



## The effect of brain gym on brain waves and levels athlete concentration

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### ABSTRACT

The brain as the activity control center plays an important role in the human body, but this important organ can experience a lack of energy, causing a decrease in concentration. As an athlete who requires high concentration during training and competition, it is necessary to do brain exercise to integrate all body functions that involve the brain. This study aims to determine the effect of Brain Gym on the brain waves and concentration levels of athletes. This study uses the Systematic Literature Review research method, while the data collection technique is carried out by identifying or reviewing all articles that have the same research topic in this study. The articles used in this study were 24 national and international journals obtained from Google Scholar. The results showed that the brain gym had a significant effect on increasing the athlete's concentration.

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### Kata kunci:

Senam Otak

Gelombang Otak

Tingkat Konsentrasi Atlet

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### ABSTRAK

Otak sebagai pusat pengatur aktivitas memegang peranan penting dalam tubuh manusia, namun organ penting ini dapat mengalami kekurangan energi sehingga menyebabkan penurunan konsentrasi. Sebagai seorang atlet yang membutuhkan konsentrasi tinggi saat latihan dan bertanding, maka perlu dilakukan senam otak untuk mengintegrasikan seluruh fungsi tubuh yang melibatkan otak. Penelitian ini bertujuan untuk mengetahui pengaruh Brain Gym terhadap gelombang otak dan tingkat konsentrasi atlet. Penelitian ini menggunakan metode penelitian Systematic Literature Review, sedangkan teknik pengumpulan datanya dilakukan dengan mengidentifikasi atau meninjau semua artikel yang memiliki topik penelitian yang sama dalam penelitian ini. Artikel yang digunakan dalam penelitian ini adalah 24 jurnal nasional dan internasional yang diperoleh dari Google Scholar. Hasil penelitian menunjukkan bahwa senam otak berpengaruh signifikan terhadap peningkatan konsentrasi atlet.

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## INTRODUCTION

The topic of the impact of physical activities on cognitive functions, particularly in athletes, has garnered increasing attention in recent years. Brain Gym is one approach aimed at improving cognitive abilities through specific physical exercises. The objective of this study is to investigate the effect of Brain Gym on brain waves and athlete concentration levels.

The field of sports science has greatly advanced, aligned with the advancements in science and technology in society, leading to a significant impact, particularly in improving optimal performance. Every athlete faces a mental competition, and must be prepared to handle emotional stimuli, heavy tasks, and mental stress in order to remain focused and perform optimally. Many athletes fail to perform at their best during competitions due to pressure from various internal and external factors, including difficulties with stress regulation which can burden an individual's attention and brain performance systems (Alficandra et al., 2021).

The brain as the center of control for all activities plays a crucial role in the human body, as it regulates all functions in the body, both thinking processes and psychological centers (Octavia, 2020). Additionally, there are several factors that can affect the human brain organ, reducing its function, including exposure to polluted environments and lack of physical activity, increasing age and poor nutrition which can impact brain performance (Engchuan et al., 2019).

The brain, a part of the human body composed of billions of neurons, is capable of generating electrical activity as a means of communication between neurons. This electrical activity in the human brain is often referred to as brain wave patterns (Tjasmadi, 2018). Neurons that interact with each other can transmit vibrations and information that result in brain waves, which are divided into several types based on frequency and depending on the psychological or mental state of the individual, with proper nutrition and regular physical activity stimulation. A balanced and nutritious diet can help maintain optimal brain function (Maclrney et al., 2017).

According to Kim et al, their research explains that the decline in performance of athletes can be caused by low concentration levels, which can be depicted by low theta brain waves during exercise or physical activity (R. Maulana, 2019). Brain waves can reflect a person's mental state when facing or carrying out a particular situation, as indicated by its characteristics. Brain waves can ultimately affect a person's body performance (Roohi-azizi et al., 2017). There are various types of brain waves produced by the electrical activity of neurons such as delta, theta, alpha, beta, and gamma (Fadhlorrohman et al., 2018). Brain wave activity gives different patterns for each different situation, like when resting, exercising, or simulating a competition, each displaying different brain waves (Kompas, 2021). From waking up to going back to sleep, the human brain always displays different dominating brain wave activity. The variety of electrical activity in the brain can be influenced by an individual's activities and habits, which can all be seen based on each individual's mental condition (Gong et al., 2019).

Compared to previous research, this study aims to provide a more in-depth analysis of the effect of Brain Gym on athletes. This study will utilize advanced technology to measure brain waves and monitor athlete concentration levels. Additionally, this research will include a larger sample size and a longer intervention period, enabling a more comprehensive evaluation of the effectiveness of Brain Gym. Overall, this research aims to contribute to the development

of research on the impact of physical activity on cognitive function and provide new insights into the potential benefits of Brain Gym for athletes. The decline in concentration can be caused by a lack of energy supply to the brain (Mulyana et al., 2013). Activating all dimensions of the brain can be done with Brain Gym (Megawati et al., 2017). Based on the background of this problem, the researcher is interested in conducting a study with the title "The Effect of Brain Gym on Brain Waves and Athlete Concentration Levels in UKM Futsal Athletes at UNPARI."

## METHODS

This research uses the Systematic Literature Review research method. According to Jordan Systematic Literature Review is a method related to literature review relating to questions that must be answered by researchers. This is done realistically by identifying, selecting, and assessing the relevant research literature that is the focus of the discussion (Yusril et al., 2021). In line with research (Triandini et al., 2019) that by using the systematic literature review method, a researcher will conduct a review by identifying several journals systematically according to the steps that have been set. These input criteria and limitations are to determine whether the data is feasible or not to be used in this study. The following criteria are eligible in this study:

1. Data used in the year 2017-2022
2. Data obtained from the source <https://scholar.google.co.id/>
3. The data used is only about the effect of brain gym on brain waves and levels concentration

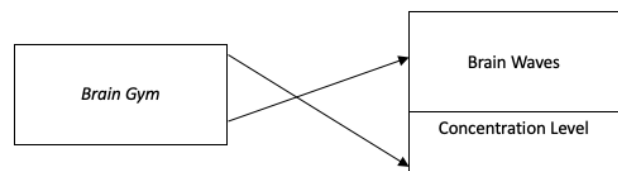


Figure 1 Framework

## RESULTS AND DISCUSSION

### Research data

The literature search was carried out in October 2022, the initial search process was carried out based on the year of publication in the 2017-2022 period using the keywords "the influence of the brain gym in increasing concentration" and "the influence of the brain gym on brain waves". The search results contained 96 articles obtained from the Google Scholar site, then the articles were selected. The literature used is only journal paper, the research study selection process is also carried out by looking at the title, abstract and extended text and the main study results are obtained which will be used for further analysis. After getting 96 articles, to improve the search results, they were selected manually, to get the desired main study. Here are the details below:

**Table 2** Search Filter

No	Search Filtering	Number of Articles
1	Invalid (not a journal paper)	48
2	Incorrect title and abstract	36
3	The title and abstract are appropriate but the contents are not discussed	3
4	Selected articles	9
Total		96

Source: Data processed 2022

From the table above, it can be seen that there are as many as 120 articles that are not valid, what is meant by invalid is not a journal paper that is presented but a thesis from the researcher. Journals and abstracts that are not in accordance with the research topic or theme, there are as many as 84 articles. There are 4 articles whose titles and abstracts are in accordance with the research theme but the full text is not discussed at all, so 15 articles were selected for further analysis. Then the information obtained will be divided into several types of journals.

**Table 3** Data Analysis

Journal	Authors	Method	Research Result
Brain Gym as a Means to Increase Study Concentration in Autistic Students	(Khasanah et al., 2021)	Single Subject Research (SSR)	The results showed that students could perform the initial movements and the 5 brain gym movements well. There is an effect of brain gym on learning concentration as indicated by the increasing mean, level and trend and no latency.
Application of Brain Gym in Improving Concentration for Class VIII Junior High School Students Al-Farabi	(Siregar et al., 2017)	Quantitative	The results showed that the concentration level of students before being given an application with good criteria (0.00%), and after being given an application with good criteria (85.00%), showed an increase of 85.00%. The results of the paired sample t-test showed a significance value of 0.000 ( $p < 0.05$ ). The conclusion of this study was that there was an effect of the application of Brain Gym in increasing students' concentration. Suggestions for school principals as a result of research can be used as a reference for teaching and learning decisions and teachers are expected to apply the application of Brain Gym before learning takes place.
Brain Gym Can Increase Study Concentration of STEI Indonesia Students Rawamangun East Jakarta	(Ali & Aminoto, 2018)	quasi experimental	The results showed that before the intervention the average value was equal to 44.65 which means the concentration level was classified as moderate and after the intervention the average value was equal to 59.26 which means the concentration level was classified as moderate. The calculation results show that there are differences between the control group and the treatment group. The results of the calculation of the average value show that the treatment group has a higher value than the control group. Thus the treatment group is more effective.
Application of the Brain Gym Method to Increase Students' Concentration in Learning Mathematics in Class IV SDN 79 Rejang Lebong	(Kartika, 2018)	Classroom action research	From this study it can be concluded that the use of the Brain Gym method (brain exercise) can improve student learning outcomes, this is because students are more concentrated and enthusiastic in learning, this is evidenced by observations by looking at student learning outcomes before using the Brain Gym method (brain gymnastics). Can be said to be low with an average value of 46.3. With the use of Brain Gym (brain exercise) students' learning activities show an increase in each cycle.
The Effect of Brain Gym on Students' Study Concentration at STIKES NU Tuban	(Basuki & Faizah, 2020)	quasi-experimental	The results of this study indicate that the brain gym technique can increase the concentration level of students at STIKES NU Tuban. Brain exercise can be applied to students in about 10-15 minutes before or in the middle of class
Efforts to increase learning concentration through the Brain Gym Method for class X pm 1 students at SMK Negeri 1 Bantul	(PC Maulana, 2017)	Classroom action research	The results showed that there was a significant effect of student concentration before and after the guidance service with the brain exercise method. So it can be concluded that the guidance service with the brain gym method can increase student learning concentration.
Application of Brain Gym in Increasing Concentration in Class VIII Students of Al-Farabi Integrated Junior High School	(Chyquitita et al., 2018)	Quasi experiment	The results showed that the Mann-Whitney U-test with an alpha level of 0.05 showed asymp. Sig of 0.001 $< 0.05$ . This means that the concentration of learning in the experimental group is lower than the control group, so it is concluded that the brain gym has no effect on the concentration of student learning.

Brain Gym Activity Training to Increase Concentration of STMIK Mataram Students	(Wahyuningsih et al., 2019)	Classroom action research	Based on the implementation of the activities, the results showed that Brain Gym can have a positive effect on increasing concentration, attention, alertness and the ability of brain function to plan, respond and make decisions. In addition, brain exercise can also improve learning abilities because it is influenced by a good level of concentration
The Effectiveness of Brain Gymnastics in Increasing Students' Learning Concentration	(Dairo & Dewi, 2019)	quasi-experimental (quasi-experimental design)	The results of the first hypothesis test showed that there was an effect of brain exercise on students' learning concentration, while the results of the second hypothesis test showed that there was a difference between the learning concentration of the intervention group (brain exercise) and the control group (conventional).

Based on the results of the identification and analysis of the articles that have been collected, the quasi-experimental method is very relevant to what is needed to find out the results that affect the level of concentration by the brain gym. Based on this Systematic Literature Review (SLR), there are 9 brain gym journals that affect concentration.

## CONCLUSIONS

The conclusion of the research on the effect of brain gym on brain waves and levels of athlete concentration highlights the important role of the brain as the control center of activities in the human body. The results of the systematic literature review (SLR) suggest that a quasi-experimental method is relevant for investigating the impact of brain gym on concentration levels. The research found that 9 brain gym journals have an impact on concentration.

Implications of this research indicate that, as an athlete, it is crucial to engage in brain exercise to increase energy levels and improve concentration. The results of this study can be used as a reference for further research on the effectiveness of brain gym in enhancing brain performance and concentration levels in athletes.

The limitations of this study are that it only analyzed 9 journals and did not consider other factors that may affect the level of concentration. Thus, further research should consider a broader range of journals and other factors that may impact the results.

The contribution of this research to future studies is that it highlights the need for athletes to engage in brain exercises to improve their concentration and overall performance. Further research can be conducted to investigate the effectiveness of brain gym in enhancing brain performance and to determine the optimal training methods and frequency to achieve the desired results.

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## Conflict of Interest

The authors declare no conflicts of interest in this study.

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