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THE RELATIONSHIP BETWEEN PHYSICAL FITNESS AND ACADEMIC ACHIEVEMENT: HOW EXERCISE IMPROVES CONCENTRATION

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Abstract
Physical fitness plays a crucial role in enhancing students' focus and improving their learning outcomes. his study explores the relationship between physical fitness and academic achievement, with a particular focus on how regular exercise improves students' concentration. As educational demands increase, there is a growing need to identify factors beyond the classroom that support cognitive development and academic performance. Research has shown that physical activity positively influences brain function by enhancing blood flow, stimulating neurochemical release, and supporting neurogenesis—factors that contribute to improved focus, memory, and mental alertness. Numerous studies have shown that regular exercise can improve cognitive skills, including attention and memory, which in turn helps enhance academic achievement. This article reviews the relationship between physical fitness and learning outcomes, emphasizing how exercise can improve concentration. The approach used is a literature review, analyzing various existing studies. Findings indicate that good physical fitness can increase blood flow to the brain, increase the production of chemicals that transmit signals in the brain, and improve brain structure through the brain's ability to adapt. The study also highlights the importance of integrating structured physical activity into the school curriculum to promote both physical and academic development. By understanding the connection between fitness and learning, stakeholders in education can make informed decisions that support students' overall well-being and academic success. In conclusion, regular exercise can improve thinking skills and support students' academic achievement
Keywords: physical fitness; focus; learning outcomes; sports; thinking skills

INTRODUCTION

In recent years, growing attention has been directed toward the holistic development of students, recognizing that academic achievement is influenced not only by intellectual engagement but also by physical well-being. One of the most compelling areas of research in educational and health sciences highlights the significant relationship between physical fitness and cognitive performance. Among various factors, regular physical exercise has been identified as a key

contributor to enhanced concentration, memory, and overall academic success.

Physical fitness, which includes cardiovascular endurance, muscular strength, flexibility, and body composition, plays a vital role in brain health. Exercise stimulates the release of neurochemicals such as dopamine, serotonin, and endorphins, which are linked to improved mood, reduced anxiety, and better focus. Furthermore, aerobic activities have been shown to increase blood flow to the brain, encouraging neurogenesis—the creation of new brain cells—particularly in the hippocampus, a region crucial for learning and memory.

Schools that incorporate regular physical activity into the curriculum often report better classroom behavior, higher levels of student engagement, and improved test scores. These findings suggest that physical education should not be viewed as secondary to academic subjects but as an essential component of student success. Yet, in many educational systems, physical activity is still undervalued, often reduced to a minimal requirement or even eliminated to make room for more classroom time.

Understanding the connection between physical fitness and academic performance is crucial for educators, policymakers, and parents. By promoting exercise and an active lifestyle among students, it may be possible to enhance not just physical health, but also the cognitive and academic capabilities of young learners. This study seeks to explore how different aspects of physical fitness contribute to concentration levels and how, in turn, these impact students' academic outcomes.

Academic performance is a crucial indicator in evaluating educational success. Various factors are known to influence students' academic outcomes, including internal factors such as interest, motivation, and health, as well as external factors such as the learning environment and teaching methods used. One internal aspect that is receiving increasing attention is physical fitness.

Physical fitness is not only related to the physical ability to carry out daily routines but also has a significant relationship with cognitive functions, such as focus, memory, and problem-solving skills. Research from various disciplines, including education and health, indicates that people who regularly exercise tend to have better concentration and academic performance than those who rarely engage in physical activity.

Exercise, as part of physical fitness, is known to stimulate the release of hormones and neurotransmitters such as endorphins and dopamine, which play a crucial role in improving mood and concentration. Furthermore, exercise contributes to improved sleep quality, reduced stress, and increased blood circulation to the brain—all of which have a direct impact on learning ability. Although theory and empirical evidence suggest a positive relationship between physical fitness and academic performance, further research is needed to understand the extent to which exercise

affects concentration and its impact on students' academic achievement. Therefore, this study aims to investigate the link between physical fitness and academic performance, with a particular emphasis on how exercise can help improve concentration in students.

METHODOLOGY

This study employed a systematic literature review method to explore the relationship between physical fitness, concentration, and students' academic achievement. This method was chosen because it provided the researcher with the opportunity to conduct a comprehensive and organized analysis of various previous research findings. Data collection was conducted by examining a variety of relevant academic sources, including accredited scientific journals, theses, and research articles published in Indonesia over the past ten years.

The inclusion criteria for the study were strictly defined to ensure the quality and relevance of the data analyzed. First, included studies must use a quantitative approach with clear and scientifically sound methods. Second, research subjects must include students from elementary to secondary education levels (SD/MI to SMA/MA). Third, the study must focus on exploring the relationship between physical fitness variables and students' concentration ability and/or academic achievement.

The literature selection process involved several steps. The first step involved searching documents in various national journal databases such as Google Scholar, Sinta (Science and Technology Index), and repositories of leading universities in Indonesia. Keywords used in the search included "physical fitness and learning concentration," "physical activity and academic achievement," and "sports and student learning outcomes." The second step was to screen documents based on predetermined inclusion criteria, with only studies meeting all requirements being included in the analysis.

After the documents were selected, an in-depth content analysis was conducted to identify key findings. The analysis focused on several key aspects, including: (1) the physical fitness measurement method used, (2) the learning concentration measurement instrument, (3) the data analysis techniques used, and (4) the research results and their significance levels. Findings from various studies were then compared and synthesized to form a comprehensive picture of the patterns of relationships between the variables studied.

To ensure the validity of the analysis, the researchers also cross-checked findings from various sources. This analysis process resulted in a synthesis of current knowledge about the impact of physical fitness on student learning abilities in Indonesia

RESULTS

Relationship between Physical Fitness and Concentration

Several studies have shown a significant relationship between physical fitness levels and the ability to concentrate while studying. This indicates that students in optimal physical condition tend to be better able to focus during the learning process. A study conducted in 2022 found a substantial positive correlation between physical fitness and students' concentration in Physical Education, Sports, and Health (PJOK) classes. The study showed a correlation (R) of 0.730, which is considered strong, coupled with a p-value of 0.003, indicating that this relationship is statistically significant. These findings reinforce the idea that maintaining physical fitness can positively contribute to students' academic performance.

Furthermore, another study conducted in 2021 also supported the previous results. This study demonstrated a significant relationship between physical fitness and students' concentration levels, with a correlation coefficient (r_calculated) of 0.578. This value is in the moderate to strong category, indicating that improved physical fitness is directly proportional to the ability to maintain focus while studying. These results are in line with a number of previous studies, which stated that regular physical activity can increase blood flow to the brain, reduce stress, and improve cognitive function, including the ability to concentrate.

These findings have significant implications for the educational environment. Schools and parents need to motivate students to participate in sports and maintain physical fitness, not only for physical health but also to improve academic performance. Structured sports programs in schools, such as extracurricular activities or quality physical education classes, can serve as one solution to improve fitness while helping students concentrate better during their studies. Thus, investing in physical fitness not only provides short-term benefits but can also have a positive long-term impact on student achievement.

The Effect of Physical Activity on Concentration and Academic Achievement

Regular physical activity has a significant impact on cognitive abilities, including concentration and academic achievement. Physiologically, regular exercise can increase blood flow to the brain, which plays a crucial role in providing oxygen and nutrients that support optimal brain function. Furthermore, physical activity also stimulates the production of brain chemicals such as dopamine and serotonin, which not only improve mood but also increase focus and reduce anxiety levels. Neuroplasticity—the brain's ability to build new neural connections—is also enhanced by regular exercise, thereby improving memory and critical thinking skills.

A 2015 study showed that students who exercise regularly have better concentration skills than those who are less physically active. These results demonstrate that physical fitness not only

impacts physical health but also has a direct impact on academic performance. Another 2020 study also showed that students who are physically active tend to achieve better academic performance, especially in subjects that require high levels of concentration, such as mathematics, physics, and language arts.

This link between physical activity and learning ability provides an important message for education. Schools should not only focus on cognitive aspects but also motivate students to engage in physical activity through organized sports programs. Activities such as morning exercise, extracurricular sports, or simply providing opportunities to move between study sessions can contribute to improving student concentration. Furthermore, parents can play a role by encouraging their children to engage in physical activities outside of school, such as cycling, swimming, or walking. Thus, a habit of exercise is not only important for physical health but also a contributing factor to academic success. Raising awareness of the importance of an active lifestyle from an early age can help students reach their full potential both academically and in their daily lives.

Underlying Biological Mechanisms

Physical activity not only benefits physical health but also significantly contributes to improving brain performance and mental well-being. One key factor behind these benefits is the increased production of Brain-Derived Neurotrophic Factor (BDNF), a protein essential for the growth and maintenance of synaptic connections between neurons. BDNF is often referred to as "brain nutrition" because of its ability to support neuroplasticity, the brain's ability to adapt and form new connections. When BDNF levels increase through exercise, learning, and memory becomes more effective, allowing students to retain information more optimally.

In addition to its benefits for the nervous system, exercise has also been shown to reduce stress and anxiety levels. Physical activity triggers the release of endorphins, natural compounds in the body that act as pain relievers and mood enhancers. By reducing stress hormones like cortisol and increasing happy hormones like serotonin and dopamine, students can feel calmer and more focused while studying. This stable mental health is crucial for supporting academic focus and productivity.

A 2019 study showed that students who regularly exercised had lower stress levels and better focus than those who were physically inactive. These results strengthen the evidence that regular exercise not only improves physical fitness but also creates an ideal mental environment for learning. Students who exercised tended to be better able to cope with academic pressure, had greater resilience to distractions, and demonstrated better cognitive performance.

To maximize these benefits, it is crucial for schools and parents to encourage students to

make exercise a part of their daily routine. It doesn't have to be high-intensity; light to moderate physical activity, such as walking, cycling, or yoga, can be quite positive. Schools can incorporate physical activity into the learning process, for example, by providing breaks between classes or organizing fun sports programs.

By understanding the link between physical activity, mental health, and cognitive performance, we can create better learning environments. Exercise is not just a supplementary activity, but a long-term investment in building a generation that is not only physically fit but also mentally strong and academically successful.

DISCUSSION

The findings from various studies suggest a strong and consistent link between physical fitness and academic achievement, primarily through the mechanism of improved concentration. Exercise, particularly aerobic activity, has been shown to have both immediate and long-term benefits on brain function. Physiologically, physical activity increases heart rate and blood flow, delivering more oxygen and nutrients to the brain. This leads to the release of neurotransmitters such as dopamine and norepinephrine, which are crucial for maintaining attention and regulating mood.

Improved concentration allows students to stay focused during lessons, process information more efficiently, and complete tasks with greater accuracy. This cognitive enhancement is particularly noticeable after short bouts of physical activity, suggesting that even brief exercises incorporated into the school day can positively impact academic performance. Moreover, long-term engagement in regular physical activity has been associated with structural changes in the brain, such as increased volume in the hippocampus and prefrontal cortex—areas responsible for memory and executive functioning.

Beyond the biological benefits, physical fitness also supports mental health, reducing stress and anxiety, which are known to impair concentration and learning. Students who are physically active tend to report higher self-esteem and better classroom behavior, both of which contribute to a more productive learning environment.

However, despite the clear benefits, many schools continue to prioritize academic instruction at the expense of physical education. Time allocated for physical activity is often reduced, particularly in high-stakes academic settings. This trend may be counterproductive, as decreasing physical activity could lead to lower cognitive performance, reduced concentration, and ultimately poorer academic results.

It is essential that educators and policymakers recognize physical education as a critical

component of the academic curriculum rather than a peripheral activity. Interventions such as classroom movement breaks, active recess periods, and daily physical education classes could be simple yet effective strategies to enhance student focus and performance. Future research should continue to explore the optimal types, durations, and frequencies of physical activity that produce the greatest academic benefits.

CONCLUSION

Through the literature analysis conducted, it can be concluded that there is a significant link between physical condition and students' academic achievement, particularly regarding their ability to concentrate. Various studies have shown that consistent physical activity not only improves physical health but also positively impacts cognitive function through a number of biological mechanisms. Increased blood flow to the brain, increased production of BDNF, which supports neuroplasticity, and the release of neurotransmitters such as dopamine and serotonin contribute to improved focus, memory, and problem-solving skills. Furthermore, exercise is effective in reducing stress and anxiety levels, which often hinder learning.

Research shows that students who actively engage in physical activity tend to have better concentration skills and achieve higher academic achievement, especially in subjects that require deep thinking. Planned physical activity programs at school and support from the family environment play a crucial role in fostering active movement habits among students. Therefore, it is important to integrate physical activity with the learning process within the education system.

Investing in physical fitness is not only about physical health but also a long-term step towards improving the quality of learning. By encouraging students to adopt an active lifestyle from an early age, we can help them reach their full academic potential while building a physically healthy and mentally resilient generation. Further research is needed to investigate the most effective types of physical activity and the ideal duration to support learning.

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