doi: 10.31674/mjmr.2022.v06i02.002

MJMR

# The Effectiveness of Brain Gym on the Cognitive Abilities of Children at TK ABA 17 Palembang

**Renda Natalina Pratama[1]*, Citra Purwanti[1], Rosmiarti[1], Tukimin Bin Sansuwito[2], Faridah Binti Mohd Said[2]**

[1]*Faculty of Health Sciences, IKesT Muhammadiyah Palembang, Sumatera Selatan 30262, Indonesia*

[2]*Faculty of Nursing, Lincoln University College, 47301 Petaling Jaya, Selangor Darul Ehsan, Malaysia.*

**Corresponding Author's Email: renda7714@gmail.com*

## ABSTRACT

Early childhood cognitive development is the child's ability to understand something in the surrounding environment so that children's knowledge will increase where cognitive development is closely related to brain control so that children's cognitive development requires brain stimulation efforts. Stimulation is needed to improve children's development, children who receive targeted and regular stimulation develop faster than children who do not receive stimulation. Brain Gym is a healthy natural alternative effort that includes a series of simple movements that can optimize human brain function so that a person can face various kinds of learning difficulties, tensions, challenges to oneself and others. The purpose of this study was to determine the effectiveness of brain exercise in improving children's cognitive abilities. This research method is quasi experimental research and uses the chi square statistical test. The research sample consisted of 28 respondents consisting of the treatment group and the control group. The results of statistical tests using the Chi Square test obtained $\rho$ <0.05 (0.018), which means that brain exercise is effective in improving children's cognitive abilities. So it is suggested that brain exercise can be applied to children so that learning becomes fun and improves their abilities.

***Keywords: Brain Gym; Children; Cognitive***

## INTRODUCTION

Childhood cognitive development refers to a child's capacity to comprehend anything in their surroundings in order to expand their knowledge. Parents and instructors must assist youngsters improve their thinking and problem-solving skills by stimulating the brain because cognitive growth is linked to brain control (Osman, Farrag & Hegazy, 2019). The toddler period is crucial in a child's development since it is at this time that linguistic skills, creativity, social awareness, emotional development, and intellect grow at a rapid pace, laying the groundwork for future development (Pratiwi, Andriati, & Indah, 2020). Child's development such as language abilities, creativity, social awareness, emotional development and cognition starts blooming at a rapid rate throughout this period by activating the brain and developing their problem-solving skill (Purnama & Herliana, 2019).An important period in child development is the toddler period, because at this time, the development of language skills, creativity, social awareness, emotional, and intelligence runs very fast and is the basis for further development. Moral development and the basic basis of personality are also formed at this time, so that any abnormality or deviation of the slightest if not detected, let alone not handled properly will reduce the quality of human resources in the future. Childhood education is a level of education prior to basic education, which is a coaching effort aimed at children from birth to six years of age carried out by providing educational stimuli to assist physical and spiritual growth and development so that children have readiness to enter further education. , which is held on formal, non-formal, and informal channels. Early childhood really needs a lot of information to fill their knowledge so that they are ready to become real humans. This golden age is known as a critical period of development called *windows of learning*, when specific stimulation is needed by children. At the golden age, children should get the right stimulation, because without stimulation of nerve cells (*neurons*) will be destroyed through a natural process, according to the working principle of *neurons* brain, namely *use it loose*.

The development index for children aged 36- 59 months in Indonesia is based on a total value of 88.3. The level of literacy development was 64.6, the level ofdevelopment physicalwas 97.8, the level of social emotional development was 69.9 and the level of learning development was 95.2. On the socio-emotional level, Indonesia is at a lower level than Thailand (79.4), Vietnam (91.2) and slightly higher than Nepal (68.6). Based on the age group, the proportion of the child's development index at the age of 36-47 months

was 85.9 and in the 48-59 month age group was 90.6. Based on gender, the proportion of the child development index for boys is 87.3 and for girls is 89.3 (Riskesdas, 2018).

In fact, humans have been gifted with a mind by Allah SWT which makes it easier for them to continue to think and develop their potentials. The Word of Allah in Al-Quran Surah An-Nahl verse 78 that humans have the potential tools that must be developed optimally: *"And Allah took you out of your mother's stomach in a state of not knowing anything, and He gave you hearing, sight and heart, so that you give thanks* " (Surah An-Nahl [16]: 78).

In Surah Ali Imran verse 190 Allah also says which means: *"Verily in the creation of the heavens and the earth, and the alternation of night and day, there are signs for those who are wise (ulul albab)"* (Surah Ali Imran [3]: 190). This explains that humans are born in a state of knowing nothing, but Allah provides humans with extraordinary potentials that must be continuously developed. The above verse also shows the importance of reason for human life. Because one of the things that affects the mind is the brain, then based on the latest educational theory mentioned above, the two hemispheres of the brain, namely the left brain and the right brain must be able to function optimally.

One aspect of growth and development that needs attention is the cognitive development of children. Early childhood cognitive development is the child's ability to understand something in the surrounding environment so that children's knowledge will increase. Children's cognitive development is closely related to brain control so that children's cognitive development requires brain stimulation efforts. Stimulation is needed to improve children's development, children who receive targeted and regular stimulation develop faster than children who do not receive stimulation. To stimulate the child's brain, fun activities are needed in the learning process. One of the fun activities that teachers in kindergarten can do to stimulate the child's brain is through brain exercise or Brain Gym (Wiradnyana, 2020). Many educators from various countries have used it in teaching and learning activities and have found it beneficial. Some of them have used all of the Brain Gym movements in class every day, but some only use certain movements related to the activity they are doing, such as reading during reading or writing lessons, listening and solving problems.

This research on child development supports the excellence of the Muhammadiyah Palembang IKesT Midwifery Study Program which carries Holistic Midwifery Care, where one of the care that can be given is to preschool children. Holistic care is care that is related to body (physical), soul (psychic) and spirituality. In line with the holistic mission, children's development is very important from these three sides where physical development is very fast along with the need for a sense of security, calm and spiritual education which is very important given in childhood.

A preliminary study at TK ABA 17 Palembang was carried out before the research was conducted. Researchers have concluded that it is necessary to introduce children to brain gym to increase students' enthusiasm for learning.

Brain Gym is useful for training balance functions by stimulating several parts of the brain that regulate it. Through the muscle test, it is found out the obstacles in the body that affect learning ability and comprehension. Brain Gym opens the parts of the brain that were previously closed or blocked so that learning / work activities take place using the whole brain (whole brain). As a result: (a) Emotional stress is reduced and the mind is clearer; (b) Relationships between people and the learning / working atmosphere are more relaxed and happy; (c) Language skills and memory are improved; (d) People become more energetic, more concentrated, more creative and efficient; (e) People feel healthier because there is less stress; and (f) Improved learning and work achievement. As explained by Dennison (in Prihastuti, 2009), the human brain is like a halogram, consisting of three dimensions with parts that are interconnected as a single unit. However, the human brain is also specific in its task where the three dimensions are in the application of motion. Brain Gym consists of 3 dimensions, namely: the Laterality dimension, the Focusing dimension and the Centering dimension.

This stimulation is given when doing the Brain Gym exercise. When doing brain exercise activities, it will be able to provide a stimulus to the brain. The brain is a part of the body that functions as a control center for

organs. The brain is always related to one's intelligence. The brain is also the center of the mind control system and body systems that carry out several functions simultaneously which can function as a receiver and processor of information, giving orders, carrying out tasks and storing information. Through brain exercise activities, it will help open parts of the brain that were previously closed and indicates that learning activities take place using the entire brain.

The steps for brain exercise can be done by starting with drinking water which is an excellent carrier of electrical energy to smooth the flow of the body, performing owl movements to release neck and shoulder tension to improve attention and memory skills, activating the hands by extending the muscles. - the upper chest and shoulders to smooth gross and fine motor movements, massage the earlobe to train to focus on hearing, massage the positive point on the forehead which serves as a logical place for thoughts, energized yawning is a natural breathing reflex that increases air circulation to the brain and stimulates the whole body (Dennison, 2002).

Other literature shows that an increase in physical activity time during learning has an impact on higher test scores in arithmetic, reading, writing, and improved health (Tremarche *et al.*, 2007). It can help children improve motor skills that may have a direct impact on numeracy, reading, language arts,awareness spatial and attention.

## METHODOLOGY

The design of this study is astudy Quasi Ekspremen with the dependent variable in this study is an increase in cognitive abilities, while the independent variable in this study is a brain gym.

The population in this study were all students of TK ABA 17 Palembang. Sampling in this study using a total sampling technique. samples to be divided into the treatment group and the control group. The number of respondents in this study were 28 respondents, divided into 14 respondents who did a brain gym and 14 respondents as a control group.

Respondents did a brain gym (treatment group) regularly every day for 2 weeks which was carried out for approximately 15 minutes. The brain gym guide was provided by the researcher through audiovisual (video guide). After 2 weeks, all respondents returned to fill in the posttest questions.

Data analysis by bivariate method was carried out to test the relationship between the independent variables and the dependent variable. The statistical test used was Chi Square with 95% confidence interval (CI).

## RESULT

From the results of research conducted on 28 children at TK ABA 17 Palembang, the following results were obtained:

### Analysis Univariate

Analysis was carried out on each variable from the research results to determine the frequency distribution and percentage of the variables independent and dependent variables. Data is displayed in table and text form.

***Table 1: Frequency Distribution of Doing Brain Gym***

| Brain Gym | Frequency | % |
|---|---|---|
| Yes | 14 | 50.0 |
| No | 14 | 50.0 |
| Total | 28 | 100.0 |

***Table 2: Frequency Distribution of Ability Improvement***

| Cognitive | Frequency | % |
|---|---|---|
| Increased | 18 | 64.3 |
| No Increase | 10 | 35.7 |
| Total | 28 | 100.0 |

From the research it was found that 64.3% of respondents experienced an increase in cognitive abilities.

**Analysis Bivariate**

Analysis in this study aims to find out whether there is a relationship between each variable, especially the dependent variable and the independent variable. Themethod analysisused is Chi-Square. In the results of the bivariate analysis contained in table 5.6, it was found that of the 14 respondents who did a brain gym, 12 respondents (85.71%) experienced an increase in cognitive abilities obtained through the pretest and posttest scores. The results of statistical analysis using the Chi Square test obtained $\rho$ value 0.018, which means $<\alpha$ 0.05, so that the research hypothesis which states that brain gym can improve the respondent's cognitive abilities can be accepted.

***Table 3. Relationship between Brain Gym and Ability Improvement***

| Brain Gym Exercise * Improvement Ability | | | | | Analystis |
|---|---|---|---|---|---|
| | | Improvement Ability | | Total | Chi Square Tests |
| | | Yes | No | | |
| Latihan Brain Gym | Yes | 12 | 2 | 14 | $p = 0.018 < 0.05$ |
| | No | 6 | 8 | 14 | |
| Total | | 18 | 10 | 28 | |

## DISCUSSION

In line with Wiradnyana's research (2020) with the cognitive findings of children before being given brain exercise activity, it shows that as many as 66% of children's cognitive is underdeveloped (BB), 23% is categorized as starting to develop (MB), and 11% of students are developing according to expectations (BSH ). While the cognitive findings that were carried out after students were given brain exercise activity showed that as many as 76% of the children's cognitive was categorized as starting to develop (MB) and 24% of students developing according to expectations (BSH). The results of data analysis carried out by the Wilcoxon test showed that the significance value of $p$ value = 0.00 (<0.05), which means that there is a significant difference between children's cognitive before brain exercise (pretest) and after being given brain exercise (posttest).

The results of other research on Brain Gym show that the value of the ability to remember early childhood whose learning uses the brain gym method is better than those whose learning uses ordinary learning carried out in school. Because the data results show that the experimental class and the control class have differences. Thus, the achievement of the ability to remember early childhood for the experimental class is better than the control class. Learning like this is very effective in making children active because learning activities like this are not centered on the teacher because the teacher is only a facilitator and the child is the main actor in the activity (Ain, 2019).

Another study on the brain gym conducted by Panzilion (2020) states that the mean rank before brain

exercise is 0,000 and after brain exercise is 8.00, it is known that the average value of fine motor skills after being given brain exercise is higher than before brain exercise, and ties value = 0 which indicates that there are no equal values between before and after brain exercise. From the statistical test results obtained *p* value = 0.000, it can be concluded that there is an effect of brain exercise to improve fine motor skills in children in preschool children.

The application of the Brain Gym in classroom learning is expected to improve student achievement by activating the two hemispheres of the brain so that it can be integrated and work optimally. Especially if it is collaborated with various innovative learning methods, it will further increase student readiness to learn which in turn improves student learning outcomes. In addition, research conducted by Prihastuti (2009) reveals that the Brain Gym activity can contribute to improving the results of students' numeracy proficiency tests. Therefore, the application of the Brain Gym in learning is expected to be carried out by teachers, as a way to improve student learning outcomes. (Sukri, 2016).

The results of other studies also show that students who received the combined intervention of explicit phonological awareness and movement were the only group that performed significantly better than the control group in terms of measurements of found phonological awareness, spelling and spelling. An interesting result is that the literacy/movement group rather than the movement group gained a significantly greater advantage for movement size. These findings suggest that teaching pre-primary age children literacy and movement together is more beneficial than teaching separately (Callot, 2015).

Likewise, the results of research conducted by Purnamawati (2018) who conducted experimental research using a Pre- and Post-Test Two Group Design Randomized Design with a sampling technique, namely simple random sampling. The treatment group was given Brain Gym training I and the treatment group II was given functional and recreational activities (AFR). Paired sample *t*-test results found significant differences with $p = 0.000$ ($p < 0.05$) in group I and group II. Followed by a different test with Mann Whitney to get the conclusion that the Brain Gym intervention is better at improving the fine motor skills of preschool children (aged 5-6 years) than functional and recreational activities (AFR).

The results of research conducted by Lestariningsih (2016) through observations in Classroom Action Research (CAR) starting from cycle I to cycle II achieve success criteria. This shows that brain exercise can improve the cognitive abilities of group B children RA Nurul Huda Air Kuning, Jembrana Regency, Bali (Lestariningsih, 2016) looking for the secrets of nature, cultivate it. Allah created man from not knowing what to knowing. By learning, the brain develops over time. With the human brain thinks, uses all his senses to capture the greatness and knowledge of Allah (Adinda, 2018).

The word Aql (intellect) is not found in the Koran, it does exist are present and past tenses. The word originally meant linguistically a rope, a barrier. Al-Quran uses for "something that binds or prevents a person from falling into error or sin". Intellect is also the power to understand and describe something, assaid Hein QS. Al-Ankabut (29): 43 which reads: 43 Meaning: These are the parables that We give to humans, but no one understands them except the pious (knowledgeable). (Surah Al-Ankabut: 43).

Sufficient stimulation can make the brain have a thicker cortex, more dendrite branching and synaptic growth will be more and brain cells will develop optimally. Cognitive stimulation of the brain can be applied to a variety of environments. This means that various kinds of exercises that are used are very useful for improving children's short-term memory, because rhythm and brain exercises will stimulate the hippocampus to store a vocabulary of body movements. Brain stimulation has many positive effects on brain structure and function, including increasing the number of 15 dendritic branches, increasing synapses (connections between nerve cells), increasing the number of nerve support cells, and improving memory skills (Sudirman, 2017).

## CONCLUSIONS

The results of statistical analysis using the Chi Square test obtained ρ value 0.018, which means $< \alpha$ 0.05, so that the research hypothesis which states that brain gym can improve the respondent's cognitive abilities can be accepted. As many as 85% percent of people in the world  This turned out to live off  belahan left

brain. Part of the rest using a combination of the two, and some use the right brain. From In terms of function, the brain consists of two belahan left and right hemisphere was as has three dimensions are mutually berhubungan. By optimizing the puse of totalthroughout this section, brain function can be optimized. One of the ways optimize the use of all dimension of the brain is brain gymnastics.

**Conflict of Interest**

The authors declare that they have no competing interests in writing this article.

**ACKNOWLEDGEMENT**

The researchers would like to thank TK ABA 17 and the Muhammadiyah Palembang Institute of Health and Technology who have provided support and financial assistance in completing this research.

**REFERENCES**

Adinda, W. N. (2018). Upaya Meningkatkan Kemampuan Kognitif Anak Usia Dini Kelompok B Melalui Kegiatan Senam Otak Di Ra Rahmah Elyunusiah Ii Medan TA 2017/2018. *Journal of Pharmaceutical Science and Clinical Research, 2*, 117-125.

Lestariningsih, F. N. (2016). Meningkatkan Kemampuan Kognitif Anak Melalui Kegiatan Senam Otak pada Anak Kelompok B di RA Nurul Huda Air Kuning Kabupaten Jembrana Bali Tahun 2015/2016 (Doctoral dissertation, Universitas Muhammadiyah Jember).

Osman, Z. H. H., Farrag, E. A., & Hegazy, A. E. S. A. (2019). Effectiveness of Cognitive-Behavioral Program on Reducing Mothers'burden Of Care Of Their Children With Autism Disorder. *The Malaysian Journal of Nursing (MJN), 10*(4), 48-62. https://doi.org/10.31674/mjn.2019.v10i04.008

Panzilion, P., Padila, P., Setyawati, A. D., Harsismanto, J., & Sartika, A. (2020). Stimulation of Preschool Motor Development Through Brain Gym and Puzzle. JOSING: *Journal of Nursing and Health, 1*(1), 10-17. https://doi.org/10.31539/josing.v1i1.1166

Purnamawati, N. P., Andayani, N. L. N. A., & Muliarta, I. M. (2018). The Better Brain Gym Intervention In Improving The Fine Motor Skills Preschool Children (Ages 5-6 Years) Than The Functional And Recreational Activities (Fra). *Majalah Ilmiah Fisioterapi Indonesia, 5*(1), 28-30. https://doi.org/10.24843/MIFI.2017.v05.i01.p08

Purnama, M., & Herliana, L. (2019). Study of Demographic Factors with Lbw Events in Tasikmalaya General Hospital. *The Malaysian Journal of Nursing (MJN), 10*(4), 33-38. https://doi.org/10.31674/mjn.2020.v11i03.006

Pratiwi, R. D., Andriati, R., & Indah, F. P. S. (2020). the Positive Effect of Educative Game Tools (Puzzle) on Cognitive Levels of Pre-School Children (4-5 Years). *The Malaysian Journal of Nursing (MJN), 11*(3), 35-41. https://doi.org/10.31674/mjn.2020.v11i03.006.

Sudirman, IM., & Imania, DR (2017). The Difference of The Influence of Brain and Exercise Rhythmic Gymnastics Against Term Memory Short Children Aged 5-6 Years at Tk Aisyiyah Bustanul Athfal Mlangi.

Sukri, A., & Purwanti, E. (2016). Meningkatkan hasil belajar siswa melalui brain gym. *JEMS: Jurnal Edukasi Matematika dan Sains, 1*(1), 50-57. http://doi.org/10.25273/jems.v1i1.778

Tremarche, P. V., Robinson, E. M., & Graham, L. B. (2007). Physical education and its effect on elementary testing results. *The Physical Educator, 64*(2), 58-65

UNAIR, P. (2009). Pengaruh Braingym terhadap Peningkatan Kecakapan Berhitung Siswa Sekolah Dasar. *Cakrawala Pendidikan, 1*(1).