



Community Service Report

Sustained Effects of School-Based Obesity Education on Knowledge and Healthy Lifestyle Behaviors among Junior High School Students

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ABSTRACT

Obesity among adolescents is an increasing public health problem that contributes to the risk of various non-communicable diseases. Schools provide a strategic setting for health promotion to improve students' knowledge and encourage healthy lifestyles. This community service aimed to evaluate the effectiveness of an obesity education program by assessing students' knowledge six months after the intervention. The program involved 51 students of SMP Negeri 2 Parangloe selected through total sampling. A quantitative evaluative approach with a one-group pretest-posttest and follow-up evaluation design was applied. Data were collected using knowledge and behavioral questionnaires and analyzed using univariate analysis and the Friedman test. The results showed a significant improvement in students' knowledge ($p=0.000$), with the median score increasing from 3 at pre-test to 6 at post-test I and reaching 7 at the six-month follow-up. Furthermore, 75.0% of students reported engaging in regular physical activity, while 80.4% reduced their consumption of high-fat and high-sugar foods. These findings indicate that school-based obesity education is effective in improving and maintaining students' knowledge while encouraging healthier lifestyle behaviors for obesity prevention.

1. Introduction

According to the World Health Organization (WHO, 2025), more than 1 billion people worldwide were living with obesity in 2022, including approximately 890 million adults and more than 159 million children and adolescents aged 5–19 years. WHO also reported that the prevalence of obesity among adults has more than doubled since 1990, while obesity among children and

adolescents has increased approximately fourfold. Obesity is a major risk factor for various non-communicable diseases, including type 2 diabetes mellitus, hypertension, cardiovascular diseases, and several types of cancer. Obesity is a multifactorial condition resulting from complex interactions among genetic factors, high-energy dietary patterns, insufficient physical activity, and increasingly obesogenic environments (Saraswati et al., 2021).

Indonesia is also experiencing an increasing prevalence of obesity, which has become an important public health concern. Based on the 2018 Indonesian Basic Health Research (Riskesdas), as cited by Suha and Rosyada (2022), the prevalence of obesity among individuals aged ≥ 18 years increased from 14.8% in 2013 to 21.8% in 2018. Furthermore, the prevalence of overweight and obesity among adolescents aged 13–15 years reached approximately 16.0%, while among those aged 16–18 years it was 13.5%, indicating that obesity among adolescents requires particular attention. Adolescence is a critical period for the development of obesity because individuals begin to gain greater independence in making food choices and establishing lifestyle patterns that may persist into adulthood (Daka et al., 2025). Previous studies have demonstrated that obesity among adolescents is associated with unhealthy dietary patterns, including frequent consumption of fast food and foods high in sugar, salt, and fat, as well as insufficient physical activity resulting from increasingly sedentary lifestyles (Nursela et al., 2025). In addition, technological advances and the increasing use of digital devices have resulted in adolescents spending more time engaging in sedentary or passive activities, thereby contributing to an increased risk of obesity (Purnomo et al., 2024). Therefore, school-aged adolescents constitute an important target population for obesity prevention strategies through nutrition education, promotion of physical activity, and early adoption of healthy lifestyle behaviors to prevent non-communicable diseases later in life.

Schools provide a strategic setting for health promotion because they enable adolescents to be reached systematically during an important period of healthy habit formation (Ho et al., 2021). Numerous studies have demonstrated that school-based interventions are effective in improving nutritional knowledge, promoting healthier dietary practices, increasing physical activity, and contributing to the prevention of obesity among children and adolescents (Habibie et al., 2022; Septiani et al., 2024). Interventions that combine health education with supportive school environments and the involvement of teachers and families have been reported to produce better outcomes than education alone. Furthermore, schools provide an ideal environment for establishing healthy behaviors from an early age because students spend a substantial proportion of their daily lives within the school setting (Jacob et al., 2021).

Various community engagement programs and research studies have demonstrated that health education can improve adolescents' knowledge of obesity and encourage the adoption of healthy lifestyle behaviors. School-based interventions focusing on balanced nutrition, physical activity, and obesity prevention have been shown to improve both students' knowledge and health-related behaviors. However, most program evaluations have been conducted immediately after the intervention using pre-test and post-test assessments, thereby primarily reflecting the short-term effects of health education. Such evaluations cannot adequately determine whether the knowledge acquired by participants is retained several months after the intervention or the extent to which the educational content remains understood over time. Therefore, follow-up evaluations conducted

several months after health education interventions are necessary to assess the sustainability of educational outcomes and to provide evidence for improving future health promotion programs (Utomo et al., 2018).

As part of the Field Learning Experience (Pengalaman Belajar Lapangan, PBL) program, an obesity education intervention was implemented among students at SMP Negeri 2 Parangloe as a promotive health strategy to improve their knowledge of obesity and its prevention. Six months after the educational intervention, a follow-up evaluation was conducted by reassessing students' knowledge to determine the retention of the information previously provided. This community engagement activity aimed to evaluate students' knowledge six months after the educational intervention as an indicator of the sustained effectiveness of the program and to provide evidence for the development of more sustainable school-based health promotion programs.

2. Method

The research method is discussed clearly and in detail consisting of 400-800 words, namely: The type of research and the approach used, Place and time of research, Consideration of subject selection and research situation, Sources of literacy and information, Population and sample and sampling method, Research procedures, including informed consent, Instrument used, Data processing/analysis, Processing, analysis, and presentation of data, Statement of having obtained a health code of ethics permit through the research ethics commission (optional).

3. Results & Discussion

The evaluation was conducted by administering a second post-test (post-test II) to assess students' knowledge and understanding of obesity six months after the first post-test, which had been administered during the health education intervention in Field Learning Experience II (PBL II). In addition to the knowledge assessment, post-test II included additional questions to evaluate changes in students' obesity-related healthy lifestyle behaviors during the six-month follow-up period.

Table 1. *Characteristics of Students Participating in the Obesity Education Program*

Variable	Frequency (n = 51)	Percentage (%)
Age (years)		
12	16	31.4
13	15	29.4
14	19	37
16	1	2
Sex		
Male	25	49
Female	26	51
Total	51	100

Based on Table 1, the age distribution of respondents showed that the largest proportion of participants were 14 years old, comprising 20 respondents (40.0%), followed by those aged 13 years with 15 respondents (30.0%) and those aged 12 years with 15 respondents (30.0%). Regarding sex distribution, female students accounted for 26 respondents (51.0%), while male students accounted for 25 respondents (49.0%).

Table 2. *Distribution of Respondents According to Knowledge Scores*

Knowledge Assessment	Frequency (n)	Minimum	Maximum	Median	p-value (Friedman Test)
Pre-test	51	1	7	3	<0.001
Post-test I	51	3	7	6	
Post-test II	51	1	7	7	

A total of 51 students participated in the health education program. At post-test I, the median knowledge score was 6.0, with scores ranging from 3.00 to 7.00. Although some participants had not yet achieved the maximum knowledge score, a substantial proportion attained high scores following the intervention. Six months after the educational intervention, post-test II showed a median knowledge score of 7.0. The score range at post-test II was wider than that observed at post-test I, ranging from 1.00 to 7.00; however, the maximum score continued to be achieved by a substantial proportion of respondents. These findings indicate that the majority of students retained a good level of knowledge regarding obesity six months after the intervention.

In comparison, the pre-test scores ranged from 1.00 to 7.00, indicating considerable variation in participants' baseline knowledge before receiving the educational intervention (Table 2). Overall, the increase in median scores from baseline to the follow-up assessment suggests an improvement and subsequent retention of obesity-related knowledge among the participating students.

Table 3. *Distribution of Respondents Based on the Implementation of Obesity-Related Healthy Lifestyle Behaviors*

Behavioral Implementation	Frequency (n = 51)	Percentage (%)
During the past six months, have you practiced a healthy lifestyle, such as exercising or engaging in physical activity?		
Yes	39	76.5
No	12	23.5
During the past six months, have you reduced your consumption of foods high in fat and sugar, such as fried foods, snacks, and sugar-sweetened beverages?		
Yes	41	80.4
No	10	19.6

Based on Table 3, the distribution of respondents according to the implementation of healthy lifestyle behaviors during the previous six months showed that most students reported engaging in

regular exercise or physical activity. Of the 51 respondents, 39 students reported implementing this behavior, whereas 12 students reported that they had not consistently engaged in regular physical activity.

Regarding dietary behavior, most respondents also reported reducing their consumption of foods high in fat and sugar, including fried foods, snacks, and sugar-sweetened beverages. A total of 41 students reported implementing this dietary behavior, whereas 10 students reported that they had not reduced their consumption of these foods and beverages. These findings suggest that a substantial proportion of students had adopted healthier lifestyle behaviors during the six months following the educational intervention.

The evaluation demonstrated that obesity education provided to students at SMPN 2 Parangloe significantly improved their knowledge. Differences in knowledge scores were observed across the pre-test, post-test I, and post-test II assessments conducted six months after the intervention. The Friedman test demonstrated a statistically significant difference among the three measurement points ($p < 0.001$). These findings indicate that the health education intervention was associated not only with an immediate improvement in students' knowledge but also with sustained knowledge retention six months after the intervention. Adequate knowledge regarding obesity may enable adolescents to better understand its risk factors and health consequences, as well as the importance of maintaining a healthy diet and engaging in regular physical activity from an early age.

Furthermore, a study by Fajar (2024) showed that health education on balanced nutrition and physical activity was effective in improving adolescents' knowledge and awareness of the importance of maintaining a healthy body weight. The study reported that, following health education, adolescents developed a better understanding of the adverse health consequences of obesity and were encouraged to adopt healthier behaviors, such as engaging in regular physical activity and reducing their consumption of fast food. Another study by Ramadhanti et al. (n.d.) also demonstrated that health education delivered through interactive media had a significant effect on improving adolescents' knowledge of obesity. The findings suggested that health information presented in an engaging and easily understandable format can facilitate students' comprehension of educational materials and contribute to positive changes in knowledge and attitudes.

Knowledge is an important determinant in the development of health-related behavior. Individuals with adequate knowledge of obesity are generally more aware of the importance of maintaining a healthy lifestyle, including engaging in regular physical activity and reducing the consumption of fast food, high-fat foods, and sugar-sweetened beverages. Nevertheless, adequate knowledge does not necessarily translate directly into behavioral change because health behaviors are also influenced by environmental factors, family habits, and peer influence.

With regard to behavioral implementation, the findings showed that most respondents had adopted healthier lifestyle practices following the educational intervention. A total of 39 respondents reported engaging in regular physical activity or exercise during the previous six months, whereas 12 respondents had not optimally implemented this behavior. In addition, 41 respondents reported reducing their consumption of foods high in fat and sugar, including fried foods, snacks, and sugar-sweetened beverages, while 10 respondents had not yet adopted this dietary behavior.

These findings suggest that the improvement in knowledge achieved through health education may have contributed to positive behavioral changes toward healthier lifestyles among students. Regular physical activity and appropriate dietary practices are important components of obesity prevention among adolescents. Adolescents who are physically active and maintain healthy dietary habits tend to have a lower risk of obesity than those who engage in sedentary lifestyles. This finding is consistent with Fajar (2024), who reported that education on balanced nutrition and physical activity had a positive influence on adolescents' knowledge regarding obesity prevention. The study further explained that education emphasizing healthy dietary practices, limiting the consumption of high-calorie foods, and increasing physical activity may enhance adolescents' awareness and encourage the adoption of healthier lifestyles in daily life. In addition, adolescents who receive appropriate health education may develop a better understanding that obesity increases the risk of non-communicable diseases, including diabetes mellitus, hypertension, and cardiovascular disease.

Despite these positive findings, a proportion of respondents had not yet optimally implemented healthy lifestyle behaviors. This indicates that behavioral change is influenced not only by knowledge but also by environmental and habitual factors. Frequent consumption of fast food, insufficient physical activity associated with excessive gadget use, and family-related factors may increase the risk of obesity among adolescents. Family support, particularly through the provision of healthy foods and positive role modeling, plays an important role in establishing healthy habits. The school environment can also contribute through continuous health education, adequate sports facilities, and access to healthier food choices in school canteens. Therefore, the active involvement of both families and schools is essential to support obesity prevention and sustained healthy lifestyle behaviors among adolescents.

The retention of knowledge six months after the educational intervention indicates that the educational materials were sufficiently understood and remembered by the students. This outcome may also have been reinforced by follow-up educational activities involving interactive educational games and group physical activities. These follow-up activities were designed to strengthen students' understanding of the importance of maintaining a healthy diet and engaging in regular physical activity to prevent obesity. One of the educational media used was a modified snakes-and-ladders game incorporating information on obesity, healthy eating patterns, the importance of exercise, and the health consequences of excessive consumption of foods high in sugar and fat. Through this approach, students were able to learn while playing, making the educational process more engaging, participatory, and easier to understand. Fajar (2024) reported that educational game-based media can improve adolescents' understanding because the learning process is interactive and enjoyable. In addition to enhancing knowledge, game-based educational methods may also increase students' active participation in health education activities.

In addition to educational games, follow-up activities included group exercise sessions and a healthy eating campaign within the school environment. These activities were intended to encourage students to integrate healthy lifestyle practices into their daily routines. Group physical activities were expected to reinforce students' awareness that regular exercise is an essential component of maintaining health and preventing obesity.

4. Conclusion

The community engagement program on obesity education conducted at SMP Negeri 2 Parangloe achieved its intended objective of evaluating the effectiveness of health education in improving and sustaining students' knowledge of obesity prevention up to six months after the intervention. The evaluation demonstrated a significant and sustained improvement in students' knowledge ($p < 0.001$). The median knowledge score increased from 3.0 at pre-test to 6.0 at post-test I and was further maintained at 7.0 during the long-term follow-up assessment (post-test II). These findings indicate that school-based health education can serve as an effective health promotion strategy to support obesity prevention among adolescents. Moreover, follow-up evaluation provides valuable information regarding the sustainability of educational outcomes and can serve as a basis for improving future health promotion programs. Therefore, similar educational interventions should be implemented continuously and integrated into school health programs through the involvement of teachers, parents, and healthcare professionals to support the long-term maintenance of students' knowledge and healthy lifestyle behaviors.

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