

## The Relationship between Healthy Eating Patterns, Physical Activity, and Physical Fitness: A Systematic Literature Review on Junior High School Students

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### ABSTRACT

Healthy eating patterns and physical activity are two crucial factors that influence physical fitness, especially among junior high school students. This study utilizes a Systematic Literature Review (SLR) method to explore the relationship between healthy eating, physical activity, and physical fitness. Relevant articles were selected based on inclusion criteria, such as focusing on junior school students, using empirical data, and being published within the last 10 years. The results reveal that a healthy diet rich in nutrients, such as complex carbohydrates, proteins, vitamins, and minerals, significantly contributes to improving students' physical endurance and bodily functions. Regular physical activity, such as exercise, has been shown to enhance muscle strength, flexibility, and cardiovascular function. Furthermore, the combination of healthy eating and physical activity demonstrates a significant synergistic effect on physical fitness, creating metabolic balance and reducing the risk of obesity and non-communicable diseases. This study emphasizes the importance of a holistic approach in consistently applying healthy eating patterns and physical activity among junior high school students. The implementation of nutrition education and physical activity programs in schools is a key recommendation to improve students' physical fitness.

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## **INTRODUCTION**

Healthy eating patterns, physical activity, and physical fitness are three critical factors that contribute to the growth and development of children, particularly junior high school students (Astuti et al., 2022). During adolescence, the body undergoes significant biological, physiological, and psychological changes that necessitate adequate nutritional support and regular physical activity. However, in recent years, modern lifestyles have led to a decline in healthy eating habits and physical activity among students, which may negatively impact their physical fitness.

Healthy eating is essential for providing the energy and nutrients required by the body to support daily activities. However, a study by Desthi et al (2019) found that many adolescents prefer fast food, which is nutritionally poor but calorie-dense. This dietary pattern increases the risk of obesity, malnutrition, and various metabolic disorders. For junior high school students, who are undergoing a critical phase of growth and development, an unbalanced diet can adversely affect academic performance, physical health, and overall well-being.

On the other hand, physical activity is crucial for maintaining physical fitness and preventing various health conditions. The World Health Organization (WHO) recommends that adolescents engage in at least 60 minutes of moderate to vigorous physical activity daily. However, with the increasing prevalence of technology and the widespread use of electronic devices, many students now spend more time on sedentary activities, such as gaming or watching videos, instead of engaging in physical exercise (Fitri et al., 2024). This shift in behavior has significantly contributed to a decline in students' physical fitness levels.

Physical fitness is a crucial indicator of physical health, particularly for adolescents during their peak growth phase. Maintaining good physical fitness not only supports overall health but also improves concentration, productivity, and self-confidence (Kumala et al., 2019). The relationship between healthy eating patterns, physical activity, and physical fitness has been widely researched. However, the findings remain inconsistent, particularly when applied to junior high school students.

Understanding these interrelationships enables educators, parents, and policymakers to develop targeted intervention programs aimed at promoting healthy lifestyles among junior high school students. These programs – such as offering nutritious meals in school cafeterias, incorporating physical activities into the curriculum, and running educational campaigns on the importance of healthy living – can have a substantial positive impact on students' health and physical fitness.

This study aims to systematically investigate the relationship between healthy eating patterns, physical activity, and physical fitness in junior high school students. The findings from this review are expected to enhance understanding of the importance of healthy living and provide a foundation for developing policies that promote the health and well-being of younger generations.

## LITERATURE REVIEW

A healthy diet is an eating habit that includes consuming nutritious foods such as fruits, vegetables, whole grains, lean proteins, and healthy fats, and avoiding processed, high-sugar, and high-saturated fat foods. A healthy diet includes a variety of nutrient-rich foods and beverages from all food groups in recommended amounts, while limiting added sugars, saturated fats, and sodium.

## METHODOLOGY

This study utilizes the Systematic Literature Review (SLR) method to examine the relationship between healthy eating patterns, physical activity, and physical fitness in junior high school students. The SLR method was selected due to its ability to systematically and rigorously collect, evaluate, and synthesize findings from a wide range of relevant studies (Carver et al., 2013). This approach aims to offer a comprehensive and detailed overview based on existing scientific evidence, facilitating the identification of prevailing patterns and providing new insights into the topic under investigation.

The research process involved identifying relevant literature through prominent academic databases, including PubMed, ScienceDirect, SpringerLink, and Google Scholar. Keywords used in the search included "healthy eating patterns," "physical activity," "physical fitness," and "junior high school students," with appropriate combinations of Boolean operators such as "AND" and "OR." Article selection was based on inclusion criteria, specifically studies published within the last 10 years, those that involved junior high school student samples, and those that addressed the relationship between eating patterns, physical activity, and physical fitness. Articles were excluded if they did not meet the inclusion criteria, such as studies focusing on age groups other than junior high school students or those not available in full text.

Data analysis involved evaluating the findings from the literature that met the inclusion criteria. The results were categorized into key themes, including the impact of healthy eating patterns on physical fitness, the relationship between physical activity and physical fitness, and the combined correlation of both factors. Data were analyzed descriptively and synthesized to draw conclusions aligned with the study's objectives. This approach ensures that the research provides valid and reliable scientific insights into the relationship between healthy eating patterns, physical activity, and physical fitness in junior high school students.

## RESULT AND DISCUSSION

Based on the analysis of studies that met the inclusion criteria, it was found that healthy eating patterns have a significant impact on the physical fitness of junior high school students. Diets rich in nutrients, such as fruits, vegetables, proteins, and complex carbohydrates, have been shown to enhance students' stamina, physical strength, and endurance. In contrast, the consumption of foods high in saturated fats, sugar, and salt is linked to an increased risk of obesity and a decline in physical performance. Research by

Manopo et al (2021) further demonstrated that students who follow healthy eating patterns tend to have a more balanced Body Mass Index (BMI), a key indicator of physical fitness.

Additionally, physical activity is strongly correlated with the level of physical fitness in junior high school students. A study by Mustar et al (2023) found that students who regularly participate in physical activities, such as school sports or extracurricular programs, tend to exhibit better cardiovascular endurance, optimal muscle strength, and increased flexibility. In contrast, a sedentary lifestyle—characterized by excessive television watching or gadget use—contributes to lower levels of physical fitness. Howell (2023) further emphasized that physical activity not only improves physical health but also helps students maintain more consistent sleep patterns and enhances their concentration during learning.

The interconnection between healthy eating patterns and physical activity demonstrates a synergistic effect on students' physical fitness. Research by Prasetyo & Winarno (2019) showed that students who combine healthy eating habits with regular physical activity exhibit significantly better physical fitness compared to those who focus on only one of these factors. This combination is also associated with improved metabolic balance and a reduced risk of non-communicable diseases, such as diabetes and hypertension. Overall, the findings of this review emphasize the importance of adopting a holistic approach that integrates both healthy eating patterns and physical activity to support the physical fitness of junior high school students.

### ***The Impact of Healthy Eating Patterns on Physical Fitness***

Healthy eating patterns are crucial for supporting the physical fitness of junior high school students, as the nutrients provided by food directly influence the body's ability to engage in physical activities. Research by Rohmah & Muhammad (2021) found that students who consistently consume balanced, nutritious meals show improvements in immune strength, physical power, and motor skills compared to those with irregular or unhealthy eating habits. A balanced diet includes the intake of complex carbohydrates, proteins, fibers, vitamins, and minerals, all of which are vital for optimal physical performance and overall health.

Suhartoyo et al (2019) highlight that complex carbohydrates, found in foods like brown rice, wheat, and potatoes, serve as the body's primary source of energy. This energy is essential for supporting students' physical activities, whether in school sports or daily tasks. Protein, sourced from foods such as eggs, lean meats, and legumes, plays a crucial role in building and repairing muscle tissue, especially after intense physical activity. Vitamins like C and E function as antioxidants, protecting body cells from damage caused by free radicals during physical exertion. Additionally, minerals such as calcium and magnesium are vital for maintaining bone health and reducing the risk of injuries.

On the other hand, the consumption of foods high in sugar, salt, and saturated fats can negatively impact physical fitness. Foods like packaged snacks and soft drinks are often linked to unhealthy weight gain, reduced flexibility, and

diminished physical endurance. Additionally, the frequent consumption of instant foods can cause an energy imbalance in the body, leading to decreased physical performance and an increased risk of obesity. These dietary habits hinder the body's ability to function optimally, ultimately affecting overall health and physical fitness.

This underscores the fact that healthy eating patterns not only meet the nutritional needs required for the growth of junior high school students but also play a crucial role in supporting their physical performance. By adopting healthy eating habits, students can achieve optimal physical fitness, which, in turn, enhances their overall quality of life (Waluyani et al., 2022). Therefore, the active involvement of families, schools, and the community is essential to ensure that students have access to nutritious foods and are educated about the importance of maintaining a balanced diet.

### *The Relationship Between Physical Activity and Physical Fitness*

Physical activity is a crucial factor that significantly influences the physical fitness of junior high school students. Research by Aqobah et al (2022) indicates that students who regularly participate in physical activities demonstrate better stamina, improved muscle strength, and greater flexibility compared to those who remain physically inactive. Physical activity – whether structured, such as school sports, or unstructured, like cycling or walking – helps enhance overall bodily functions, particularly in the cardiovascular, muscular, and respiratory systems.

According to Efendi & Widodo (2021), physical exercises, such as gymnastics or sports games commonly performed at school, play a crucial role in improving the efficiency of heart and lung function. When students engage in physical activity, their heart rate increases, optimizing blood and oxygen flow throughout the body. This not only enhances physical fitness but also accelerates recovery from fatigue. Furthermore, regular exercise strengthens muscles, improves posture, and supports healthy bone development during the critical growth phase of junior high school students.

On the other hand, research by Karim (2017) indicates that a sedentary lifestyle – such as excessive gadget use, watching television, or spending time without engaging in physical activity – can negatively affect the physical fitness of students. These habits are often linked to an increased risk of weight gain, reduced muscle function, and metabolic disorders. Students who spend more time on these passive activities are also more likely to experience health issues such as obesity, muscle weakness, and decreased stamina. These conditions can limit their ability to engage in more intense physical activities in the future, further impacting their overall health and fitness.

Moreover, physical activity not only benefits physical health but also positively impacts students' mental well-being. Research by Langitan et al (2023) reveals that physically active students exhibit better concentration in class, enhanced cognitive abilities, and more stable emotions. Physical activity stimulates the release of endorphins, hormones that help alleviate stress and promote feelings of happiness. Additionally, regular exercise contributes to

improved sleep quality, allowing students to wake up feeling more refreshed and better prepared to tackle daily activities.

Thus, physical activity is not only beneficial for enhancing physical fitness but also supports students' overall well-being, both physically and mentally. Therefore, it is crucial for schools and families to encourage students to engage in regular physical activities, whether through structured sports programs at school or active daily habits at home and within the community. A supportive environment is also essential in fostering an active culture that contributes to the long-term health and well-being of students.

### ***The Synergy Between Healthy Eating Habits and Physical Activity***

The combination of healthy eating habits and physical activity produces a significant synergistic effect on the physical fitness of junior high school students. This synergy creates a balance that enables the body to function optimally, both physically and mentally. Research by Muharamda & Effendi (2020) indicates that students who adopt healthy eating habits and consistently engage in physical activity demonstrate higher levels of physical fitness compared to those who focus on only one of these aspects. This highlights that healthy eating and physical activity complement each other, contributing to a more optimal overall body condition.

According to Noviyanti & Marfuah (2017), physiologically, healthy eating provides the energy and essential nutrients required by the body, particularly during physical activity. Nutrients such as complex carbohydrates, protein, and healthy fats serve as primary energy sources during exercise, while vitamins and minerals aid in recovery and help prevent fatigue. After physical activity, consuming healthy foods like fruits, vegetables, or lean protein accelerates muscle regeneration and reduces the risk of injury. Conversely, physical activity enhances the body's metabolism, making nutrient absorption from food more efficient. This creates a positive cycle that supports increased stamina, endurance, and muscle strength.

Additionally, the synergy between healthy eating habits and physical activity plays a crucial role in maintaining an ideal body weight, a key indicator of physical fitness. By balancing appropriate caloric intake from healthy eating with calorie expenditure through physical activity, students can prevent excessive weight gain and reduce the risk of obesity. Furthermore, this combination is effective in lowering the risk of non-communicable diseases such as diabetes, hypertension, and heart disease. Consistently incorporating both healthy eating and physical activity can help students develop long-term healthy habits that contribute to their overall well-being (Oktaviani & Wibowo, 2021).

Beyond physical effects, the synergy between healthy eating habits and physical activity also has a significant impact on the mental health of junior high school students. Research by Putro & Winarno (2022) shows that proper nutrition enhances brain function, improves mood, and supports concentration during learning. When combined with physical activity, which stimulates the release of endorphins, students become more relaxed, happier, and better able to cope with

stress. This stable mental state not only benefits emotional well-being but also influences students' motivation to consistently maintain a healthy lifestyle.

A comprehensive approach that integrates both proper nutrition and regular physical activity is essential and should not be overlooked. To promote a healthy lifestyle among junior high school students, it is critical to involve schools, families, and the broader environment. Schools can play a key role by offering nutrition education programs alongside structured physical activities, while families can support these initiatives by providing nutritious meals and encouraging active behaviors at home. This integrated approach not only enhances students' physical fitness but also establishes a foundation for a lifelong commitment to healthy living.

### ***Recommendations to Improve Physical Fitness of Junior High School Students***

Based on research by Sendra (2018) and Utami et al (2024), here are several recommendations that can be implemented to improve the physical fitness of junior high school students through healthy eating habits and physical activity:

#### *Enhanced Nutrition Education in Schools*

Nutrition education should be an integral part of the school curriculum, as it plays a critical role in shaping students' dietary habits from an early age. Within subjects such as Science and Physical Education, students can be taught about key nutritional concepts, including the importance of a balanced diet, daily nutritional requirements, and the adverse effects of unhealthy foods, such as junk food, on health and performance. To enhance student engagement and retention, educational materials should utilize interactive approaches, such as digital media and gamified learning. Additionally, schools can organize seminars or workshops led by nutrition experts to provide students and parents with a more comprehensive understanding of nutrition's role in physical well-being (Yane & Wardhani, 2024). These sessions facilitate interactive discussions on topics like healthy food choices and the positive impact of proper nutrition on physical fitness. Such initiatives not only ensure students acquire theoretical knowledge but also enable them to apply it in their daily lives, while promoting a school-wide awareness of the importance of healthy eating practices.

#### *Strengthening School Sports Programs*

Sports programs in schools are an effective means of enhancing students' physical fitness, and strengthening these programs is essential for fostering long-term health. Schools can increase the number of physical education classes or offer a wider range of extracurricular sports activities, such as gymnastics, traditional games, or competitive sports like soccer and volleyball, allowing students to explore different activities and identify those they enjoy. This variety can increase student motivation, leading to more active participation and improved physical fitness. It is important that sports activities are inclusive, engaging all students, including those with lower fitness levels, to ensure broad participation. In addition to expanding sports offerings, schools should also facilitate specialized training or host sports competitions to create a competitive

yet supportive environment (Astuti et al., 2022). These events not only motivate students but also foster camaraderie and sportsmanship. Furthermore, collaboration with professional coaches can provide students with targeted training, ensuring they receive both physical benefits and proper technique instruction. By strengthening school sports programs in this way, schools can help cultivate a generation of students who are physically and mentally healthy.

#### *Collaboration with Parents*

Parents play a crucial role in shaping their children's eating and physical activity habits, making their active involvement essential in promoting a healthy lifestyle. Schools should engage parents through regular meetings or group discussions, where practical guidance can be provided on preparing healthy meals at home, such as creating balanced daily menus or cooking nutritious foods. Additionally, parents can be educated about the positive impact of physical activity on their children's overall development, encouraging them to support sports activities at home. Beyond meetings, schools can organize special events, such as "Healthy Eating Day" or family sports activities, to strengthen the connection between the school, students, and families. These events provide families with a direct experience of the importance of a healthy lifestyle, reinforcing the synergy between schools and homes in supporting students' dietary and physical activity habits. This collaborative approach ensures that students receive consistent support for maintaining a balanced diet and engaging in physical activity, both at school and at home (Desthi et al., 2019).

#### *Provision of Healthy Food in School Canteens*

The school canteen plays a vital role in shaping students' eating habits, as many students depend on it for their daily nutritional needs during school hours. Therefore, schools should prioritize the provision of healthy foods in the canteen, including fresh fruits, vegetables, low-fat dairy products, and foods that are low in sugar and salt. To ensure both nutritional value and appeal, schools can collaborate with nutritionists to design menus that are not only healthy but also visually attractive and flavorful, thus encouraging students to make healthier food choices. This initiative should be supported by awareness campaigns to educate students on the benefits of healthy eating (Fitri et al., 2024). For instance, schools can organize sessions to discuss how healthy food supports physical activity and overall physical fitness. Additionally, to further promote healthy eating habits, schools can offer incentives such as discounts on nutritious foods or hold healthy food creativity competitions. These strategies will motivate students to make better dietary choices, leading to improved health outcomes.

#### *Creation of an Environment that Supports Physical Activity*

Creating an environment that promotes physical activity is essential for motivating students to engage in regular movement. Schools bear a significant responsibility in providing adequate and appealing sports facilities, such as expansive fields, indoor sports halls for inclement weather, and basic fitness equipment, all of which can effectively support students' physical activities. Additionally, schools can design comfortable green open spaces that not only facilitate physical activity but also contribute to a healthy and enjoyable

environment for students. Well-maintained and safe facilities are crucial in encouraging students to utilize their time for physical activities both during classes and outside of school hours. Local governments also play a key role in supporting the development of conducive environments (Kumala et al., 2019). The provision of public facilities such as playgrounds, running tracks, or green spaces near schools offers students more opportunities to engage in physical activities beyond school hours. Furthermore, collaborative initiatives, such as "Car-Free Day" around school areas, can encourage both students and the local community to adopt more physically active lifestyles. With a supportive environment and backing from multiple stakeholders, students are more likely to incorporate physical activity into their daily routines.

#### *Active and Healthy Lifestyle Campaigns*

An active and healthy lifestyle campaign is an effective strategy for promoting healthy habits among students. Schools can implement such initiatives through innovative programs like the "Healthy School Movement," which involves students, teachers, and parents in physical activities such as mass exercises, walking events, and inter-class sports competitions. Additionally, healthy cooking competitions can be organized to educate students and parents on the importance of nutritious eating habits. This multifaceted approach not only promotes physical health but also strengthens community bonds. In the digital age, social media platforms like Instagram and TikTok offer powerful tools for extending the reach of health campaigns, enabling schools to share information on healthy eating and physical activity through engaging content such as short videos or home-based fitness challenges (Manopo et al., 2021). Collaborating with influencers or local figures who advocate for healthy living can further amplify the campaign's impact. By leveraging digital platforms, schools can effectively engage students and encourage the adoption of healthy behaviors in a manner that aligns with their technology-driven lifestyles.

#### *Routine Monitoring and Evaluation*

Routine monitoring of students' physical fitness is essential for assessing the effectiveness of health programs implemented in schools. This evaluation can include measuring physical indicators such as weight, height, body mass index (BMI), and endurance, with assessments conducted each semester to ensure consistent tracking of students' physical conditions. Accurate data enables schools to identify students who may require additional support in increasing physical activity or managing their nutrition. For instance, students who are overweight can be provided with tailored diet plans combined with appropriate physical activities. Beyond its role as a monitoring tool, this evaluation also serves an educational purpose. The data gathered can be used to provide personalized feedback to both students and parents, fostering greater awareness of students' health status. This awareness can motivate students to adopt healthier lifestyles (Mustar et al., 2023), while encouraging parents to actively support healthy habits at home, such as preparing nutritious meals or promoting participation in physical activities. By integrating routine monitoring and

evaluation, schools can ensure that efforts to maintain students' physical fitness are both targeted and sustainable.

## CONCLUSIONS AND RECOMMENDATIONS

This systematic literature review underscores the significant relationship between healthy eating patterns, physical activity, and physical fitness among junior high school students. A balanced and nutritious diet provides essential energy and nutrients that are crucial for optimal physical performance and growth, while regular physical activity improves cardiovascular endurance, muscular strength, and overall fitness, also benefiting mental well-being. The findings highlight the synergistic effects of combining healthy eating with consistent physical activity, demonstrating that students who engage in both practices exhibit better physical fitness levels and are less susceptible to health issues such as obesity and chronic diseases. This synergy emphasizes the importance of a holistic approach in promoting a healthy lifestyle for junior high school students. To achieve optimal outcomes, collaboration among schools, families, and communities is necessary to incorporate nutrition education and physical activity programs into daily routines. By fostering these healthy habits, students can build a strong foundation for lifelong health and well-being.

## ADVANCED RESEARCH

Further research is needed to deepen our understanding of the relationship between healthy eating patterns, physical activity, and physical fitness, particularly in the context of junior high school students. First, longitudinal studies can be conducted to evaluate the long-term impact of nutrition interventions and physical activity programs on students' fitness and mental health. Second, it is important to examine the role of social and environmental factors, such as family influence, school policies, and access to sports facilities and nutritious foods, in supporting or inhibiting the adoption of healthy lifestyles.

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