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Original Article

THE EFFECT OF COLORING PICTURES ON FINE MOTOR DEVELOPMENT OF PRESCHOOL CHILDREN 4-6 YEARS OLD AT KINDERGARTEN DHARMA WANITA I WERUNGOTOK NGANJUK

Rahayu Budi Utami [1)]*, Adelia Nur Dwiyanti [2)]
[1,2)] STIKES Satria Bhakti Nganjuk, Indonesia
*Corresponding Author, E-mail : budiutami2201@gmail.com

ABSTRACT

Background. Stimulation of preschool children's fine motor skills needs to be done as a start to writing and drawing. Improving fine motor skills requires stimulation, one of which is to improve the fine motor skills of coloring pictures. Coloring pictures has many benefits, namely as a medium for color recognition, stimulating the sense of sight, and helping to solve problems. This study aims to determine the effect of coloring pictures on the fine motor development of preschool children aged 4-6 years at Dharma Wanita I Werungotok Nganjuk Kindergarten. **Research Method.** This study used a pre-experimental approach with a one-group pre-post-test design. The study population was pre-school children aged 4-6 years as many as 29 children. The sampling technique used was total sampling. Statistical tests used the Wilcoxon Test with $\alpha \leq 0.05$. **Findings.** The results showed that of the 29 respondents, the fine motor development of children before coloring pictures was almost half, namely 11 respondents (37.9%) had dubious fine motor development. After the coloring picture was done, most of the 22 respondents (75.9%) had fine motor development according to development. The Wilcoxon test results obtained p value = $0.000 \leq \alpha = 0.05$ so that Ha is accepted, meaning that there is an effect of coloring pictures on fine motor development in preschool children aged 4-6 years. **Conclusion.** Stimulation of coloring pictures is expected to be well implemented so that fine motor development in preschool children can improve in accordance with their age development.

Keywords: Coloring Picture, Fine Motor Skills, Pre-School Age Children.

BACKGROUND

Preschool-age children are children aged 3-6 years. Children are the dream of every family and families also expect their children to grow and develop optimally to be proud of and useful for the country and nation [1]. The preschool period is a golden period, because the development of children will experience many significant changes. In order for the growth of preschool children to be optimal, stimulation is given to provide stimulation in all aspects of child development [2]. There are 4 aspects of development, namely gross motor, fine motor, speech and language, socialization and independence ([3]. One aspect of preschool child development that has a significant influence on child development is motor skills. Motor skills are the ability of a child to perform typical motor activities without causing injury. The development of physical motor abilities of preschool children is one

aspect of the development of essential abilities consisting of gross motor and fine motor abilities [4].

Based on a preliminary study on October 10, 2023, out of 29 preschool children, 12 children received a 2-star score and experienced delays in fine motor development as seen from their inability to make circles, perpendicular lines, arrange blocks, and write. Based on interviews with the Principal at Dharma Wanita I Werungotok Nganjuk Kindergarten, so far there are still shortcomings in developing children's fine motor skills and the results obtained during the previous 2 years are still below the 80% target, such as coloring picture activities (Coloring Picture) there are problems some children coloring out of the picture pattern, some children who cannot complete coloring, and some are assisted by the class

Delayed child development is a worldwide problem, especially in developing countries, there is data on the incidence of motor development disorders of 27.5% or 3 million children experiencing disorders [5]. The incidence of growth and development disorders in children aged 3-6 years, especially in motor disorders, reaches 30% of the total 250 million children (43% come from developing countries and poor countries) [6]. Meanwhile, 5 - 25% of preschool children in the world have impaired fine motor development [1]. Delays in child growth and development in Indonesia reach 13-18%. East Java Province has 24.5% of preschool children with impaired fine motor development [7]. In Dharma Wanita I Werungotok Nganjuk Kindergarten, the number of preschool age children based on the age of 4 - 6 years old with a total of 29 children.

Factors that can affect motor development include biological factors, environmental factors, and physical factors [8]. The provision of stimulus has a major influence in child development. The more stimulus provided, the child's development can develop optimally, and the lack of stimulation can cause developmental disorders in children [3]. If a child's fine motor development is not well developed, the child will have difficulty exploring the environment and have an impact on future development. Impaired motor development can cause difficulties in the learning process at school, resulting in a variety of behaviors such as lazy writing, lack of interest in learning, children become inferior, hesitant, and wary of the environment [9].

The development of preschool children can experience deviations in exploring the environment and the learning process at school if not given stimulation, one aspect of development that is given stimulation is fine motor. Fine motor is a proficiency activity that involves small muscle movements, such as folding paper, play dough, cutting, drawing and coloring pictures or coloring pictures [10]. Child development is also influenced by optimal

stimulation from parents, especially mothers [11]. Stimulation that can stimulate fine motor skills is coloring pictures [5]. Coloring is a creativity activity, where children are invited to give one or several strokes of color to a shape or sketch of an image, resulting in the creation of a work of art [12]. Almost every child likes coloring and drawing activities, these activities are not for artistic development alone but can be used as a medium to express an idea, foster creativity, and children's emotions. In addition to this, coloring and drawing can train fine motor skills in children and will be useful when children start learning to write at school age [13]. In addition to this, coloring pictures has many benefits, among others, as a medium for color recognition, stimulating the sense of sight, training fine motor skills, and helping in solving problems [14]. Based on this, researchers are interested in conducting research to train fine motor development in preschool children aged 4-6 years at Dharma Wanita I Kindergarten through Coloring Picture activities or coloring pictures.

RESEARCH METHOD

The design of this study was "Pre-experimental with a One Group Pre-Post Test Design approach", in which the subject group was observed before the intervention and observed again after the intervention [15].

Pre-Test: Measurement of fine motor development before Coloring Picture with KPSP. Intervention: Coloring Picture was conducted 8 times for 4 weeks (1 week 2 meetings with a duration of 35 minutes). Post-Test: Measurement of fine motor development 1 day after the 8th meeting with KPSP.

The research was conducted at Dharma Wanita I Werungotok Nganjuk Kindergarten, on March 06 - April 06, 2024. This research was conducted based on a letter of assignment from head of the Research and Community Service Center of STIKES Satria Bhakti Nganjuk with No. 007/073.138.PN/II/20224. The population of this study were preschool children aged 4-6 years at Dharma Wanita I Werungotok Nganjuk Kindergarten, totaling 29 children, and the research sample was all preschool children aged 4-6 years at Dharma Wanita I Werungotok Nganjuk Kindergarten.

The sampling technique in this study was total sampling, which is a sampling technique when all members of the population are used as samples [16]. Research variables consist of independent variables, namely Coloring Picture, and dependent variables of fine motor development of preschool children aged 4-6 years. Coloring pictures was activity to give a color or scratching colors or paints on an image. Conduct Coloring Picture stimulation for 8 times in 4 weeks (2 meetings in every week) with a duration of 35 minutes.

The instrument used in this thesis uses a questionnaire, namely KPSP (Pre-Screening Development) adopted from Batlajery et al. using a Likert scale, namely statements "1 = Yes", "2 = No". Furthermore, the number of answers obtained is calculated and adjusted to the KPSP standardization scoring, namely Score 9-10 categorized as Development (S), Score 6-8 categorized as Doubtful (M), and Score ≤ 6 categorized as Deviation (P) [17]. Data analysis using the Wilcoxon Test with a significance level of $\alpha = 0.05$, ρ value ≤ α then H1 is accepted which means there is an effect of Coloring Picture on the fine motor development of preschool children aged 4-6 years at Dharma Wanita I.

FINDINGS

Respondent characteristics

The result of respondent characteristic based on gender, age, birth order, number of siblings, mother's age, maternal education, mother's work, father's age, father's education, and father's work of preschool children aged 4-6 years is listed below.

Table 1. Respondent Characteristics at Dharma Wanita I Werungotok Nganjuk Kindergarten on March 06 – April 06, 2024.

No	Gender	Frequency (*f*)	Percentage (%)
1.	Man	10	34.5
2.	Woman	9	65.5
	Total	**29**	**100.0**
No	**Age**	**Frequency *(f)***	**Percentage *(%)***
1.	48-54 Months	5	17.2
2.	60-66 Months	22	79.9
3.	72 Months	2	6.9
	Total	**29**	**100.0**
No	**Birth Order**	**Frequency (*f*)**	**Percentage (%)**
1.	Last Child	0	0.0
2.	Middle child	8	27.6
3.	Eldest child	21	72.4
	Total	**29**	**100.0**
No	**Number of siblings**	**Frequency (*f*)**	**Percentage (%)**
1.	1 brother	29	100.0
2.	2 brothers	0	0.0
3.	>3 brothers	0	0.0
	Total	**29**	**100.0**
No	**Mother's Age**	**Frequency (*f*)**	**Percentage (%)**
1.	20-25 years old	7	24.1
2.	26-30 years old	17	58.6
3.	>30 years	5	17.2
	Total	**29**	**100.0**
No	**Maternal Education**	**Frequency (*f*)**	**Percentage (%)**
1.	No School	1	3.4
2.	Primary school	2	6.9
3.	Junior High School	6	20.7
4.	High School	15	51.7
5.	College	5	17.2
	Total	**29**	**100.0**

No	Mother's Work	Frequency (*f*)	Percentage (%)
1.	Housewives	20	69.0
2.	Private	5	17.2
3.	Self employed	2	6.9
4.	Civil Servants	2	6.9
	Total	**29**	**100.0**
No	**Father's Age**	**Frequency (*f*)**	**Percentage (%)**
1.	20-25 years old	0	0.0
2.	26-30 years old	20	69.0
3.	>30 years	9	31.0
	Total	**29**	**100.0**
No	**Father's Education**	**Frequency (*f*)**	**Percentage (%)**
1.	No School	2	6.9
2.	Primary school	4	13.8
3.	Junior High School	9	31.0
4.	High School	9	31.0
5.	College	5	17.2
	Total	**29**	**100.0**
No	**Father's Work**	**Frequency (*f*)**	**Percentage (%)**
1.	Not Working	1	3.4
2.	Private	9	31.0
3.	Self employed	15	51.7
4.	Farmer	3	10.3
5.	Civil Servants	1	3.4
	Total	**29**	**100.0**

Table 1. showed that of the 29 respondents, most of them had the gender of a girl, namely 19 respondents (65.5%), most of the respondents were 60-66 months old, namely 22 respondents (75.9%), most of them were the eldest children, namely 21 respondents (72.4%), all had one sibling, which was 29 respondents (100%), most of the mothers were 26-30 years old, namely 17 respondents (58.6%), most of the mother's education was in high school, namely 15 respondents (51.7%), most of the mother's work as a housewife, namely 20 respondents (69.0%), most of the fathers were 26-30 years old, namely 20 respondents (69.0%), almost half of the last education of junior high school fathers was 9 respondents (31.0%) and almost half of the last education of high school fathers was 9 respondents (31.0%), most of the father's work as an entrepreneur was as many as 15 respondents (51.7%).

Fine motor development of preschool-aged children 4-6 years before Coloring Picture.

Table 2. Distribution of frequencies of fine motor development of preschool children 4 – 6 years old before coloring pictures are carried out at Dharma Wanita I Werungotok Nganjuk Kindergarten on March 06 – April 06, 2024

No	Development	Frequency (*f*)	Percentage (%)
1.	Deviation	9	31.0
2.	Doubt	11	37.9
3.	Keeping up with developments	9	31.0
	Total	29	100.0

Table 2 shows that of the 29 respondents, almost half, namely 11 respondents (37.9%) had doubtful about children's fine motor development before the Coloring Picture was done. But 9 respondents already had developed fine motor, as many as 9 respondents had deviation (31%).

Fine motor development of preschool children 4-6 years old after Coloring *Picture*

Table 3. Distribution of frequencies of fine motor development of preschool children aged 4 – 6 years after coloring pictures at Dharma Wanita I Werungotok Nganjuk Kindergarten on March 06 – April 06, 2024

No	Development	Frequency (*f*)	Percentage (%)
1.	Deviation	1	3.4
2.	Doubt	6	20.7
3.	Keeping up with developments	22	75.9
	Total	29	100.0

Table 3 shows that of the 29 respondents, most of them, namely 22 respondents (75.9%) have children's keeping up fine motor development according to the development after Coloring Picture.

Effect of fine motor development of preschool children 4-6 years old before and after Coloring *Picture*

Table 4. Tabulation of the effect of Coloring Picture on fine motor development of preschool children aged 4 – 6 years at Dharma Wanita I Werungotok Nganjuk Kindergarten on March 06 – April 06, 2024

KPSP (Pre-Screening Development)	Before		After	
	Frequency (*f*)	Percentage (%)	Frequency (*f*)	Percentage (%)
Deviation	9	31.0	1	3.4
Doubt	11	37.9	6	20.7
Keeping up with developments	9	31.0	22	75.9
Total	29	100.0	29	100.0
Hasil Uji *Wilcoxon p value* = 0.000 ≤ α 0.05				

Table 4 shows that of the 29 respondents whose children's fine motor development before the coloring picture was carried out, almost half, namely 11 respondents (37.9%) had doubtful fine motor development, after the coloring picture was done, most of them, namely 22 respondents (75.9%) had children's keeping up fine motor development according to development. The results of the Wilcoxon Test showed that p-value = 0.000 ≤ α 0.05 so that Ha was accepted, meaning that there was an Effect of Coloring Picture on Fine Motor Development of Preschool Children 4 – 6 Years Old at Kindergarten Dharma Wanita I Werungotok Nganjuk.

DISCUSSIONS

Children's fine motor development before Coloring *Pictures* at Kindergarten Dharma Wanita I Werungotok Nganjuk

The results showed that of the 29 respondents, almost half, namely 11 respondents (37.9%), had doubtful fine motor development before coloring *pictures*. Of the 11 respondents who had dubious fine motor development, almost all of them, namely 10 respondents (90.9%) were male, all of them, namely 11 respondents (100%) had the number of siblings 1. The results of the statistical test obtained *a p value* of gender $0.000 \leq \alpha$ (0.05). The results of the statistical test obtained *a p value* of the number of siblings $a \leq \alpha$ (0.05), so that fine motor development before being given *a coloring picture* was significantly influenced by gender and the number of siblings.

The majority of respondents who had the number of siblings 1 were studied related to parental parenting in educating and developing the abilities of preschool-age children [18]. Parenting of parents with developmental preschool-age children who have 1-2 siblings have good fine motor skills compared to the number of siblings more than 2. The first or only child, in general, his intellectual ability is more prominent and develops quickly because he often interacts with adults. However, her motor skills are lacking because there is no stimulation that is usually done by her siblings [19].

The difference in sex between men and women also affects development. Gender has a big influence, that girls experience fine motor development faster compared to boys because boys are happier in gross motor training activities compared to girls [20]. In addition, girls are more easily stimulated compared to boys because girls are calmer and more manageable [2].

Based on the description above, the number of siblings affects the child's fine motor development, children who have a number of siblings 1-2 get stimuli obtained by their siblings but if not given a stimulus their fine motor skills will be disturbed, in single children their intellectual abilities are more prominent because they often interact with adults. Gender affects children's fine motor development; female children experience fine motor development faster than boys because girls are more comfortable doing activities that involve their fine muscles and are easier to manage than boys.

Children's fine motor development after Coloring Picture at Dharma Wanita I Werungotok Nganjuk Kindergarten

The results of the study showed that of the 29 respondents, almost all, namely 22 respondents (75.9%), had fine motor development according to the development after

coloring *pictures*. Of the 22 respondents who had fine motor development according to almost all development, namely 22 respondents (100%) had the number of siblings 1, most of them were 16 respondents (72.7%) of the mother's age of 26-30 years, most of them were 15 respondents (68.2%) of high school mothers' education. The results of the statistical test obtained a p value of the number of siblings a ≤ α (0.05). The results of the statistical test of the maternal age p value were 0.011 ≤ α (0.05). The results of the statistical test of the p value of maternal education were 0.041 ≤ α (0.05). So that fine motor development after being given coloring pictures is significantly influenced by the number of siblings, maternal age and maternal education.

Preschoolers who have siblings, regardless of age and gender, have a greater chance of being in the high motor competency group and on average in terms of total motor competence, when compared to children without siblings [21]. These results can be an indication of a tendency to develop better motor competencies in the future. The position of children in the family can affect their growth and development. Single children in general have slow fine motor skills because there is no stimulus that is usually done by their siblings, while having 1 to 2 siblings has high parental confidence and makes the child develop fine motor faster. In families whose economy is poor with a large number of children, it can affect children's development, because in addition to not being able to meet children's nutritional intake, parental affection and attention will also be reduced [22].

There is a relationship between the mother's age and the level of child development, mothers aged 20-35 years are at productive age so that mothers still have preschool-age children [23]. Mothers who are <20 years old psychologically have a level of maturity and strength that is not ready to think, act, and work as parents and mothers are also greatly influenced by input from the surrounding environment. While mothers who are >35 years old may be the factor that causes it is the maternal fatigue factor, where mothers are tired of looking for information about child development and providing care according to the child's previous experience.

There is a relationship between maternal education and fine motor development in preschool-age children. Maternal education is an influential factor in children's motor development [24]. The mother is an important part of the first five years of child development, the communication established between mother and child since the womb becomes an important role in the growth and development of the child. A person with an equivalent advanced education has a cognitive domain of more complex knowledge structures than individuals in elementary education (elementary and junior high school),

compared to the mother's ability to capture information and process it into knowledge that can be applied concretely. Parents have an important role, especially in the process of growth and development as well as the formation of a person's personality. Parents are the first educators for their children. With a high level of education, a person will be able to more easily follow the development of science and technological advances so that it will be easy to provide stimulation to their children. The higher the level of education of the mother, the greater the fine motor stimulation given to the child [2].

Based on the description above, the number of siblings affects the child's fine motor development, children who have siblings have better motor development because they get stimuli obtained by their siblings and after being given coloring picture stimulation at school, it is likely that the mother also applies the same stimulation to her child when at home. The mother's age also affects motor development, mothers who are 20-35 years old are at a productive age in stimulating and seeking information related to child development. In addition, maternal education also affects the fine motor development of children, mothers with high school education have more complex knowledge compared to individuals who are in elementary education. This means that a high level of maternal education will improve the child's ability in fine motor development.

The Effect of Coloring Pictures on Fine Motor Development of Preschool Children 4-6 Years Old at Kindergarten Dharma Wanita I Werungotok Nganjuk

Based on the results of the study, it was shown that of the 29 respondents whose fine motor development was carried out before the *coloring picture*, almost half, namely 11 respondents (37.9%) had doubtful fine motor development, after the coloring picture most of them, namely as many as 22 respondents (75.9%) had fine motor development according to development. The results of the Wilcoxon test showed that p value = $0.000 \leq \alpha = 0.05$ so that Ha was accepted, meaning that there was an effect of coloring pictures on fine motor development in preschool children at Dharma Wanita Kindergarten 1 Werungotok Nganjuk.

Coloring pictures with crayons is very functional for children, with crayons serving to train fine motor skills in their development, which is implemented in the act of coloring pictures evenly, does not go out of line patterns, and is even able to blend colors. At the time of coloring, children have been led to concentrate on acquiring certain skills [13].

There is a significant influence of coloring pictures on children's fine motor development in Paud Bukit Sepanjang, Kalayang District, Indragiri Hulu Regency (Kurnia, 2019). Based on the description above, coloring *pictures* have a great influence on children's fine motor development. Children who have siblings Because *coloring pictures* are one of

the stimuli that can develop expression and imagination through coloring pictures with hand movements, developing fantasy, imagination and creation. So that the nerves, nerve veins and finger muscles of the child's hands are more organized. Based on attachment 13, there are several respondent data, namely numbers 11 and 16 did not experience an increase in the status of fine motor development (fixed). Before the coloring picture was carried out, respondent number 11 had doubtful fine motor development and after the coloring picture was done, the results were also fixed. This also happened to the respondent at number 16, before the coloring picture was carried out, the fine motor development was doubtful and after the coloring picture was done, the result was that the fine motor development was still doubtful. In addition, in respondent number 7, before the coloring picture was done, his fine motor development was deviated and after the coloring picture was done, the result was that his fine motor development still had deviations. This is because respondents' number 11, 16, and 7 when coloring the picture did not follow the directions, colored until it came out of the sketch line, and could not finish it on time. In addition to this, it can also be influenced by several other factors that are not researched by researchers, namely biological factors (development direction, growth rate, differences and integration, readiness, learning period, individual differences, phylogeny and ontogenicity), environmental factors (bonds, temperament), physical factors (premature birth, diet, fitness, biomechanics) that are not researched by researchers. However, from these factors, the stimulation can be further increased, so that fine motor development in children can increase according to their age by examining the child to the doctor or doing it by therapy.

CONCLUSION

Fine motor development in children can be improved according to their age in several ways, one of which is with coloring picture therapy, so that children can learn and train fine motor skills well. Stimulation of coloring pictures is expected to be applied properly so that fine motor development in pre-school children can increase according to their age, because it can develop creativity and imagination through coordination between eyes and hands.

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