but are also being adapted as educational media to stimulate creativity and motor skills in children. Mosaic art is not limited to those materials but also includes the use of paper and natural materials such as grains. Grain mosaic has several advantages that make it a popular choice in art and crafts, especially compared to paper mosaics or other synthetic materials. Natural materials are easily accessible, and their natural textures and colors can help develop children's hand and eye imagination continuously (Dhewanty & Mutmainah, 2024).

Grain mosaic is a common activity used in kindergartens and early childhood education centers as a form of stimulation to develop fine motor skills in young children. This activity involves sticking various types of grains such as corn, mung beans, and soybeans onto specific patterns on paper. For example, research by Sari (2023) shows that children who regularly participate in grain mosaic activities experience significant improvement in fine motor skills. This is supported by Mahdiar (2025), who noted that art activities based on natural materials, such as grains, have a positive impact on children's fine motor development.

According to Piaget's theory (2010), activities involving touching, holding, and arranging grains can strengthen fine motor skills and improve hand-eye coordination. In line with this, research by Lestari et al. (2023) found that children who receive stimulation using natural materials like grains show stronger gripping ability compared to those who do not receive similar stimulation.

Data from the Bengkulu Education and Culture Office profile in 2024 shows that the highest number of students is in Teluk Segara district, with a percentage of 100%, totaling 15 kindergarten students in the Teluk Segara area, which is one of the largest groups at TK Shandy Putra Telkom. This is higher

compared to early childhood centers in Padang Serai, which have a percentage of 37.81%. Kandang (47.50%), Kampung Bali 896 (81.68%), and Gading Cempaka (92%) (Disdikbud, 2024).

From an initial survey at TK Shandy Putra Telkom in Bengkulu City, the results of fine motor skill assessments on students showed that out of 5 children measured, 3 (60%) had delays in fine motor skills related to gripping and lacked self-confidence. After interviewing the teachers, it was found that there had been no similar research conducted at the school regarding the “Effect of Grain Mosaic Media on the Fine Motor Development of 5-Year-Old Children.”

Based on this information, the researcher is interested in studying the “Effect of Grain Mosaic Media on the Fine Motor Development of 5-Year-Old Children at TK Shandy Putra Telkom, Bengkulu City.”

MATERIALS AND METHODS

This study employed a quantitative approach with a quasi-experimental one group pretest– posttest design. The research was conducted at TK Shandy Putra Telkom, Bengkulu City, from June 3–13, 2025. The population was 66 children enrolled in the school, and purposive sampling was applied to select 30 children aged 5 years who met the inclusion criteria. The independent variable was mosaic media using grains (corn and mung beans), while the dependent variable was fine motor development. Data collection used the KPSP questionnaire, observation sheets, and documentation of children’s mosaic works.

Data analysis was performed using univariate statistics for frequency and mean, and the Wilcoxon signed-rank test for pretest–posttest comparison at a 95% confidence level ($p < 0.05$). Ethical approval was obtained from the health research Ethics Committee, Poltekkes Kemenkes Bengkulu (NO. KEPK. BKL/439/06/2025).

Fine motor delays negatively affect children’s academic readiness, confidence, and social interactions. Therefore, effective, enjoyable, and low-cost interventions are needed. One promising approach is mosaic art using natural materials, specifically grain mosaic media. This method involves arranging and pasting grains such as corn, mung beans, and soybeans onto patterns. The activity stimulates hand–eye coordination, grip strength, patience, and creativity. Previous studies, including Sari (2023) and Herawati et al. (2023), confirmed that grain-based.

Collage activities significantly improve fine motor skills. Mahdiar (2025) emphasized that natural material-based crafts provide stronger developmental stimulation than synthetic materials. However, limited evidence exists from Bengkulu City, particularly at TK Shandy Putra Telkom. Therefore, this study investigates the effect of grain mosaic media on fine motor development in 5-year-old children at TK Shandy Putra Telkom, Bengkulu City, in 2025.

RESULTS AND DISCUSSION

Results

Univariate Analysis

Table 1. Distribusi of Frequency of Fine Motor Development Before and After Being Given Grain Mosaic Media.

Kategori	Frequency(F)	Percentage (%)
<i>Pre-test</i>		
Poor	9	30%
Fair	13	43,3%
Good	8	26,7%
Total	30	100%
<i>Post-test</i>		
Fair	9	30%
Good	21	70%
Total	30	100%

Table 1 after being given the mosaic grain media, there was an increase in the development of children's fine motor skills. Before the intervention, most children were in the poor category (9 children) (30%), children in the sufficient category (13 children) (43.3%), and only 26.7% were in the good category. After the intervention, 70% of children were in the good category, indicating an increase in fine motor skills.

Table 2. Average Distribution of Children's Fine Motor Development Before and After Being Given Mosaic Media.

Variable	N	Min	Max	Mean	Mean Rank	SD
Fine motor skills						
Pre-Test	30	5	9	7.50	1,50	1.196
Post- Test	30	7	10	9.00		0,871

Table 2 it is known that the average value of children's fine motor development before being given grain mosaic media was 7.50 with a standard deviation of 1.196, a minimum value of 5, and a maximum of 9. After being given grain mosaic media, the average value increased to 9.00 with a standard deviation of 0.871, a minimum value of 7, and a maximum of 10. Thus, there was an average increase of 1.50 points in children's fine motor development after the intervention was given.

Bivariate Analysis

Table 3. Distribution of Results Before and After Grain Mosaic Treatment The Wilcoxon Test

Post Test -Pre-Test	N	Mean Rank	Sum of Rank
Negative Rating (Post Test < Pre-Test)	0	.00	.00
Positif Rating (Post Test > Pre-Test)	27	14	378.00
Nilai Sama (Post-Test = Pre-Test)	3		
Jumlah Total	30		

Table 3, The Effect of Grain Mosaic Media on Fine Motor Development in 5-Year-Old Children Based on the results of the Wilcoxon test, it was found that of the 30 children studied: A total of 27 children (90%) experienced an increase in fine motor scores after being given children experienced increased fine motor development after the intervention was given.

Univariate Analysis

The results showed that before the bead mosaic was administered, the majority of children were in the poor fine motor development category (43.3%), and only 26.7% had demonstrated good development (good category). This indicates that before the intervention, children's fine motor skills were still suboptimal.

After the bead mosaic was administered, significant improvements were observed. The number of children in the good category increased to 70%, while the number of children in the adequate category decreased to 30%, and there were no children in the poor category

These results are in line with research by Nenggolan et al. (2020) who found that handicraft- based media such as mosaics can improve children's fine motor skills through sticking and patterning activities. Kholidah (2025) also stated that grain media can stimulate children's concentration, accuracy, and finger muscle strength gradually but effectively. Thus, grain mosaic media can be an

appropriate alternative in early childhood learning activities, because it has been proven to have a positive impact on their fine motor development.

The average value of children's fine motor development before being given the grain mosaic media was 7.50 with a standard deviation of 1.196, while after being given the media, the average value increased to 9.00 with a standard deviation of 0.871. The difference or mean difference of 1.50 indicates an increase in fine motor skills after the intervention.

These results are in line with the developmental theory according to Hurlock (2003), which states that children's motor development can be improved through stimulation provided routinely and according to the child's age stage. The more varied and interesting the form of stimulation used, the more optimal motor development will be. In addition, research by Yuliani (2020) also shows that educational play activities such as mosaics can significantly improve the fine motor skills of early childhood. This media provides direct experience for children in controlling fine movements consciously and directed. Thus, it can be concluded that the grain mosaic media is very useful in improving the average fine motor skills of 5-year-old children, and can be an alternative creative and fun learning method in PAUD.

Bivariate Analysis

The bivariate analysis results in Table 4.3 show that of the 30 respondents, 27 children (90%) experienced an increase in fine motor skills after being given the seed mosaic media treatment (after > before). None of the children experienced a decrease (after < before), and only 3 children (10%) showed the same results before and after treatment.

This is indicated by positive ranking values ($N = 27$, Mean Rank = 14, Sum of Rank = 378.00) and negative ranking values ($N = 0$, Mean Rank = 0, Sum of Rank = 0). Three children also had the same score (no change).

These findings indicate that the use of seed mosaic media has a positive effect on improving the fine motor skills of 5-year-old children. Children become more sensory and motorically stimulated through mosaic-assembling activities that involve hand-eye coordination, pinching skills, and concentration. These results align with previous research by Anugrah et al. (2024) and Listiarini et al. (2024), who stated that sensory-based play media such as grain mosaics can stimulate fine motor development in early childhood because this activity involves controlled and systematic hand skills.

CONCLUSION

Grain mosaic media significantly improves fine motor development in 5-year-old children, particularly in hand–eye coordination, grip strength, accuracy, and focus. This media is not only effective but also affordable and culturally relevant, making it an engaging and creative alternative for developing fine motor skills. Its low cost allows for easy implementation both at school and at home, encouraging active involvement from teachers and parents in supporting children's development. Besides enhancing motor skills, using grain mosaic media also fosters enjoyment and motivation, making the learning process more fun and effective. This combination of educational value and accessibility makes grain mosaic a highly recommended method for early childhood educators and parents seeking innovative ways to stimulate fine motor abilities. Therefore, incorporating grain mosaic media into early childhood learning activities can enrich educational experiences and optimize skill development in young children.

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