



The influence of health education through physical education on the healthy living behavior of elementary school students

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ABSTRACT

This study evaluates the impact of integrating health education into physical education on healthy living behaviors of elementary students at State Elementary School SDN 48 Kuranji, Padang City. Employing a quasi-experimental design with a pretest-posttest control group, the study involved 60 students. The experimental group received health education integrated into physical education, while the control group followed standard physical education. Data collection used questionnaires and observations, analyzed through descriptive and inferential statistics, including paired t-tests. Results revealed significant improvements in knowledge, attitudes, and behaviors in the experimental group, with higher posttest scores than pretests, while the control group showed no notable changes. These findings underscore the effectiveness of combining health education with physical education to enhance health behaviors, supporting earlier research on the value of experiential learning. This study highlights the importance of a holistic educational approach to foster healthy lifestyles from an early age. Further research is recommended to assess long-term impacts and optimize program implementation in diverse educational settings.

Keywords: health education, physical education, healthy living behavior, elementary school students, quasi-experimental design.

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INTRODUCTION

Health education is one of the key components in shaping healthy living behaviors among elementary school students. According to Nugraheni (2019), school health education significantly shapes students' knowledge, attitudes, and behaviors toward health. In Indonesia, the implementation of health education is often integrated with Physical Education, Sports, and Health subjects. This subject, known as PJOK in Indonesian, aims to raise students' awareness of the importance of maintaining bodily health through physical activity and health knowledge.

It has been widely held that effective health education can enhance students' awareness and knowledge about the importance of maintaining bodily health. In view of this, Sudrajat (2020) suggests that students who receive health education tend to have better healthy living behaviors compared to those who do not receive similar instruction. Health education delivered through PJOK focuses on physical aspects and students' understanding of nutrition, hygiene, and disease prevention. Therefore, this education is expected to be a foundation for forming healthy living habits early on.

Health education, in general, can be defined as a process aimed at increasing individuals' awareness, knowledge, attitudes, and behaviours to maintain and improve their health and the health of their surroundings. According to Friskawati et al. (2020), health education functions as a promotive and preventive effort in the field of health. Physical education, as part of the school curriculum, plays an important role in shaping students' character and healthy living habits.

Several other benefits are evident, as supported by relevant studies (Li et al., 2024; Permatasari, 2018; Siedentop, 2009).

Firstly, integrating health education in PE can strengthen students' learning about the importance of healthy living. According to Permatasari (2018), physical activities conducted in PE can introduce health concepts to students. Siedentop (2009) further adds that effective physical education improves physical fitness and can be used as a medium to deliver health education. Structured physical activities in physical education can introduce students to health concepts such as nutrition, hygiene, and disease prevention. This can help students understand and apply these concepts in their daily lives.

Secondly, its incorporation into the school curriculum offers students a more enjoyable and effective health learning experience. According to the constructivist learning theory by Piaget (1952), students learn through direct experiences and interactions with their environment. In the context of physical education, students can learn about health through physical activities and games that teach them the values of fitness and health. Li et al. (2024) also revealed that health education delivered through physical education could provide long-term benefits for students as those involved in physical education programs integrated with health education tend to have better fitness levels, broader health knowledge, and more consistent healthy living behaviours.

Behavior change is one of the main goals of health education. The Theory of Planned Behavior by Ajzen (1991) states that individual behavior is influenced by their intention to perform certain behaviors, which in turn is influenced by their attitudes, subjective norms, and perceived control over the behavior. In the context of health education through PE, activities designed to increase students' knowledge and awareness about health can influence their attitudes and intentions to adopt healthy living patterns.

Despite the many benefits of health education through physical education, its implementation in elementary schools (ESs) still faces various challenges. Widyastuti (2017) said the lack of facilities and infrastructure, as well as limited time and competent teaching staff, often become major obstacles. Additionally, a dense curriculum and the prioritization of other academic subjects cause health education to receive insufficient attention. Therefore, effective strategies and support from various parties are needed to optimize health education in elementary schools.

Concerning this, research on the influence of health education through physical education on the healthy living behaviors of ES students is crucial. The results of this study are expected to contribute to the development of curricula and health education policies in elementary schools and provide empirical evidence on the importance of integrating health education into physical education to improve the quality of students' lives. Thus, efforts can be made to create a healthier and more knowledgeable generation.

METHOD

This study employs a quantitative approach with a quasi-experimental design. This design was carefully selected since it allows the researchers to evaluate the influence of health education through physical education on the healthy living behavior of elementary school students. According to Creswell (2014), quasi-experimental research is an appropriate method to measure the effectiveness of an intervention in conditions where full randomization is not feasible.

The research design applied includes a pretest-posttest control group model. In this design, two groups of students were involved: an experimental group that receives health education through physical education and a control group that receives physical education without additional health material. According to Fraenkel & Wallen (2009), this design effectively compares the results between groups that receive treatment and those that do not.

The population in this study consists of 4th and 5th-grade students at State Elementary School SDN 48 Kuranji, which is situated in Padang City. The research participants as a sample were taken using purposive sampling, where two classes of fourth- and 5th-grade students with similar characteristics in terms of facilities and curriculum were selected. The total sample consists of 60 students, with 30 students in the experimental group and 30 in the control group. This is in line with Sugiyono (2017), who states that purposive sampling is an appropriate

technique for the researcher to ensure that the selected sample meets certain criteria relevant to the research objectives.

Data in this study were collected through questionnaires and observation sheets. The questionnaires were distributed to examine students' knowledge, attitudes, and healthy living behaviors before and after the intervention. The observation sheets were utilized to monitor the implementation of physical education and student activities during health education sessions. The selection of both instruments confirms Arikunto's (2010) idea that questionnaires and observations are valid means for measuring behaviour changes and program effectiveness.

The collected data were then analyzed using descriptive and inferential statistical techniques. Descriptive analysis was employed to describe the characteristics of the sample and data distribution. A paired t-test was performed to compare pretest and posttest scores in the experimental and control groups, while an independent t-test was used to compare the results between the two groups. In view of this, t-tests have become appropriate statistical tools for testing significant differences between two sets of correlated and independent data (Santoso, 2014).

FINDINGS AND DISCUSSION

Findings

As stated, this study attempts to examine the impact of integrating health education into physical education on healthy living behaviors of elementary students at State Elementary School SDN 48 Kuranji, Padang City. Descriptive statistical analysis was conducted to provide a general overview of the data obtained from the study. Table 1 shows the descriptive statistics for the variables of knowledge, attitudes, and healthy living behaviors of students before and after the intervention in both the experimental and control groups.

Table 1. Descriptive statistics of the variables of knowledge, attitudes, and healthy living behaviors of students before and after the intervention

Group	N	Mean Pretest	Mean Posttest	SD Pretest	SD Posttest
Experiment	30	65.4	85.6	7.5	6.8
Control	30	64.8	67.2	6.9	7.0

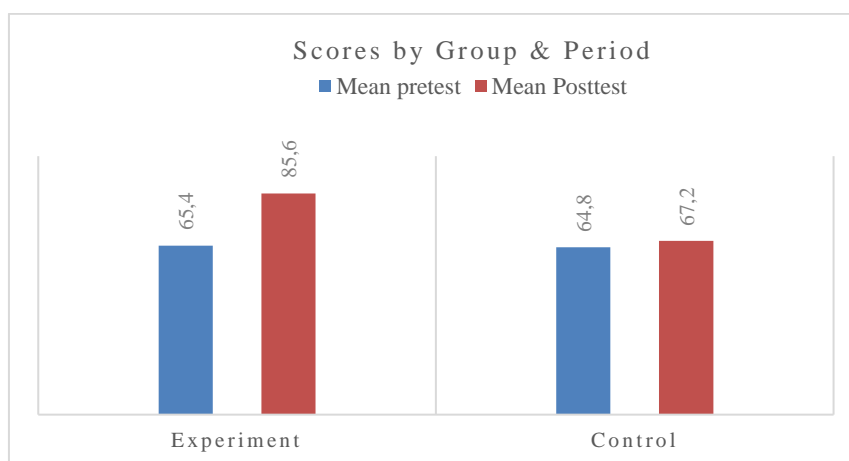


Figure 1. The initial and final scores of the experimental and control groups

Figure 1 illustrates the initial and final scores of the experimental and control groups. The experimental group shows a significant improvement from the initial score of 65.4 to the final score of 85.6, while the control group shows a slight increase from 64.8 to 67.2. A paired t-test was conducted to determine whether there were significant differences between pretest and posttest scores in the experimental and control groups. The analysis results show that there is a significant difference between pretest and posttest scores in the experimental group ($p < 0.05$). However, the control group has no significant difference ($p > 0.05$).

Table 2. The results of the paired t-test for the experimental group

Variable	Mean Difference	t-value	df	p-value
Knowledge	20.2	9.56	29	0.000
Attitude	15.3	7.84	29	0.000
Behaviors	18.1	8.23	29	0.000

Besides, the results of the study indicate that health education through physical education has a significant impact on improving the knowledge, attitudes, and healthy living behaviors of elementary school students. The experimental group that received health education interventions through physical education showed significant improvements in all measured variables, while the control group did not show significant progress. Therefore, integrating health education into physical education has proven effective in enhancing students' healthy living behaviors.

Discussion

Integrating health education into physical education (PE) curricula has been demonstrated to enhance elementary school students' health-related behaviours significantly. Empirical studies have consistently shown that such integrative programs not only augment students' knowledge of healthy lifestyles—encompassing dietary habits, physical activity, and personal hygiene—but also positively influence their attitudes towards physical activity and the cultivation of essential life skills conducive to lifelong wellness (Friskawati et al., 2020; Liu & Fernando, 2024).

A pivotal aspect of this integration is the development of child-friendly, school-based learning management models tailored for health and physical education. Sunardiyanta et al. (2024) underscore the necessity of creating educational environments that are both engaging and conducive to learning, thereby fostering an atmosphere where students feel safe and motivated to participate actively in health-promoting activities. Such environments are instrumental in instilling clean and healthy living behaviours, which protect against many diseases (Akram et al., 2022).

The role of PE teachers is paramount in this integrative approach. Their performance directly influences the effectiveness of health education initiatives and, consequently, students' character development. Research indicates that proficient PE teachers can create a positive school environment that promotes physical well-being and reinforces moral and ethical values among students (Hendrayana et al., 2022). This holistic development is crucial, as it equips students with the resilience and discipline necessary to maintain healthy behaviours throughout their lives.

There is a demonstrable correlation between physical activity and academic performance. Komarudin et al. (2023) highlight that regular engagement in physical activities not only enhances physical health but also contributes to improved cognitive functions, leading to better academic outcomes. This finding reinforces the argument for a well-rounded curriculum that seamlessly integrates health and physical education, ensuring students benefit physically and intellectually. Integrating health education into physical education curricula is a multifaceted strategy that yields substantial benefits in promoting healthy living behaviours among elementary school students. By fostering child-friendly learning environments, empowering PE teachers, and acknowledging the symbiotic relationship between physical activity and academic performance, educational institutions can address public health concerns effectively and cultivate a generation of students committed to lifelong wellness.

Impact of health education on students' knowledge

The results of the study show that health education through physical education significantly improves students' knowledge about healthy living behaviors. The experimental group experienced a significant increase in knowledge scores compared to the control group. These findings are consistent with Sudrajat's (2020), demonstrating that health education interventions can enhance students' health knowledge. This increase in knowledge is crucial because good health knowledge is an important first step in forming healthy living behaviors.

First, health education significantly enhances students' knowledge by providing a structured platform to learn essential health principles. Incorporating health education into

physical activities has been shown to bolster students' comprehension of physical and mental health significantly. Moral-Garcia et al. (2021) highlight that health education programs embedded within physical activities enable students to grasp the multifaceted benefits of exercise, encompassing cardiovascular health, physical fitness, and mental well-being. This experiential learning approach facilitates the practical application of theoretical knowledge, promoting healthier lifestyles.

Second, health education integrated into physical activities has been proven to enhance students' knowledge of the importance of physical and mental health. According to research published by Gkintoni et al. (2024), health education programs delivered through physical activities help students understand the benefits of exercise for heart health, physical fitness, and mental well-being. The information provided in the context of physical activities allows students to practically internalize this knowledge, making them more likely to adopt a healthy lifestyle.

Third, health education plays a crucial role in disease prevention efforts. According to research by Rizvi (2022), effective health education delivers information on vaccination, healthy habits, and avoidance of harmful substances to students. This helps increase their awareness of avoidable risk factors, thereby reducing incidents of preventable diseases among student populations.

Lastly, health education improves students' abilities to recognize early symptoms of diseases and take appropriate preventive measures. Research published by Rizvi (2022) indicates that students receiving health education are more likely to promptly identify early signs of diseases and seek necessary medical care. This demonstrates that the knowledge gained from health education impacts their general understanding of health and enhances their ability to act effectively in maintaining their health.

The impact of health education on students' attitudes

In addition to knowledge, health education through physical education has also proven effective in improving students' attitudes toward healthy living. A positive attitude toward health is essential as it can motivate students to apply the knowledge they have in their daily lives. This result supports the findings of Permatasari (2018), which show that integrative health education in physical activities can shape positive attitudes toward health. A good attitude is a prerequisite for sustained behavior change.

First, health education significantly influences students' attitudes by providing a deeper understanding of the importance of health in their daily lives. Pulimeno (2020) said structured health education programs effectively change students' attitudes towards health, enhancing their motivation to pay attention to and adopt healthy lifestyles. The information provided within the educational context helps students develop a positive attitude towards maintaining their personal health.

Second, health education also plays a role in changing students' health-related behaviors. Students participating in health education programs tend to have more positive attitudes towards disease prevention, timely healthcare, and healthy lifestyles in general (Lee et al., 2023). This reflects attitude changes driven by knowledge gained from structured health education.

Third, health education also influences students' attitudes towards their societal role in promoting health. Research published by Kivimäki (2024) found that effective health education programs enhance students' participatory attitudes towards public health activities, such as mass vaccination programs or health campaigns. This indicates that health education changes individuals' attitudes towards personal health and strengthens their involvement in public health efforts.

Finally, health education also shapes students' attitudes towards the importance of disease prevention and early detection. According to research published by Rizvi (2022), students who have access to health education tend to have more positive attitudes towards regular health check-ups and preventive measures, such as vaccinations and healthy lifestyles. This demonstrates that health education impacts students' knowledge and attitudes towards crucial preventive efforts for long-term health.

Changes in students' healthy living behaviors

This study also shows a significant increase in the healthy living behaviors of students who received health education through physical education. This means that students know and have a good attitude toward health and implement healthy living behaviors daily. This result supports Ajzen's (1991) Theory of Planned Behavior, which states that good knowledge and attitudes will influence an individual's intentions and behaviors. Therefore, health education through physical education effectively promotes healthy living behavior changes.

First, health education delivered through physical education classes significantly changes students' healthy lifestyle behaviors. According to research published by Liao et al., (2023) and Martins et al. (2022) students involved in health education programs integrated with physical education tend to be more physically active and better understand the importance of physical fitness in maintaining health. Information provided in the context of physical activities helps students consistently practice healthier lifestyles.

Second, health education within physical education also plays a role in increasing students' awareness of the need for balanced nutrition. This approach helps students understand the relationship between physical activity and nutrition, encouraging better food choices and overall health awareness (Wallen & Davis, 2013). Studies show that such integrated programs improve students' health-related knowledge and attitudes towards physical activity (Liu & Fernando, 2024). However, the impact on behavioral and secondary outcomes, like body mass index, remains mixed (Lee et al., 2023). Higher education levels in physical education are associated with increased consumption of healthier foods and improved nutritional knowledge (Popławska et al., 2018). Additionally, high physical activity levels correlate with healthier food choices, particularly among female students (Popławska et al., 2018). These findings underscore the importance of incorporating nutrition education within physical education to promote overall student wellness.

Third, health education in the context of physical education also contributes to reducing harmful health behaviors such as substance abuse or smoking among adolescents. According to research published by Nawi et al. (2021) and Aura et al. (2016), health education provided within the physical education framework effectively reduces the prevalence of risky behaviors among students, including substance use and alcohol consumption. This demonstrates that health education affects students' physical activities and other behaviours that impact their overall health.

Finally, health education through physical education helps students develop sustainable healthy living skills. According to research published by Gray et al. (2015) and Martins et al. (2022), health education programs integrated with physical education not only enhance students' knowledge of healthy lifestyles but also cultivate positive habits they can maintain in the long term. This underscores the important role of physical education in providing a platform to teach healthy living skills to younger generations.

The role of physical education in forming healthy living behaviors

Physical education improves physical fitness and can serve as an effective medium for delivering health education. According to Siedentop (2009), structured and integrated physical education with health education can provide students with enjoyable and meaningful learning experiences. In this study, health education delivered through physical activities has increased students' knowledge, attitudes, and healthy living behaviors. This demonstrates that physical education has great potential to promote health among students.

First, health education integrated into physical activities has been proven to enhance students' knowledge of the importance of physical and mental health. Health education programs delivered through physical activities help students understand the benefits of exercise for heart health, physical fitness, and mental well-being (Gkintoni et al., 2024). The information provided in the context of physical activities allows students to practically internalize this knowledge, making them more likely to adopt a healthy lifestyle. Incorporating health education into physical activities fosters an experiential learning approach, where students actively engage with concepts rather than passively receiving information. This hands-on experience strengthens their ability to retain knowledge and develop lifelong health-conscious habits. Research by Martins et al. (2022)

suggests that students participating in movement-based learning show higher motivation levels and a deeper appreciation for the role of physical activity in overall well-being. Integrating mental health education into physical activity sessions can help students manage stress, improve emotional regulation, and enhance cognitive function. Programs that include mindfulness exercises, breathing techniques, and relaxation strategies within physical education classes contribute to both physical and psychological resilience (Granero-Jiménez et al., 2022). Therefore, a holistic approach to health education—one that seamlessly blends physical activity with wellness instruction—creates a sustainable foundation for lifelong well-being.

Second, health education is also known to influence students' behaviors towards healthier lifestyle choices. Health education also influences students' behaviors towards healthier lifestyle choices. Research published by Pulimeno et al. (2020) indicates that students participating in health education programs are likelier to adopt healthy habits, such as consuming nutritious food and engaging in regular physical activity. This enhances their understanding of the importance of a healthy lifestyle and develops practical skills they can use throughout their lives. Health education fosters critical thinking and informed decision-making regarding personal health and well-being. By integrating evidence-based knowledge into school curricula, students become more aware of the risks associated with unhealthy behaviors, such as excessive sugar consumption, sedentary lifestyles, and poor hygiene practices. Studies have also shown that early exposure to structured health education helps students build self-efficacy, allowing them to make autonomous and informed choices that align with long-term wellness goals (Tamanal & Kim, 2020).

Incorporating health education into the school environment promotes a holistic approach to student well-being by addressing physical health and mental and emotional wellness. Programs that include stress management techniques, mindfulness practices, and social-emotional learning components contribute to improved resilience, self-regulation, and overall psychological well-being (Haines et al., 2019). As a result, students are better equipped to navigate the challenges of adolescence and adulthood with a balanced and proactive mindset. Considering these findings, it is evident that health education extends beyond basic knowledge acquisition; it serves as a foundation for cultivating lifelong habits, fostering personal responsibility, and creating a supportive environment that prioritizes overall well-being. Therefore, policymakers and educators must continue to enhance and expand health education programs, ensuring that students receive the necessary resources and guidance to lead healthier, more fulfilling lives.

Third, health education in physical activities also plays a role in shaping positive attitudes towards overall health. Students participating in health education programs integrated with physical activities tend to have more positive attitudes towards physical fitness and a commitment to maintaining their own health. This reflects attitude changes driven by direct experience and a deep understanding of the benefits of fitness.

Fourth, health education through physical activities also contributes to changing students' behaviors towards healthier lifestyles (Nawi et al., 2021; & Aura et al., 2016). Integrating health education into the physical activity curriculum effectively improves students' healthy behaviors, such as increasing regular physical activity, adopting healthy eating patterns, and reducing risky behaviors. This demonstrates that health education influences knowledge and attitudes and promotes positive behavioral changes in students' lives.

Lastly, health education in physical activities helps students develop sustainable, healthy living skills. According to research published by Haerens (2011), Moral-Garcia et al. (2021), and Aquino (2023), health education programs integrated with physical activities enhance students' understanding of health and help them develop healthy habits that can be maintained in the long term. This underscores the importance of physical education as a platform for teaching healthy living skills to younger generations.

CONCLUSION

Health education through physical education has proven effective in improving the knowledge, attitudes, and healthy living behaviors of elementary school students. The study

results show that students who received health education interventions through physical activities experienced significant improvements in all measured variables compared to the control group. These findings underscore the importance of integrating health education into the physical education curriculum as a strategy to promote health among students from an early age, as well as the need for adequate facilities and teacher training to optimize the implementation of this program in elementary schools. Furthermore, this study recommends further research to evaluate the long-term effectiveness of this program and to develop more effective implementation strategies in various school contexts.

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