



The Effect of Brain Gym on Psychomotor Development in Preschool Children

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Abstract

The development of children who are stimulated by their parents regularly and purposefully will develop faster than children who are not stimulated. Most parents do not really understand this, many parents think that if the child is not sick then the child does not experience health problems including growth and development. Stimulation using Brain Gym very important because this method can significantly improve children's brain performance and learning abilities. The purpose of this study was to determine whether there is an effect of Brain Gym the psychomotor development of children aged 3rd-6th years at Harapan Bangsa Playground Pandak and Masyithoh Kauman Kindergarten Bantul. The research technique used was a quasi-experiment with a total sample of 106 children divided into control and intervention groups. Data was collected using the Instrument of Developmental Achievement of Children aged-6th years. The data analysis used is the Mann Withney Test and after being given Brain Gym stimulation, the results of P value 0.000 are smaller than 0.05 (p-value <0.05), these results indicate that Brain Gym has a significant influence on psychomotor development in preschool children.

Keywords: brain gym; preschool children; psychomotor.

INTRODUCTION

Development is an aspect that explains the process of forming a child, where during the developmental period a child experiences an increase in the ability and function of his body gradually (Andari et al., 2018). A child's development is contingent upon the stimulation they receive from their parents or family members (Cabrera et al., 2020). Parents who have sufficient knowledge and skills will provide optimal stimulation for their children's growth and development (Zhang et al., 2021). The development of children who are stimulated by their parents regularly and purposefully will develop faster than children who are not stimulated. Most parents do not really understand this, many parents think that if the child is not sick then the child does not experience health problems including growth and development (Chon et al., 2020).

According to the results of a study conducted by world researchers namely World Health Organization (WHO), mentioned that there are 52.9 million children under 5 years old, 54% of children have developmental disorders at that age. In Indonesia, child development is still a serious concern. Children who experience developmental delays are around 5-10%, which is still quite high. A review of national data indicates that 45.12% of children in preschool age have been diagnosed with a developmental disorder. Based on the following data of Indonesian Ministry of Health in the year 2019 It is documented that 16% of children under the age of five experience developmental disorders, encompassing a range of conditions including motor development, mental decline, social habits, and speech delays (RI, 2021; Olusanya et al., 2018).

Children aged 3-6 years (early age) will experience a process of rapid growth and development, because children are in the golden age period or also known as the Golden Age, where at that age it becomes a critical period for a child to be vulnerable to experiencing disturbances in their development (Kristina & Sari, 2021). There are several aspects of development that must be developed and stimulated in children aged 3-6 years, including psychomotor, cognitive, language, and social-emotional aspects. Psychomotor development is the development of controlling body movements through coordinated activities between the central nervous system and muscles (Musonah et al., 2023).

According from previous study state that one method for promoting psychomotor development in early childhood is through the implementation of brain exercises (brain gym). The Brain Gym method is designed to facilitate the relaxation and focus of children, thereby enhancing their ability to absorb information and engage in communication. By engaging in the movements prescribed by the Brain Gym method, children experience a sense of relaxation and readiness to resume learning or other activities. Physical activity and mental stimulation that increases blood flow and releases hormones that help with focus and concentration are two forms of brain gym exercise (Pranata et al., 2021).

The Brain Gym method is designed to facilitate relaxation and focus in children, thereby enhancing their ability to absorb information and engage in communication. The movements prescribed by the Brain Gym method have been shown to induce a sense of relaxation and readiness to resume learning or other activities in children. Another research found that its findings indicated that there were a number of beneficial effects, such as children who were more self-assured and who could effectively handle stress. Researchers were able to demonstrate this because, from the moment they arrived and carried out the first activity in line with the lesson plan, the majority of the kids' expressions showed displeasure and decreased interest. But over time, after administering Brain Gym, researchers saw that children who appeared joyful had a different facial expression (Azizah et al., 2023)

Based on observations made, stimulation using the brain gym method has never been applied in Harapan Bangsa Playground Pandak and Masyithoh Kauman Kindergarten Bantul, the need for education and the benefits of Brain Gym stimulation for brain intelligence in children aged 3-6 years, Therefore, health education is carried out to optimize the stimulation of psychomotor development with audio-visual media methods. This research is expected to provide benefits in the insight of science, especially in the field of pediatrics, especially those related to psychomotor development in preschool children. In addition, Brain Gym media can be used as a more interactive and fun learning media, and help children in stimulating physical and mental development. Based on existing phenomena, researchers are interested to determine the influence of Brain Gym on psychomotor development in preschool children.

METHOD

This research was conducted at Harapan Bangsa Kindergarten Pandak and Masyithoh Playground Kuaman which are located in Pandak District, Bantul Regency, D.I Yogyakarta. This study was conducted to determine the effect of Brain Gym on psychomotor development in preschool children. The method used is quantitative with the type of research Quasi Experiment by giving pretest and posttest. The difference between the results of the Pre-test and Post-test shows the results of the treatment that has been given. The design can be described as follows:

Table 1. Research Design

Classes	<i>Pre-test</i>	<i>Treatment</i>	<i>Post-test</i>
Experiment	O1	X	O2
Control	P1	-	P2

With description: Experiment : The group of children who received stimulation in the form of Brain Gym videos; Control : Untreated children group; O1 : Pretest results of the experimental group before treatment; O2 : Posttest results of the experimental group after treatment; P1 : Pretest results of the untreated control group; P2 : Posttest results of the untreated control group; X : Treatment provided to the experimental group; - : The control group did not receive any form of treatment.

The population in this study were all children aged 3-6 years who were overall students in the Pandak area, namely 1939 children. The sampling technique in this study is probability sampling which is a sampling technique that provides equal opportunities for each population to be selected as sample members, where in this study using cluster random sampling to determine the control group and intervention group. Determining the sample size, researchers used the Slovin formula. Based on the results of the sample calculation using the Slovin formula, the number of samples in this study were 106 respondents, the research sample was divided into 2 groups, Masyithoh Kauman Kindergarten Bantul as the control group and Harapan Bangsa Playground Pandak as the intervention group, with each group having a total sample of 53 respondents. The method of data collection in this study the instruments used were videos, booklets and instruments for the achievement of children's development aged 3-6 years, to determine the psychomotor development of children aged 3rd-6th years before and after using brain gym. The questionnaire of developmental achievement of preschool children consists of 10 items of psychomotor development, which must be achieved by children with the target age of 3-6 years based on the Regulation of the Minister of Education and Culture on National Early Childhood Standards in 2019. The data collection technique used by researchers to obtain data on psychomotor development by giving a pretest on the first day, then the respondent is given a posttest on day 7 after being given an intervention in the form of Brain Gym, using an instrument for the developmental achievement of children aged 3-6 years, Brain Gym is structured using a brain gymnastics technique guide consisting of centering and focusing movements, Brain Gym movements involve large muscle and small muscle activities so that they can help in the stimulation of psychomotor development in early childhood.

The data analysis technique uses the Wilcoxon Test which is used to determine the difference in average values before (pre) and after (post) using Brain Gym. Before doing the Wilcoxon Test, there are prerequisites that must be done, namely conducting a data normality test. Normality test is one of the tests that can find out the data to be analyzed whether it is normally distributed or not. Furthermore, to determine the results of the difference test between the control group and the intervention group because the data is not normally distributed, the Mann Withney Test is used.

RESULTS AND DISCUSSION

The results of this study consist of general data which includes the characteristics of respondents including age, gender and demographic data characteristics of parents which

include age, education, occupation, income, parental involvement in childcare and sources of information obtained regarding psychomotor development in children.

Characteristics of parents based on age, in the control group the majority of parents aged 31-40 years as many as 27 respondents (50.9%) and in the intervention group the majority aged 21-30 years, namely 26 respondents (49.1), the most recent education is SMA / SMK as many as 39 respondents (73.6%) in the control group, 36 respondents (67.9%) in the intervention group. The majority of occupations in the control group were private employees as many as 13 respondents (24.5%), in the intervention group the majority worked as housewives, 31 respondents (58.5%), the majority of childcare was carried out by parents, 29 respondents (54.7%) in the control group and 33 respondents (62.3%) in the intervention group. Sources of information related to child development were mostly obtained from health workers, 26 respondents (49.1%) in the control group and 22 respondents (41.5%) in the intervention group. the characteristics of respondents according to age in the control group as a whole were 5-6 years old, 53 children (100%) and in the intervention group the majority of children were 4-5 years old (66.0%). The characteristics of respondents according to gender were mostly female, 29 children (54.7%) in the control group and 27 respondents (50.9%) in the intervention group.

The normality test was carried out on the pretest and posttest data scores to determine the normality of the data distribution as a hypothesis test requirement. The statistical analysis used in this study is the Kolmogorof-Smirnov Test which is calculated with the help of the SPSS 27 for windows program, the results are known as follows:

Table 2. Normality of The Data

Indicators	Group	<i>Statistic</i>	<i>Sig.</i>	Description
Pretest	Control	0.929	0.004	Not Normal
	Experiment	0.956	0.049	Not Normal
Posttest	Control	0.960	0.074	Normal
	Experiment	0.952	0.034	Not Normal

Table 2. showed that the significance values of control pretest, intervention pretest and intervention posttest were lower than 0.05 (sig. < 0,05) which means that the data is not normally distributed. While the significance value on the control posttest is greater than 0.05 (sig. > 0,05) which means that the data is normally distributed. So it can be concluded that the next test uses a non-parametric test method, namely using the Willcoxon Test, including the following:

Table 3. Test analysis of the effect of Brain Gym on the psychomotor development of preschool children in the control group at Masyithoh Kauman Kindergarten, Bantul.

Group	Indicator	<i>Mean</i>	<i>Std. Deviation</i>	<i>Sig.</i>
Control	Pretest	30.49	1.353	0.000
	Posttest	32.85	1.574	

Table 3. shows that the results of statistical tests using the Willcoxon Signed Rank Test in the control group without being given treatment obtained a significance value of 0.000 where the significance value is lower than 0.05 (sig. 0,000<0,05) which means there is a psychomotor difference in the control group between pretest and posttest.

Tabel 4. Test Analysis of the Effect of Brain Gym on the Development of Preschool Children in the Intervention Group

Group	Indicator	Mean	Std. Deviation	Sig.
Experiment	Pretest	29.81	1.755	0.000
	Posttest	31.62	1.522	

Table 4, shows that the results of statistical tests using the Willcoxon Signed Rank Test in the intervention group given treatment in the form of Brain Gym stimulation obtained a significance value of 0.000 where the significance value is lower than 0.05 (sig. 0,000 < 0,05). This shows that there is an influence after 7 days of Brain Gym stimulation. Based on these data, it can be concluded that H_a is accepted, which means that there is a positive influence between Brain Gym stimulation on psychomotor development in children after preschool at KB Harapan Bangsa Pandak as the group given the intervention.

Furthermore, to determine the difference in development between the control group and the intervention group using the Mann Withney Difference Test and the following results were obtained:

Tabel 5. Test Analysis of the Effect of Brain Gym on Psychomotor Development in Preschool Children in The Control and Intervention Groups

Develompent	Group	Mean	Std. Deviation	Sig.
Psychomotor	Control	32.85	1.574	0.000
	Intervention	31.62	1.522	

Table 5, Mann Whithney Test analysis results obtained probability value (sig)<0,05) (0,00 < 0,05) so it can be concluded that there is a significant difference between the control group and the intervention group. In this study, the effect of Brain Gym on the psychomotor development of preschool children was investigated through two groups: a control group and an intervention group. The control group did not receive any special treatment such as stimulation in the form of Brain Gym videos, while the intervention group received treatment in the form of Brain Gym videos regularly for a period of 7 days.

Based on the results of the study and the results of statistical calculations in table 3. shows that in the control group at Masyithoh Kauman Kindergarten, there were 30 respondents (56.6%) who had psychomotor development as expected (BSH), while in the posttest most of them were 49 respondents (92,5%) have very well-developed psychomotor development (BSB). The results of statistical tests using the Willcoxon Signed Rank Test in the control group showed a significance value of 0.000 where the significance value was lower than 0.05 (sig. 0,000 < 0,05) which means that there is a difference in psychomotor development in the control group between pretest and posttest, indicating that even though they did not receive special treatment in the form of Brain Gym, there was psychomotor development in some children in this group. This finding supports the importance of interpreting the effect of Brain Gym on the psychomotor development of preschool children.

Table 4, to analyze the results of psychomotor development in the intervention group before and after being given Brain Gym stimulation at KB Harapan Bangsa Pandak. Before treatment, 64.2% of respondents had psychomotor development that developed as expected (BSH) and 35.8% respondents developing very well (BSH), After being treated in the form of Brain Gym videos, the results of the posttest were mostly 77.4% of respondents had very well

developed psychomotor development (BSB) while the other 22.6% of den responses have psychomotor development in the Developing As Expected category (BSH).

The results of statistical tests using the Willcoxon Signed Rank Test for the intervention given the treatment of Brain Gym stimulation obtained a significance value of 0.000 where the significance value is lower than 0.05 (sig. 0,000 < 0,05). This shows that there is an effect after 7 days of Brain Gym stimulation. These results confirm that Brain Gym has a positive or significant influence on psychomotor development in preschool children. This supports the use of Brain Gym as an effective method to improve development in preschool children, especially the ability in the psychomotor aspect.

According (Devi et al., 2024) research also supports the results of this statistical test ($p = 0.025$). Simple motions in the brain gym can help youngsters improve motor skills since they engage all body parts and stimulate children's brains, according to (Zotey et al., 2023) the idea that says stimulating the brain with a brain gym can boost neuroplasticity further supports this. This neuroplasticity is associated with the nervous system's growth and the idea that the nervous system of the brain may adjust to outside sensory input. Instructions, movement analysis, and learning about proper movement (motor learning) are forms of this sensorimotor integration stage (Uysal & Düger, 2020).

Observations of the control group showed that even without special treatment such as Brain Gym, some children still showed psychomotor development. However, the higher percentage of development in the intervention group indicates the effectiveness of Brain Gym in improving the psychomotor development of preschool children. Child development theory emphasizes the importance of proper stimulation at an early age to promote motor abilities (Cheraghi et al., 2022). According to (Jariyah et al., 2024) structured activities such as Brain Gym can play an important role in developing children's cognitive and motor functions(10).

The golden age is the ideal period for children to develop their full range of potential and talents, including social, emotional, cognitive, gross motor, and fine motor abilities (Yulianingsih et al., 2020). Children that get concentrated stimulation exhibit fundamental fine and gross motor skills, socialisation, independence, and speech and language abilities. According to (Cuartas, 2022) the lack of stimulation, inadequate maternal education, and the mother's work situation can all affect a child's growth and development (Faridah et al., 2024). Children's lack of physical activity is also influenced by geographic considerations (Nurwanti et al., 2019).

This is in line with researchers' findings that Brain Gym sessions consistently help children overcome barriers to psychomotor development. The results of this analysis are in line with previous research too which explains that the results of research after being given brain gymnastics showed that most pre-school children had good fine motor skills (Erol, 2022). Previous studies stated that Developmental problems and restricted perception might result from childhood inactivity. Additionally, motor skills and cognitive processes particularly executive functions, which mature at the age of 12th develop most dynamically throughout the late childhood period. Executive functions enable one to participate in a situation by organising a specific activity and to suppress or delay a certain response (Bidzan-Bluma & Lipowska, 2018). According form (Hapsari & Sulastri, 2023) found, the aforementioned findings demonstrate that participants who had Brain Gym stimulation (brain gymnastics) exhibited enhanced concentration power, suggesting that Brain Gym stimulation (brain gymnastics) is beneficial for developing youngsters (Tai & Lau, 2021; Khasanah et al., 2022).

This study provides evidence that Brain Gym has a positive and significant impact on psychomotor development in preschool children. Results from the control group showed that

although there was development without any special treatment, the higher level of development in the intervention group confirmed the superiority of Brain Gym as a method to improve children's motor skills. The implications of this study support the implementation of Brain Gym as part of early childhood education to maximize their psychomotor development potential.

CONCLUSION

Conclusion Based on the research and studies that have been conducted, it can be concluded that brain gymnastics has a positive influence on child development. The results of the Willcoxon Test showed that the development of children in the control group and the intervention group, the majority of children experienced Development According to Expectations (BSH) and several children experienced Very Good Development (BSB). The results of the analysis after taking pretest-posttest data showed that there was an increase in development in the intervention group. Brain Gym offers a range of nursing care for preschool-aged children and can be utilised as an intervention of choice to maximise overall development

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