

The Effect of Puzzle Stimulation on Fine Motor Development of Preschool Aged Children

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How to cite this article: Reny Siswanti, Dewi Nopitasari, Eni Rizki et. al. The Effect of Puzzle Stimulation on Fine Motor Development of Preschool Aged Children. Indian Journal of Forensic Medicine and Toxicology 2022;16(4).

Abstract

Background: The growth and development of children involve physical changes and other several aspects, namely fine and gross motor, cognitive, language, emotional and social. Growth and development of children is influenced by internal and external factors. Children who received positive stimulations from the surrounding environment will help them grow and develop optimally. Puzzle play can be an option to stimulate the growth and development of preschool aged children.

Aim: This study is aimed to determine the effect of puzzle stimulation on fine motor development of preschool aged children.

Methodology: The design of this study was quasi-experimental which involved one group pretest and posttest design approach, using observation sheet with DDST (Denver Developmental Screening Test) rating scale instrument. The study was conducted at Leuwiliang Village in Bogor District with a total sample of 23 parents or caregivers of children. The data analysis techniques used were univariate and bivariate with Wilcoxon Rank Test.

Result: Out of 23 participants, 14 participants (60,9%) had suspected delay before stimulation and 19 participants (82.6%) had normal fine motor development after puzzle stimulation.

Conclusion: There was a significant effect of puzzle stimulation in fine motor development of preschool aged children.

Keywords: Fine motor, Puzzle, Preschool aged children, Stimulation

Introduction

Early childhood is defined as period from the child is born up until the age of 6 years old. This period is the age which determines the formation of

the character and personality of a child. At this stage, children experience rapid growth and development and it is called as the golden age period. Foods that are nutritious and well-balanced as well as stimulation are needed for growth and development.¹

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Development is the increase of the structure and function of the body to complex state, in the ability of motion rough, smooth motion, speech and language socialization, and independence.² Early childhood development are divided into four primary areas: social and emotional, language/communication, physical development, and cognitive development.

Stimulation should be given early according to development of each child. According to research by Panzilio, et.al (2020), there are many preschool aged children who have not received sufficient stimulation, while only about 48-72% of family households provide stimulation for their children.⁴one group pre-post test equivalent without control design. The results of the univariate analysis with brain gymnastics and playing puzzles intervention showed the 15 respondents before doing brain gymnastics and puzzle, there were nine children.

Fine motor skill is the coordination of small muscles in movement with the eyes, usually involving the synchronization of hands and fingers.⁵ Motor skill can be developed through games and daily life activities.⁶ During games, the activity of the sensory motor is the largest component used by children and active play is very important for the development of muscle function.⁷

According to Hartshorne (2016), 8.1% of toddlers were found with developmental disorder and 1.92% of preschool aged children were diagnosed with mental retardation. Data from Indonesia Ministry of Health (2016) showed that 16% of children under five years old in Indonesia experienced developmental disorders. Approximately 40% of the total population of Indonesia consists of children and adolescents aged 0-16 years and 13.5% of children under five years old is the age group with high risk of developmental disorders.⁹

Hayuningtyas (2020) found that out of 73 children who participated in the study, 40 children (54.8%) had low cognitive skill and 50 children (68.5%) experienced delayed fine motor skill.¹¹

Puzzle is the method of collecting the pieces of small pictures into a complete large image. Image is something that is manifested visually in the form of two-dimensional as the outpouring of feelings and

thoughts.¹² Puzzle is one of educational tools that can be used to develop fine motor skills.¹² Puzzle can also be used to stimulate cognitive development, language development and fine motor skill.⁴

Material and Method

Based on the preliminary study that has been conducted at Leuwiliang Village in Bogor District, there were 23 families with preschool aged children. It has recently been reported that out of 10 preschool aged children, 6 children had developmental disorders and 4 children had impaired fine motor skills.

This type of research used Quasi experimental, with one group pre-test and post-test design. The population in this study were parents or caregivers of preschool aged children at Leuwiliang Village in Bogor District with a sample of 23 participants.

The study inclusion criteria were parents or caregivers of preschool aged children and willing to participate in the research. The exclusion criteria were participants who are unwilling to be a participant. The sampling technique used was Total Sampling. After the number of samples was identified, then the first participant was given code 1, the next sample number was coded 2, and so on until all the samples were fulfilled by 23 participants.

Researchers submitted a research permit issued by Academy of Midwifery Wijaya Husada to the head of Leuwiliang Village in Bogor District. After obtaining research permit, researchers met participants to ask for permission and explained the instruments to be used for the research. The primary data were collected through sheet checklist and DDST (Denver Development Screening Test) observation, while the secondary data were obtained through local government data to determine the number of preschool aged children.

The DDST observation contained personal identity. The nominal dispatch scales for fine motor development is categorized as follows:

1. Unstable
2. Suspect
3. Normal

The magnitude of the effect is determined by Wilcoxon Rank Test.

Results

This research was conducted in April 11-18, 2021. Majority of participants (16 children) were aged 4-5 years old and 15 (65.2%) participants were female.

Table 1: Normality Test of Fine Motor Development of Preschool Aged Children

Group	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-Test	0.043	23	0.049
Post-Test	0.037	23	0.005

Table 1 indicated that the data were normally distributed, because the *p-value* in the pre-test and post-test groups fine motor development was significant (>0.05).

Table 2: Homogeneity Test Fine Motor Development of Preschool Aged Children

	Levene Statistic	Sig.
Based on Mean	1.156	0,357
Based on Median	1.125	0.325
Based on Median and with adjusted df	1.235	0.314
Based on trimmed mean	1.271	0.342

Table 5: Effect of puzzle stimulation in Fine Motor Development of Preschool Aged Children

Paired Differences					
	Mean	T	Df	Correlation	Sig. (2-tailed)
Pre-test and Post-test	5.7233	12.082	23	0.152	0.000

The table 5 above showed that the *p-value* = 0.000, which means $p\text{-value} < 0.05$ and H_a is accepted.

Discussion

A. Fine Motor Development of Preschool Aged Children Before Puzzle Stimulation

Based on the frequency distribution of fine motor development of preschool aged children before puzzle stimulation, the majority of participants had experienced suspect development delay with a total of 14 (60.9%) children.

Based on Table 2, it can be seen that that the data is homogeneous ($0,357 > 0.05$).

Table 3: Frequency Distribution of Fine Motor Development of Preschool Aged Children Before Puzzle Stimulation

Development	Total	Percentage (%)
Uncertain	4	17.4
Suspect	14	60.9
Normal	5	21.7
Total	23	100

Table 3 showed that most of the participants had suspect development delay with a total of 14 (60.9%) participants.

Table 4: Frequency Distribution of Fine Motor Development of Preschool Aged Children After Puzzle Stimulation

Development	Total	Percentage (%)
Uncertain	1	4.3
Suspect	3	13.1
Normal	19	82.6
Total	23	100

Based on Table 4, it can be seen that after puzzle stimulation, most of the participants experienced normal fine motor development with a total of 19 (82.6%) children.

This study is in line with research conducted by Darmayasa (2020) which stated that around 76% of preschool aged children experienced problems with fine motor development.¹⁴

Delayed motor development means that motor development stage is below the normal age of the child. It can be resulted from brain damage at birth or other unfavorable conditions before birth and unpleasant environment after birth. Developmental delays are more often caused by lack of time to learn motor skills, due to overprotection of caregivers or lack of motivation to learn.¹⁵

Impaired fine motor development without receiving early and adequate treatment, most likely will end up with a disability. Frequent health check-up to neonatal specialist is also very important to detect developmental disorders in children.¹⁶

B. Fine Motor Development of Preschool Aged Children After Puzzle Stimulation

Based on the frequency distribution of fine motor development of preschool aged children after puzzle stimulation, the majority of participants had experienced normal development with a total of 19 (82.6%) children.

Puzzle game relies on instinct or intelligence. The game is made by dismantling and re-installing the suitability of shape, pattern or color. With this game children can practice finding, rearranging and making something seemingly unrelated to being a form of unity that is meaningful.¹¹

C. Effect of Puzzle Stimulation in Fine Motor Development of Preschool Aged Children

Table 5 showed that $p\text{-value} = 0.000$, which indicated that there was significant effect of puzzle stimulation in fine motor development of preschool aged children at Leuwiliang Village in Bogor District.

This study is in line with a research conducted by Erni Yuniati (2018) which stated that there was significant difference in the average fine motor skill before and after the puzzle game. Puzzle comes in various materials, pictures, shapes and size. Puzzle play also has different difficulty level and can be used by all children according to each child's ability. Some wooden puzzles have small knobs that involve children to move their fingers by pinching it. Fine motor skills require small and precise movements and also essential to children's ability to handle smaller objects and to write for future school preparation. Puzzle is a form of educational games that is attractive and should be introduced to children.¹²

The purpose and function of motor development is the mastery of skills that are reflected in the ability to complete the task of specific motor. The child will develop optimally when the success rate in performing motor tasks is high.

Conclusion

There was a significant effect of puzzle stimulation in fine motor development of preschool aged children at Leuwiliang Village in Bogor District, Indonesia.

Ethical Clearance: Ethical clearance was not required hence was not obtained

Source of Funding: Self-funded

Conflict of Interest: There was no conflict of interest in the research

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