

The Effect of Simple Drawing Stimulation on Hand-Eye Coordination in 7-8 Years Children with Mental Retardation in Banyumas Regency

Anhar Nur Azizah¹, Ulfa Azizah²

^{1,2}Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto, Indonesia

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ABSTRACT

Background : The development of hand-eye coordination in children with mental retardation differs from that of typically developing children. *Stimulation* is needed to enhance the development of hand-eye coordination. *Objective* : To prove the effect of simple drawing stimulation on hand-eye coordination in children with mental retardation aged 7-8 years in Banyumas regency. *Methods* : This quantitative research used a quasi-eksperimental designs with a non-equivalent control group. The respondents in study were children with mental retardation aged 7-8 years in Banyumas regency. The sample consisted of 32 children, with 16 children in experiment group and 16 in control group, selected using the total sampling technique. *Results* : Most children with mental retardation had Down Syndrome, accounting for 13 (41%) out of 32 children. Based on the level of mental retardation, mild mental retardation was the most common, with 20 (63%) out of 32 children. Most children were 7 years old, totaling 19 (59%) and the majority were male, with 22 (69%). The results of this study show a significant effect of simple drawing stimulation on hand-eye coordination as indicated by paired sample *t*-test for both experimental group (0,005) and the control group (0,001) ($p \leq 0.005$). The independent sampel test also yielded a significant value (0,121) ($p \geq 0,005$). *Conclusion* : Simple drawing stimulation affects the development of hand-eye coordination with a significant value 0,001 ($p \leq 0.005$).

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Corresponding Author:

Ulfa Azizah

Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto,
Soepardjo Rustam Street KM. 7, Banyumas, Indonesia

Email: ulfazizah15@gmail.com

1. INTRODUCTION

According to the American Association on Mental Deficiency, mental retardation is a disorder of intellectual function below average, namely an IQ below 84. Mental retardation is classified into three categories: mild mental retardation with an IQ of 50–70, moderate mental retardation with an IQ of 30–50, and severe mental retardation with an IQ <30. According to data from the Central Statistics Agency (BPS) for 2021, the number of mentally retarded children in Central Java is 4,808 people, which are divided into 2,787 males, 1,940 females, and 81 who do not input gender. Meanwhile, in Banyumas Regency, the number of mentally retarded children is 227.

The problem that children with mental retardation often experience is the development of their fine motor skills (Sipahelut & Ambon, 2021). Children who have difficulty with motor movements due to weak coordination

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of visual (eyes) and motor (hand movements, finger movements, and toes) simultaneously. The fine motor skills of children with mental retardation are related to their ability to control hand movements with their eyes less precisely. Hand-eye coordination is the combination of making movements when the eyes receive a stimulus and responding with hand movements so that movements appear as desired (Sania, 2019). One of the ways to maximize the ability to coordinate hands and eyes is through occupational drawing therapy. This activity involves elements of muscles, nerves, fingers, and eye movements. Drawing is the process of expressing ideas, experiences, or fantasies resulting from scribbles on a surface with relatively simple tools. Every time he moves a writing instrument or draws, it requires the child to control the movements of his shoulders, arms, and fingers that hold the writing instrument and be trained to combine hand and eye movements (Sulastri, 2019).

Based on previous research conducted by Putri, Efendi, and Susilawati (2020) regarding teaching materials for mentally retarded drawing skills, it was concluded that teaching materials for drawing skills were appropriate to use for learning for children with mental retardation. This is in accordance with the test results, which showed that there were differences in test scores. From the three studies, all subjects produced scores above the minimum completeness score, namely 65, with an average score for each subject of 85, 89, and 81, so that the subjects were declared complete.

In a preliminary study conducted in October 2022 at SLB C-C1 Yakut Purwokerto, children with mental retardation aged 7-8 years have lower hand and eye coordination abilities than normal children their age because their ability to learn motor skills is low compared to normal children their age, so they need special training. The ability to coordinate hands and eyes of mentally retarded children in grades 1 (aged 7 years) and 2 (aged 8 years) is also different. This happens because children in grades 1 and 2 or those aged 7-8 years have not received a lot of therapy or activities that train their motor skills, especially hand movements and aggressive behavior, which still occur frequently and can hinder learning. Mentally retarded children aged 7-8 years need stimulation for the development of hand-eye coordination because it can support learning at the next level, such as writing skills. Based on the description above, researchers are interested in conducting research related to the effect of simple drawing stimulation on hand-eye coordination in children with mental retardation aged 7-8 years.

2. RESEARCH METHOD

This research method is quantitative, with a quasi-experimental design and a non-equivalent control group design. Respondents were taken using a total sampling technique of 32 children, divided into 16 children as the experimental group and 16 children as the control group. Data was obtained directly from respondents through observation and filling out an observation checklist sheet. The data collected was a pre-test taken before the intervention was carried out and a post-test taken after the intervention was carried out. Data analysis used the Paired Sample T-test, which was used to find out the difference in the average score before and after the intervention was given, and the Maan-Whitney test to compare the data of the two groups and determine whether there was a significant difference.

3. RESULT AND DISCUSSIONS

3.1. Univariate

Table 1. Frequency Distribution of Mentally Retarded Children Aged 7-8 Years in Banyumas Regency

Characteristics of Respondents	Experiment		Control	
	n	%	n	%
Clinic Type				
<i>Down syndrome</i>	5	15	8	25
Speech Delay	4	14	2	6
Autistic	4	13	-	-
Hiperactive	4	13	2	6
Single RM	-	-	3	9
Levels				
Mild	8	25	13	40
Moderate	8	25	3	9
Aged				
7 Years	16	50	3	9
8 Years	8	25	5	16

Characteristics of Respondents	Experiment	Control
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		n	%	n	%
Gender					
	Women	4	13	6	18
	Man	12	32	10	31

The largest percentage based on clinical type was children with mental retardation with Down syndrome in the control group, 8 (25%) of 32 children, while based on the highest level, namely mild mental retardation in the control group, 13 (40%) of 32 children. The majority were children aged 7 years in the experimental group (16, 50%) and males in the experimental group (12, 31%) of 32 children.

Table 1. Development Before Intervention

Pre-Test	Mean	Score Category	n
Experiment Group	16,12	Low	5
		Moderate	11
		High	0
Control group	18,79	Low	3
		Moderate	13
		High	0

In the experimental group, the most pre-test results were in the medium score category, namely 11 children, as well as in the control group with the medium score category, where there were 13 children.

Table 2. Development After Intervention

Post-Test	Mean	Score Category	n
Experiment Group	18,6	Low	3
		Moderate	13
		High	0
Control group	21,57	Low	1
		Moderate	11
		High	4

In the experimental group, the most pre-test results were in the moderate score category, namely 13 children, which means that 2 children experienced an increase in their score category from mild to moderate. In the control group with a moderate score category, there were 11 children, and there were 4 children who experienced an increase from the moderate score category to tall.

3.2. Bivariat

Table 4. Uji Paired Sample T Test

	Paired Sample T Test		
	t	df	P value
Experiment Group (n=16)	-3,255	30	0,005
Control group (n=16)	-7,612	15	0,001

Data analysis using the paired sample t test obtained a p-value of 0.05 for the experimental group and the control group, which means that the intervention in the experimental group and the control group had an effect.

Table 5. Maan-Whitney

Therapy	Maan-Whitney		
	Z	df	p
Experiment Group	-1.679	15	0,93
Control group		15	

Data analysis using the independent sample t test showed that $p > 0.05$, which means there was no significant difference in average value between simple drawing therapy and the control group.

a. Characteristics of Respondents

1. Clinic type

Down syndrome children have developed hand-eye coordination. They are able to make lines, numbers, circles, and simple shapes by thickening the dotted lines. Some children are still in the low category because they do not understand the instructions given. Similar to research conducted by Diana and Arianti (2018) that fine motor development in Down syndrome is influenced by the child's low grasping ability. Children with speech delay have well-developed hand-eye coordination; they are able to receive instructions and work according to them. In line with research conducted by Ahmad (2022), writing therapy can improve fine motor skills and writing skills in children with speech delay. The development of hand and eye coordination in autistic children has increased, but there are obstacles, namely difficulty interacting, which affects the ability to receive instructions. This is in comparison to Azwar's research (2020), which shows that finger painting therapy can help autistic children develop finger strength, finger flexibility, and hand-eye coordination. Single-retarded children or mentally retarded children without accompanying disorders have good hand-eye coordination development and can receive and follow instructions. In line with research conducted by Ruslan, Hidayat, and Logiana (2021), the fine motor skills of mentally retarded children in drawing activities found that children were able to make lines, circles, and simple shapes. In the next phase, by combining shapes into an image, the child is able to draw according to instructions but not perfectly.

In this study, mentally retarded children with the clinical type of hyperactivity had the lowest development of hand-eye coordination. Hyperactivity is a behavioral disorder caused by neurological dysfunction, with the main symptom being an inability to focus and control movement. Children with hyperactivity in class have difficulty focusing and doing schoolwork, do not pay attention to teacher instructions, and cannot be told to sit still (Purwati, 2022).

2. Levels

Based on research results, children with mild and moderate mental retardation have almost the same development of hand and eye coordination, but the ability to receive and process instructions in children with mild mental retardation is better than in children with moderate mental retardation. Similar to research by Heri et al. (2020), mild and moderate mental retardation requires continuous and routine guidance and training to improve hand and eye coordination abilities.

3. Aged

The research results showed that the development of hand and eye coordination in children aged 8 years was better than in children aged 7 years because children aged 7 years still behaved aggressively, which affected their ability to receive and process instructions. In line with research conducted by Madden (2021), the motor coordination ability of mentally retarded children aged 7 years or in grade 1 is still relatively low, with an average score of 22.57 out of a maximum score of 36.

4. Gender

The results of the study found that the hand and eye coordination of male and female mentally retarded children was almost the same, but the male sex had difficulty focusing on activities and was easily distracted by friends' distractions. In research conducted by Heri et al. (2020), it was found that learning difficulties tend to be experienced by mentally retarded male children.

b. Development of hand-eye coordination before and after intervention

Fine motor development at an early age is very important for children. Children who have good hand-eye coordination will find it easy to carry out fine motor activities such as cutting, writing, and drawing. To achieve maximum development, the right stimulus is needed (Moniru, 2021). The results of the research showed that there was development of hand and eye coordination before and after the intervention in the experimental group: 5 children in the low category, 11 children in the medium category, 3 children in the low category, and 13 children in the medium category. Meanwhile, in the control group, the development of hand and eye coordination before and after the intervention was 3 children in the low category and 13 children in the medium category, becoming 11 children in the medium category and 4 children in the high category.

c. Analysis of the development of hand and eye coordination before and after the intervention

In this study, the results showed that both activities had an effect on the development of hand and eye coordination in mentally retarded children aged 7-8 years. In the experimental group, the average score was 18.6 in the moderate score category, and the p value was 0.005, while in the control group therapy, the average score was 21.57 in the moderate score category, and the p value was 0.001. The research results showed that the control group had a higher score than the experimental group; this was due to differences in the characteristics of the respondents. This research was conducted in two places so that the different characteristics were also influenced by different learning strategies. However, the experimental

group continued to experience development, as shown by a decrease of 40% in the low category, namely from 5 to 3 children, and an increase of 18% in the medium category, from 11 to 13 children.

This research is divided into four stages with different levels of difficulty. Stages 1–3 children make shapes with the help of dotted lines. The activity of thickening dotted lines trains children's hand and eye coordination abilities when holding writing instruments, their ability to concentrate when thickening lines, and can introduce children to various shapes (Yusuf et al., 2022). In stage 1, the children made numbers and basic shapes with the help of dotted lines. At this stage, there were 7 children who were able to thicken the line with one pull but still crossed the auxiliary line; 8 children thickened the line with broken movements and crossed the auxiliary line; and 1 child did not complete stage 1.

Stage 2 children combine basic shapes into simple images with the help of dotted lines. There are 3 children able to make a line with one pull and not many parts that come out of the help line, and 6 children with many parts can make one line with many parts coming out of the help line. Six children made lines with broken shapes and outside the guide lines, and one child did not complete stage 2.

In stage 3, the child makes simple pictures with the help of dotted lines. 5 children were able to make a shape with one pull and a few parts came out of the guide line; 7 children made a shape with one pull and many parts came out of the guide line; 4 children made a shape with broken movements; and 1 child did not finish at stage 3.

In stage 4, children make simple pictures of basic shapes and numbers without lines with instructions from the researcher and imitate the pictures in stage 3. The child's ability to reflect on the instructions received through the function of the fingers shows an increase in fine motor skills (Rezeika et al., 2022). The difficulty at this stage is complex shapes with no guide lines. There are 5 children who are drawing completely, 6 children who are not completing their drawings, and 5 children who are not completing stage 4.

In line with research conducted by Putri, Efendi, and Susilawati (2020), using drawing activities on three respondents, it was found that each child experienced improvement at each stage. Other research also conducted by Kurniawati (2018) showed that finger painting (drawing) activities had an effect on the fine motor skills of children with mental retardation, with an average pretest result of 40 and a posttest result of 80.

d. Analysis of the therapeutic effect of simple drawing and number drawing

In this study, simple drawing therapy and the control group did not have a significant difference in average, as indicated by a p-value of 0.93. This happened because the two groups had the same number of students, namely 16 children, and received the same number of interventions, namely four. However, the control group received therapy that was already in school and continued to receive therapy outside of study time, so when given the same therapy, they had more skills when working on it.

This research was divided into 4 stages: in the experimental group who received simple drawing therapy, each stage had a different level of difficulty so that they trained hand and eye coordination from simple shapes to more complex shapes, while in the control group with therapy, drawing numbers had different shapes in each stage.

In line with research conducted by Fikri (2022) using activities to thicken dotted lines, such as tracing dotted lines that form basic shapes such as circles and triangles, children's motor skills increased with an average score of 25 in the high category.

4. CONCLUSION AND RECOMMENDATION

Simple drawing stimulation affects the development of hand-eye coordination in mentally retarded children aged 7-8 years in Banyumas district (p value 0.005) with an average pre-test of 16.12 and post-test of 18.6. Simple drawing can be used as a medium at school or at home to stimulate children.

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