

The Effect of Playing Plasticine on the Fine Motor Development of Children Aged 4-6 Years in Kindergarten

Ganjar Safari, Zein Al Syurfah, KM Yusfar, Liana Pujiastuti

Nursing Study Program, Faculty of Health Sciences, Bale Bandung University,
Indonesia

ganjar_ners@yahoo.com, zeinalsyurfah20@gmail.com,
yusfarmuhamad70@gmail.com, lianapujiastuti533@gmail.com

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Abstract

Introduction: Fine motor development in children aged 4-6 years is able to use scissors correctly, write numbers, letters, draw body parts. However, the facts in the field, especially in Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool, there are still many children aged 4-6 years who are not able to hold a pencil properly, have not been able to hold scissors and hold the crayon correctly and even draw body parts are not able to cause problems with children's fine motor development that is slow and causes obstacles to children in completing their tasks. **Objective:** The purpose of this study was to determine the effect of playing plasticine on fine motor development of children aged 4-6 years kindergarten in Baleendah Village, Bandung Regency. **Method:** The method used in this study is with experimental methods with Quasi Experimental Design research design. **Result and Discussion:** The statistical test in this study is Mc Nemar obtained results with p-value (Asymp. Sig 2 tailed) of $0.0001 < 0.05$, it can be concluded that there is an effect of playing plasticine on fine motor development in children aged 4-6 years kindergarten in Baleendah Village, Bandung Regency. **Conclusion:** Through this study there are results that playing plasticine has an influence on children's fine motor development, therefore it is hoped that learning methods by utilizing plasticine play can be applied in kindergartens in Baleendah Village

Keyword: Child; Fine Motor; Playing Plasticine;

Introduction

Developmental problems in children reviewed by dr. Atien Nur Chamidah, MD, Is, St. include gross motor development disorders, fine motor development disorders, language development disorders, emotional and behavioral disorders (Puspita & Umar, 2020). According to UNICEF 2021 Countries with the lowest development rates are in the Central African Republic at 36%, the World Health Organization (WHO) in 2018 reported the prevalence of toddlers who experience impaired growth and development is 28.7% and Indonesia is included in the third country with the highest prevalence in the Southeast Asia Region / South-East Asia Regional (SEAR), the lowest child development in Indonesia is in Central Sulawesi Province (74.8%) while in West Java (85%) (RISKESDAS, 2018).

Broadly speaking, factors that affect development in children can be divided into two categories, namely internal factors, and external factors (environment). Internal factors include differences in race/ethnicity or country, family, age, gender, genetic diseases, and chromosomal abnormalities. In addition to internal factors, external/environmental factors can also affect child development. Environmental factors that affect children's growth and development include nutritional, stimulating, psychological, and socioeconomic factors. Children aged 4-6 years are in the learning phase with a rapid growth span at this age is the right time to form character in children (Maghfiroh, 2020)

Fine motor development is the development of children's body movements involving small muscles, such as those in the fingers, wrists, and other parts that require accuracy, perseverance, and good coordination between the eyes and small muscles (Ningsih et al., 2022). Fine motor development in children aged 4-6 years is able to use scissors correctly, write numbers, letters, draw body parts. However, the fact that in the field there are still many children aged 4-6 years who are not able to hold a pencil properly, have not been able to hold scissors and hold the crayon correctly and even draw body parts are not able to, causing problems with children's slow fine motor development and causing obstacles to children in completing their tasks.

The fine motor development of this child is influenced by two factors, namely internal factors which include: genetics, motivation to practice, health, nutrition, practice opportunities, and external factors which include: parental knowledge, parental education, parental attitudes, family, socio-economic, socio-cultural, environmental, health workers, and parenting (Rohmah & Gading, 2021). Fine motor skills in each child are different, because fine motor skills are influenced by the stimulation provided (Pura & Asnawati, 2019). If given proper stimulation, then children's motor skills can develop optimally.

Delays in fine motor development in children can cause developmental disorders in children, resulting in low self-confidence, less active and difficult to adapt to the environment which ultimately reduces the quality of the nation's next generation due to low human resources (Prasetyanti, 2017)

In addition, fine motor development is not age-appropriate, prone to nervous disorders, abnormal motor system motion characteristics, such as difficulty in writing, buttoning clothes, unstable walking, inaccurate movements, etc. (Maghfuroh, 2018)

Based on the results of Basic Health Research (Riskesdas) in 2018 shows that the percentage of child development index, Nepal amounted to 64.4%, Vietnam amounted to 88.7%, Thailand as much as 91.1% and Indonesia as much as 88.3%, Most children who experience developmental delays occur in the Asian and African region. (Riskedas, 2018).

A study in Indonesia shows that 20-30% of children under five experience delays in development, most of them experience delays in fine motor aspects caused by lack of stimulation (Sembiring, 2020). Developmental disorders in children include cases of fine motor delays, in the United States ranging from 12-16%, Thailand 24%, Argentina 22%, and in Indonesia reaching 13-18% (WHO, 2018) in (Damayanti, 2021)

In the development of fine motor skills in children, must go through activities that are interesting and varied for children. In this case, the development of children's fine motor skills is carried out through play activities, because play is important for children.

According to dr. Merry Dame Cristy Pane, one of the efforts in improving children's fine motor skills is by providing educational games such as playing with rubber bands, playing with paper, arranging blocks and puzzles, eating with spoons, and playing with plasticine.

One of them is plasticine play therapy that is safe for children, by being given plasticine play therapy children are trained in making something new that provides artistic value according to their ideas and creativity. This activity has the main objective to expand the child's attention span, make the child understand and carry out instructions, support the development of small muscles and improve eye-hand coordination (Prasetyanti, 2017)

Plasticine is a night candle that can be used repeatedly as a multifunctional educational play tool (Putri et al., 2023) So by playing plasticine children can be creative in making a modeling, sculpture, numbers, letters and shapes that children want because materials that are easy to form this activity can help stimulate small muscles such as finger muscles also involve eye coordination and small muscles (SOFIYANTO, 2017)

In research conducted by (Rohmah & Gading, 2021) showed that there was an increase in fine motor skills through playing plasticine by 23.94%. While through finger painting activities showed that children's fine motor development increased by 17%

The general purpose of this study was to determine the effect of playing plasticine on the fine motor development of kindergarten children 4-6 years in Baleendah Village, Bandung Regency

Method

The design of this study uses a Quasi Experimental Design research design. This form of design is a development of True Experimental Design. This design has a control

group, but cannot fully control outside variables that affect the conduct of the experiment. However, this design is better than Pre-Experimental Design. Quasi Experimental Design, used because it is difficult to get the control group used for research. Quasi Experimental Design is formed into two designs, namely Time-Series Design and Nonequivalent Control Group Design. The approach used in this study is Nonequivalent Control Group Design

The population in this study was 97 people with 30 Siduri Kindergarten students, 52 SKB Playschool, 15 Mawar Putih Playschool located in Baleendah Village, Bandung Regency. The samples in this study were 40 students of Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool which were divided into 2 groups, namely 20 experimental groups and 20 control groups

$$n = \frac{N}{1 + N(e)^2}$$

Information

n: Number of samples required

N: Total population

e: Level of sampling error, usually 5%

The location of this research was carried out at Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool in Baleendah Village, Bandung Regency. The implementation time and making of the report will be carried out in Baleendah Village, Bandung Regency from April 2023 to June 2023.

Result and Discussion

Result

Based on the results of research conducted by *Rahmawati, Herman, Widya Praningrum* at Beringin XI Kindergarten, it was found that plasticine play activities can improve children's fine motor skills. This is evidenced by an increase in the percentage of fine motor skills.

Further research conducted by *Herlina Tadaronggo, Bastiana, Ramlah* through research activities with observation techniques, documentation obtained results through the method of playing with plasticine can improve children's fine motor skills.

Based on a preliminary study conducted by researchers on January 25, 2023, conducted at Widuri Kindergarten, the results of interviews with teachers found that efforts have been made to stimulate fine motor skills including squeezing paper, tearing paper, splashing water, squeezing rice, but there are still children aged 4-6 years whose fine motor skills are not in accordance with their development as many as 23 people out of 30 people. On January 30, 2023, researchers conducted an interview with SKB Playschool teachers that children aged 4-6 years old had not optimal fine motor development with their developmental age, which was 39 out of 52 children despite stimulation such as squeezing paper, arranging blocks, squeezing rice. On January 31,

2023 at Mawar Putih Playschool, the results of interviews with teachers were obtained information that had been stimulated by carrying out educational activities such as attaching colored paper to books, coloring, squeezing paper but 11 out of 15 people had fine motor development not in accordance with their development.

Based on the results of the examination of fine motor development in Widuri Kindergarten using DDST by researchers, the results were obtained namely children aged 4 years 2 people, 5 years 18 people, 6 years 3 people whose fine motor skills were not in accordance with their developmental age. In SKB Playschool, the results of children aged 4 years 3 people, 5 years 24 people and 6 years 12 people whose fine motor skills are not in accordance with their developmental age. In Mawar Putih Playschool, the results of children aged 4 years 6 people, 5 years 5 people whose fine motor skills are not in accordance with their developmental age.

Child Gender

The gender of respondents aged 4-6 years can be seen in the table below:

Table 1

Gender Frequency Distribution of Kindergarten Children in Baleendah Village

Gender of Child Respondents	Frequency	Percentage (%)
Man	18	45.0
Woman	22	55.0
Total	40	100

Based on table 1, it can be explained that from 40 respondents, most of the child respondents were women with a total of 22 people with a presentation of 55%, men 18 people with a presentation of 45%.

Age of Child Respondents

The ages of respondents aged 4-6 years can be seen in the table below:

Table 2

Distribution of Age Range of Kindergarten Child Respondents in Baleendah Village

Age Range of Child Respondents	Frequency	Percentage (%)
4-5 Year	17	42.5
5-6 Year	23	57.5
Total	40	100

Based on table 2, it can be explained from 40 respondents, most of the respondents were children aged 4-5 years as many as 17 people with a presentation of 42.5% and ages 5-6 years as many as 23 people with a presentation of 57.5%.

Changes in Children's Fine Motor Development Before and After Plasticine Play

Table 3

Distribution of Children's Fine Motor Development Level Before Playing Plasticine
 Experimental Group in Kindergarten in Baleendah Village, Bandung Regency

Level of fine motor development	Frequency	Percentage (%)
Normal	0	0.0
Delay	20	100.0
Total	20	100

Based on table 3, it can be explained from 20 experimental group respondents, all of them were categorized as Delay with a percentage of 100% before playing plasticine.

Table 4

Distribution of Fine Motor Development Level of Control Group Children in
 Kindergarten in Baleendah Village, Bandung Regency

Level of fine motor development	Frequency	Percentage (%)
Normal	0	0.0
Delay	20	100.0
Total	20	100

Based on table 4, it can be explained that all the 20 control group respondents are still in the Delay category with a 100% presentation

Table 5

Distribution of Children's Fine Motor Development Level After Playing Plasticine in
 Experimental Group in Kindergarten in Baleendah Village, Bandung Regency

Level of fine motor development	Frequency	Percentage (%)
Normal	20	100.0
Delay	0	0
Total	20	100

Based on table 5, it can be explained from 20 experimental group respondents, all of them are categorized as Normal with a percentage of 100% after playing plasticine for 3x a week in 3 weeks, which is an increase from the pre-test which shows the category of children to be normal because in accordance with the operational definition of chapter 3, the normal category ranges from (50-100%).

Table 6

Distribution of Fine Motor Development Level of Control Group Children in
 Kindergarten in Baleendah Village, Bandung Regency

Level of fine motor development	Frequency	Percentage (%)
Normal	19	95.0
Delay	1	5.0
Total	20	100

Based on table 6, it can be explained from 20 respondents of the control group categorized as normal with a percentage of 5.0% and categorized as delay with a percentage of 95.5%.

Cross tabulation of plasticine plays on fine motor development of children aged 4-6 years

Table 7

Cross Tabulation of Plasticine Play on Fine Motor Development of Children in Experimental Group Children in Kindergarten in Baleendah Village, Bandung Regency

Pre-test	Pos-test	
	Delay	Normal
Delay	0	20
Normal	0	0

Based on table 7 shows that the results of the experimental group sample with the child's value on the *post-test are higher than* the pre-test score. Children who were originally in the delay category at the time of the pre-test there were 20 children, then after the treatment of playing plasticine for 3x a week in 3 weeks was carried out post-test and 20 children changed the category to normal

Table 8

Cross Tabulation of Fine Motor Development of Control Group Children in Kindergarten in Baleendah Village, Bandung Regency

Pre-test	Pos-test	
	Delay	Normal
Delay	19	1
Normal	0	0

Based on table 4.8 shows that the results of the control group sample with a value of 20 children on the pre-test are categorized as delay, then pre-test is carried out after 3 weeks, 19 children are still categorized as delay and 1 child changes category to normal.

The effect of playing plasticine on fine motor development in children aged 4-6 years

The Effect of Playing Plasticine on Fine Motor Development in Children Aged 4-6 Years with the Mc. Nemar Test in processing data carried out using the Mc. Nemar Test, which is to analyze the results of paired observations from two data whether different or not with the approach method used in this study is *Nonequivalent Control Group Design*.

Table 9

The Effect of Plasticine Play on the Fine Motor Development of Children in the Experimental Group in Kindergarten in Baleendah Village, Bandung Regency

No	Instruments	Total Respondents	Significant Value $\alpha = 0.05$
1	Pre-tes	20	0,0001
2	Pos-tes	20	

Based on table 9 shows that the results of the experimental group sample of children in the post-test are higher than the pre-test scores. The critical limit value of this study is 0.05 were based on the calculation of *Mc Nemar Test* obtained results with *p-value (Asymp. Sig 2 tailed)* of $0.0001 < 0.05$, it can be concluded that there is an effect of playing plasticine on fine motor development in children aged 4-6 years.

Table 10

Fine Motor Development of Control Group Children in Kindergarten in Baleendah Village, Bandung Regency

No	Instruments	Total Respondents	Significant Value $\alpha = 0.05$
1	Pre-tes	20	1,000
2	Pos-tes	20	

Based on table 10 shows that the results of the control group sample of children's values on the post-test are lower than the pre-test scores.

The critical limit value of this study is 0.05 were based on the calculation of *Mc Nemar Test* obtained results with *p value (Asymp. Sig 2 tailed)* of $1,000 > 0.05$ it can be concluded that there is no effect of playing plasticine on fine motor development in children aged 4-6 years.

Discussion

Fine Motor Development of Children Before Being Given Plasticine Play

In this study was conducted on 40 respondents of children whose fine motor development with a delay category with a percentage of 100% that is not developed, and divided into 2 groups, namely the experimental group is a group that carried out plasticine play intervention as many as 20 respondents and the control group is a group that is not carried out plasticine play intervention as many as 20 respondents, in the experimental group and this control group all children are categorized as delay when The test was carried out using DDST that children were not able to imitate circle drawings, draw 3-part people, imitate plus drawings, choose longer lines, have not been able to draw 6-part people, have not been able to imitate square drawings at the time of the pre-test.

Internal factors that make children's fine motor development experience a slowdown in Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool are motivation to practice in children less because of the way fine motor stimulation is less attractive at school and external factors are parents' knowledge of fine motor development is less so that children's fine motor is not monitored and also not stimulated at home, Although at school is stimulated, but this fine motor development requires a long time and must also be trained consistently because fine motor is associated with movements involving certain parts of the body only carried out by small muscles such as fingers and wrist movements which usually require high accuracy, perseverance and coordination between the eyes and small muscles, so children's fine motor skills really need to be stimulated In such a way that the hand muscles become stronger and able to

be used for various activities related to fine motor such as cutting, drawing, coloring, tearing, writing, crocheting, folding, sewing, squeezing, grasping, weaving

As in children in Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool, children are less active in interacting with their peers as well as with teachers and researchers, and difficult for children to adapt to others.

In this case, the development of children's fine motor skills is carried out through play activities, because play is important for children. When a fine motor development test was carried out using DDST at Widuri Kindergarten, SKB Playschool, Mawar Putih Playschool, children still had difficulty doing various activities related to fine motor such as when conducting a fine motor development test using DDST, children still had difficulty drawing because the position of the fingers when holding a pencil was not right, which should only be the thumb, index and middle fingers (opposition) while the other finger stabilizes but the child's hand position when drawing is not right, the child still has difficulty when drawing cross lines and even the child still has difficulty in drawing squares. Children who are given proper stimulation, then the child's motor skills can develop optimally and if left unchecked, the child's fine motor development does not develop according to the child's age.

Fine Motor Development of Children After Being Given Plasticine Play

After the intervention of playing plasticine 3x a week in 3 weeks in the experimental group, it was found that 20 children with fine motor development developed very well with the Normal category of 100% and in the control group there were still 19 children in the category of delay of 95.0%. And using DDST sheets for 4–5-year-olds consists of imitating circle drawings, drawing 3-part people, imitating plus drawings and for 5–6-year-olds consists of choosing longer lines, drawing 6-part people, imitating square drawings.

The child who was originally not able to use scissors correctly, write numbers, letters, draw parts of the body. during the pre-test become capable and confident at the time of the post-test. This shows that playing plasticine has a very large influence on children's fine motor development, as evidenced by the intervention of playing plasticine in the experimental group with a duration of 3x a week in 3 weeks the child's fine motor development develops very well. So in this experimental group, after being given stimulation to play plasticine in fine motor development, they experienced very good development because motor nerves and sensory nerves that had not developed optimally became optimal so that in contrast to the control group, which was the group that was not stimulated by playing plasticine, 95% of fine motor development was still categorized as delay, this was because the child's fine motor was not stimulated so that the nerves Motor and sensory do not develop optimally if left unchecked, then fine motor development does not develop according to the age of the child so that the child will have difficulty when doing activities that involve fine motor and the child becomes insecure.

By playing plasticine children can be creative in making a modeling, sculpture, numbers, letters and shapes that children want because materials that are easy in the form

of this activity can help stimulate small muscles such as finger muscles also involve eye coordination and small muscles (SOFIYANTO, 2017). So it can be concluded that by playing plasticine children can do various movements such as pressing, squeezing, shaping, printing plasticine according to the wishes and imagination of children, so that by playing plasticine can develop aspects of child development in fine motor to be more effective, with the method of playing plasticine is also an activity that children like so it is very appropriate for the first step of forming physical skills that involve the muscles. Small also eye and hand coordination that requires high perseverance.

In this study, after being given plasticine play on fine motor development, children experienced very significant development because playing with plasticine is considered a modeling activity or making sculptures. Plasticine has the advantage that it is an easily available material, has many colors that children like, can be made into various shapes, plasticine can be made by yourself, can be used repeatedly, the price of plasticine and plasticine materials for those who want to make their own is affordable.

Research conducted (Rufaida et al., 2019) on "The Effectiveness of Playdough Play on the Fine Motor Development of Pre-School Children in Pembina Jabon Mojokerto State Kindergarten" The results showed that playdough was effective in improving the fine motor skills of pre-school children (Rufaida et al., 2019) (Rufaida et al., 2019)

From the research conducted by researchers is also supported by previous research by playing plasticine can train wrist flexibility, hand muscles and eye and hand coordination that can hone children's fine motor skills so that optimal development and in accordance with the child's age.

The effect of playing plasticine on children's fine motor development

That the results of the experimental group sample show that the value at the time of the post-test is higher than the value of the pre-test. The critical limit value of this study is 0.05 were based on the calculation of Mc Nemar Test obtained results with p-value (Asymp. Sig 2 tailed) of $0.0001 < 0.05$, it can be concluded that there is an effect after playing plasticine on fine motor development in children aged 4-6 years.

Fine motor skills of children aged 4-6 years include the ability of children to master and show muscle movements in the form of coordination, flexibility, accuracy and speed of hands and fingers. Children's fine motor development really needs to be stimulated in the form of directing, guiding, and providing opportunities for children to move small muscles in the body.

This plasticine play is a stimulation specifically designed to increase creativity and develop the fine motor skills of preschoolers. This is in line with research (Rohana et al., n.d.) states that there is improvement in the child's fine motor before and after being given plasticine play. Playing plasticine is a way that researchers use to improve fine motor skills. Because when children use plasticine media can help children jasmine the movement of the muscles of the fingers and wrists by pinching, squeezing, and grasping.

And reinforced by research (Rufaida et al., 2019) shows that plasticine game media provides an increase in fine motor skills that are at a level that is less good. Stimulation

by playing plasticine, the child's motor nerves are optimally trained to send impulses from the central nervous system to the muscles, resulting in body responses such as kneading and shaping plasticine into something desired by the child.

Because this motor nerve is a collection of nerves in the brain, spine, and muscle tissue that has a function as a sender of impulses from the central nervous system to the muscles. In addition to motor nerves, sensory nerves also become stimulated because these nerves function to receive stimuli from outside the body which are then delivered to the brain and the brain responds according to stimuli received previously because these sensory nerves play a role in the process of seeing and feeling physical touch. (dr. Rizal Fadli, 2021). So, the stimulation of playing plasticine in fine motor development has experienced a very significant development due to motor nerves and sensory nerves that had not developed optimally to be optimal.

And this research is also supported by the results of research that has been conducted by Rahmawati, Herman, Widya Praningrum at Beringin XI Kindergarten in the results that plasticine play activities can improve children's fine motor skills. This is evidenced by an increase in the percentage of fine motor skills. This research is also supported by the research of Herlina Tadaronggo, Bastiana, Ramlah through research activities with observation techniques, documentation obtained results through the method of playing with plasticine can improve children's fine motor skills.

And this study is also supported by research conducted by (Harsismanto et al., 2021) showing that there is a difference in effectiveness between playing plasticine with finger painting on the fine motor development of pre-school children in Paud. Then research conducted by (Watulingas & Wantah, 2021) showed that plasticine games had a positive effect on the fine motor skills of grade B kindergarten children.

If fine motor stimulation is done regularly, the child's fine motor development will develop according to the child's age and can strengthen the child's fingers as preparation for the child to learn to write, extend the child's concentration span, train independence and form a positive self-image in children, train eye and hand coordination and vice versa if the child is not given stimulation in his fine motor skills it can cause delays in fine motor development Not appropriate for the age of the child and the child can have difficulty in exploring the environment, experience obstacles in activities involving fine motor and the child can also experience a lack of interest in learning and creativity because the child feels insecure.

On research conducted by (Herniwati, Pahrul, & Amalia, 2022) playing plasticine was only done for 4 meetings and got good results on the fine motor development of children who experienced delays and in this study in the experimental group was carried out with a duration of time 3x a week in 3 weeks proven by the intervention of playing plasticine in the fine motor development of children developed very well, with this the more often stimulation is carried out the better the child's fine motor develops according to the age of the child. Based on theoretical and research with plasticine play which is an appropriate stimulation for children aged 4-6 years to improve fine motor development.

Conclusion

The fine motor development of children before being given plasticine play in the experimental group and the control group got results with a percentage of 100% which showed that the child had a delay. The fine motor development of children after being given plasticine play in the experimental group got results with a percentage of 100% in the Normal category while in the control group showed a percentage of 95% still in the Delay category and 5% in the Normal category. There is an influence of playing plasticine on fine motor development in children aged 4-6 years kindergarten in Baleendah Village, Bandung Regency.

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