

## THE EFFECTIVENESS OF HEALTH EDUCATION IN IMPROVING KNOWLEDGE OF DIARRHEA PREVENTION AMONG SCHOOL-AGED CHILDREN AT SDN SINGONEGARAN 1 KEDIRI CITY, INDONESIA

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| Article info                                                                                                                                                                                                                         | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <p><b>Corresponding Author:</b></p> <p>Kili Astarani<br/><a href="mailto:astaranikili79@gmail.com">astaranikili79@gmail.com</a><br/>STIKES RS Baptis Kediri</p>                                                                      | <p>Diarrhea remains a significant health problem among school-aged children and is closely associated with inadequate implementation of Clean and Healthy Living Behavior (CHLB). Health education is one of the promotive strategies needed to improve children's knowledge of diarrhea prevention from an early age. This community service program aimed to analyze the effectiveness of health education in improving knowledge of diarrhea prevention among school-aged children at SDN Singonegaran 1 Kediri. The program involved 17 students and was conducted through interactive health education sessions using lectures, PowerPoint presentations, educational videos, leaflets, and demonstrations of proper handwashing with soap (HWWS). Knowledge was evaluated using pre-test and post-test questionnaires, and the data were analyzed descriptively. The findings demonstrated an improvement in students' knowledge following the intervention. The proportion of students with good knowledge increased from 0% to 52.96%, while those with moderate knowledge decreased from 70.58% to 23.52%, and those with poor knowledge decreased from 29.42% to 23.52%. Health education was effective in improving students' knowledge of diarrhea prevention and can serve as a promotive strategy to support the adoption of Clean and Healthy Living Behavior (CHLB) in the school setting.</p> <p><b>Keywords:</b> <i>diarrhea prevention; health education; knowledge; school-aged children; Clean and Healthy Living Behavior (CHLB)</i></p> |
| This article distributed under the terms of the Creative Commons Attribution-Share Alike 4.0 International License ( <a href="https://creativecommons.org/licenses/by-sa/4.0/">https://creativecommons.org/licenses/by-sa/4.0/</a> ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

### INTRODUCTION

Diarrhea remains one of the most common infectious diseases affecting the gastrointestinal tract and continues to be a significant public health concern, particularly among school-aged children (Polly et al., 2024). It is clinically defined as the passage of three or more loose or watery stools within a 24-hour period (Wantiyah et al., 2015). Diarrhea is primarily caused by bacterial, viral, or parasitic infections transmitted through contaminated food and water, as well as poor hygiene practices (Adnan et al., 2024). Although most cases are preventable, diarrhea remains a leading cause of morbidity and mortality among children in many developing countries, including Indonesia (Ayu Fatmawati & Murti, 2024).

Globally, an estimated 1.7 billion cases of diarrhea occur among children each year, resulting in approximately 443,832 deaths among children under five years of age and 50,851 deaths among children aged 5–9 years (Uribe et al., 2021). Beyond increasing morbidity and mortality, diarrhea contributes to dehydration, malnutrition, impaired growth and development, and reduced academic performance due to increased school absenteeism (Adnan et al., 2024).

In Indonesia, diarrhea remains one of the most prevalent childhood diseases (Setiawati et al., 2024). This condition is closely associated with inadequate implementation of Clean and Healthy Living Behavior (PHBS), particularly poor handwashing practices with soap, inadequate environmental sanitation, and the consumption of unhygienic food (Yulianti & Yuniati, 2026). UNICEF has emphasized that inadequate water quality, sanitation, and hygiene practices continue to pose major challenges in Indonesia, highlighting the important role of schools in fostering healthy behaviors from an early age (Fahira et al., 2021).

One of the most effective preventive measures against diarrhea is proper handwashing with soap using the six-step technique recommended by the World Health Organization (WHO) (Kementerian Kesehatan RI, 2020). Practicing handwashing at critical times, such as before eating and after using the toilet, has been shown to significantly reduce the risk of diarrheal diseases (Siregar & Batubara, 2021). Furthermore, selecting safe and hygienic snacks is another essential strategy for preventing gastrointestinal infections among school-aged children (Ciptaningrum et al., 2024).

SDN Singonegaran 1 Kediri City was selected as the partner school for this community service program conducted by STIKES RS Baptis Kediri. Based on a preliminary assessment and discussions with school staff, several students were found to have inadequate handwashing practices and frequently purchased snacks from vendors outside the school environment, where food hygiene could not be guaranteed. These conditions increase the risk of diarrheal diseases among students if promotive and preventive health interventions are not implemented (Marisa et al., 2025).

School-aged children represent an ideal target group for health education because they are at a developmental stage in which healthy behaviors can be effectively established and reinforced (Mufida et al., 2021). Previous studies have demonstrated that health education combined with interactive lectures, audiovisual media, educational leaflets, and practical demonstrations can significantly improve children's knowledge and skills related to Clean and Healthy Living Behavior (PHBS) as a strategy for diarrhea prevention (Ayu Fatmawati & Murti, 2024).

Based on this situation, the community service team conducted a program entitled "The Effectiveness of Health Education in Improving Knowledge of Diarrhea Prevention among School-Aged Children at SDN Singonegaran 1 Kediri City, Indonesia." The program represented the implementation of the university's community service mission through promotive and preventive activities in the school setting. The intervention included health education on diarrhea prevention, demonstrations of the WHO-recommended six-step handwashing technique, education on healthy snack selection, and an evaluation of students' knowledge using pre-test and post-test assessments (Mufida et al., 2021). This aimed to improve school-aged children's knowledge of diarrhea prevention through health education as a promotive strategy to encourage the adoption of clean and healthy living behaviors.

## METHOD

This community service program was conducted at SDN Singonegaran 1 Kediri City, Indonesia, from March to April 2026, involving 17 elementary school students as participants. The program aimed to improve students' knowledge and skills regarding diarrhea prevention through health education, demonstrations of proper handwashing with soap (HWWS), and education on selecting safe and healthy snacks. The activities were collaboratively implemented by lecturers and undergraduate nursing students from STIKES RS Baptis Kediri, with support from the partner school. The program adopted an educational approach using a one-group pre-test and post-test design without a control group to evaluate changes in participants' knowledge before and after the educational intervention.

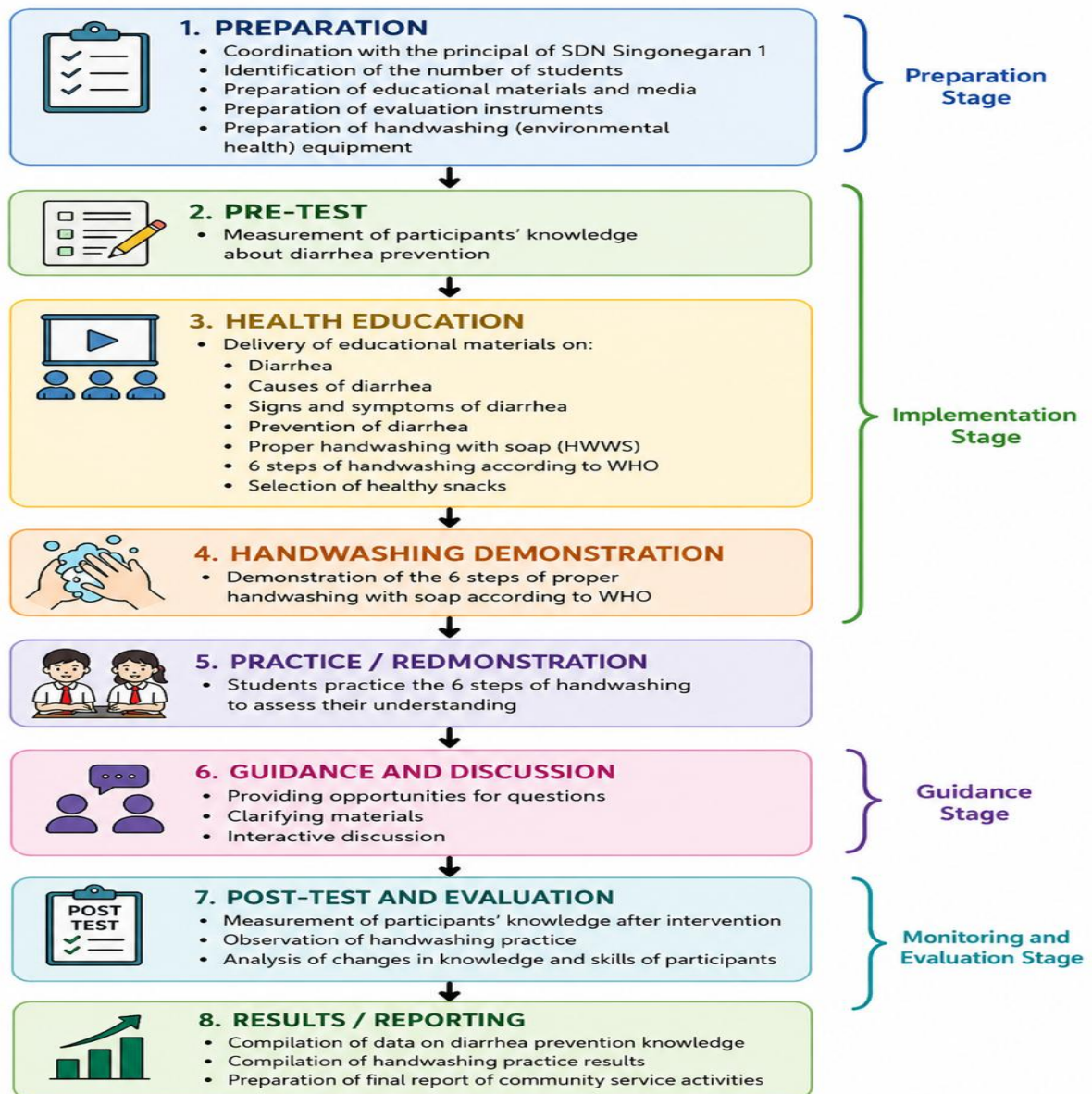


Figure 1. Implementation Flow of Community Service Activities

The community service program was implemented in four stages: preparation, implementation, guidance, and monitoring and evaluation (Astarani et al., 2023).

**1. Preparation Stage**

The preparation stage began with coordination between the community service team and the principal of SDN Singonegaran 1 Kediri City to obtain permission for program implementation and to determine the schedule, venue, and target participants. A needs assessment was subsequently conducted through observations and discussions with teachers regarding students' behaviors related to diarrhea prevention, including handwashing practices and snack selection at school. The team then prepared educational materials, including PowerPoint presentations, animated videos, educational leaflets, pre-test and post-test questionnaires, and equipment for demonstrating the six-step handwashing technique recommended by the World Health Organization (WHO).

**2. Implementation Stage**

The implementation stage commenced with a pre-test administered through a structured questionnaire to assess students' baseline knowledge regarding diarrhea, including its causes, signs and symptoms, preventive measures, the importance of handwashing with soap, and the selection of healthy snacks.

Following the pre-test, health education was delivered using interactive lectures supported by PowerPoint presentations, educational videos, and leaflets. The educational content covered the definition of diarrhea, its causes, signs and symptoms, potential health impacts, the importance of Clean and Healthy Living Behavior (PHBS), appropriate handwashing times, the WHO-recommended six-step handwashing technique, and guidelines for selecting safe and healthy snacks.

After the educational session, students participated in a demonstration of the six-step handwashing technique with soap conducted by the community service team. Subsequently, all participants performed a return demonstration under the supervision of lecturers and nursing students until they were able to perform each step correctly. This hands-on learning approach was employed to enhance not only students' cognitive understanding but also their psychomotor skills in practicing clean and healthy living behaviors for diarrhea prevention.

**3. Guidance Stage**

Throughout the program, the community service team and teachers provided continuous guidance to students during both the educational sessions and handwashing practice. Guidance was delivered individually and in small groups to ensure that each participant fully understood the educational materials and was able to independently perform the six-step handwashing technique. Students were also encouraged to participate in interactive discussions and ask questions regarding the educational content, thereby promoting active learning and reinforcing their understanding.

**4. Monitoring and Evaluation Stage**

Program evaluation was conducted immediately after completion of the educational intervention through the administration of a post-test using the same questionnaire as the pre-test. Pre-test and post-test results were compared to determine changes in students' knowledge following the health education program. In addition to assessing knowledge, the community service team observed students' ability to correctly perform the WHO-recommended six-step handwashing technique as an indicator of skill acquisition. The

evaluation results were summarized descriptively using frequency distributions and percentages to illustrate changes in participants' knowledge and practical skills following the intervention.

## RESULTS AND DISCUSSION

The community service program at SDN Singonegaran 1 Kediri City, Indonesia, was conducted from March 2026. The implementation of the program consisted of the following activities.

### 1. Program Socialization

The community service program commenced with a socialization session (Astarani et al., 2025) involving SDN Singonegaran 1 Kediri City as the program partner. The session was conducted through coordination meetings with the school principal and teachers to discuss the program objectives, expected benefits, implementation schedule, target participants, and the distribution of responsibilities throughout the program. The coordination results indicated that the school fully supported the implementation of the program because it aligned with the school's efforts to promote Clean and Healthy Living Behavior (PHBS) among students. The school also reported that many students still frequently purchased unhygienic snacks and had not consistently practiced proper handwashing with soap before meals and after using the toilet. These findings highlighted the need for health education on diarrhea prevention among school-aged children.

The socialization stage played a crucial role in strengthening the commitment and participation of the partner institution. Early involvement of the school during the planning process ensured that the intervention was tailored to the participants' needs, thereby enhancing the effectiveness and sustainability of the program. Furthermore, collaboration between higher education institutions and elementary schools contributes to the development of a healthier school environment through the implementation of promotive and preventive health programs (Ministry of Health of the Republic of Indonesia, 2023).

### 2. Health Education

Following the socialization stage, the community service team delivered health education using interactive lectures supported by PowerPoint presentations, educational videos, and leaflets. The educational materials covered the definition of diarrhea, its causes, signs and symptoms, complications, preventive measures, the importance of Clean and Healthy Living Behavior (PHBS), the WHO-recommended six-step handwashing technique, and guidelines for selecting safe and healthy snacks.

Students demonstrated high enthusiasm throughout the educational sessions, as reflected by their active participation in discussions and the large number of questions they asked. The use of audiovisual learning media facilitated students' understanding by presenting information through a combination of illustrations, animations, and age-appropriate explanations. This interactive learning approach encouraged greater engagement and improved comprehension of the educational materials.

Health education is widely recognized as an effective promotive strategy for improving children's knowledge and awareness of healthy behaviors. Previous community service programs have demonstrated that interactive educational media enhance knowledge

retention, conceptual understanding, and learning motivation more effectively than conventional lecture-based methods. Moreover, providing health education during the school-age period is essential for establishing lifelong healthy behaviors (Fitri et al., 2022; UNICEF, 2023).

### 3. Pre-test and Post-test Results

Students' knowledge was evaluated using structured questionnaires administered before (pre-test) and after (post-test) the health education intervention. The evaluation results demonstrated an improvement in students' knowledge following the community service program. Before the intervention, several students had insufficient or moderate knowledge regarding diarrhea, its prevention, and the importance of proper handwashing with soap. After participating in the health education sessions and handwashing demonstrations, most students achieved higher knowledge scores, as reflected by the increased proportion of students classified in the good knowledge category.

**Table 1 Distribution of Students' Knowledge Levels on Diarrhea Prevention Before Health Education (n = 17)**

| No           | Knowledge Level | Frequency | Percentage   |
|--------------|-----------------|-----------|--------------|
| 1.           | Good            | 0         | 0 %          |
| 2.           | Moderate        | 12        | 70,58 %      |
| 3.           | Poor            | 5         | 29,42 %      |
| <b>Total</b> |                 | <b>17</b> | <b>100 %</b> |

The pre-test results showed that most students had a moderate level of knowledge, with 12 students (70.58%), while 5 students (29.42%) were categorized as having poor knowledge. None of the students demonstrated a good level of knowledge before receiving the health education intervention. These findings indicate that students' knowledge regarding diarrhea, its prevention, the importance of handwashing with soap, and the selection of healthy snacks still need to be improved.

**Table 2. Distribution of Students' Knowledge Levels on Diarrhea Prevention After Health Education (n = 17)**

| No           | Knowledge Level | Frequency | Percentage   |
|--------------|-----------------|-----------|--------------|
| 1.           | Good            | 9         | 52,96 %      |
| 2.           | Moderate        | 4         | 23,52 %      |
| 3.           | Poor            | 4         | 23,52 %      |
| <b>Total</b> |                 | <b>17</b> | <b>100 %</b> |

The post-test results demonstrated an improvement in students' knowledge following the health education intervention. Most students achieved the good knowledge category, accounting for 9 students (52.96%). Meanwhile, the numbers of students in the moderate and **poor** knowledge categories decreased to 4 students (23.52%). These findings indicate that the health education program, combined with handwashing with soap demonstration, was effective in improving students' knowledge of diarrhea prevention.

**Table 3. Comparison of Students' Knowledge Levels Before and After Health Education (n = 17)**

| No           | Knowledge Level | Before (%)        | After (%)         | Change |
|--------------|-----------------|-------------------|-------------------|--------|
| 1.           | Good            | 0 (0 %)           | 9 (52,96 %)       | +9     |
| 2.           | Moderate        | 12 (70,58 %)      | 4 (23,52 %)       | -8     |
| 3.           | Poor            | 5 (29,42 %)       | 4 (23,52 %)       | -1     |
| <b>Total</b> |                 | <b>17 (100 %)</b> | <b>17 (100 %)</b> |        |

The comparison of the pre-test and post-test results demonstrated a positive shift in students' knowledge levels following the health education program. The number of students categorized as having good knowledge increased from 0 (0.00%) before the intervention to 9 (52.96%) after the intervention. Conversely, the number of students with moderate knowledge decreased from 12 (70.58%) to 4 (23.52%), while those with poor knowledge decreased from 5 (29.42%) to 4 (23.52%). These findings indicate that the health education intervention had a positive impact on improving students' knowledge of diarrhea prevention.

### **Discussion**

The findings of this community service program demonstrated that health education on diarrhea prevention had a positive impact on improving the knowledge of students at SDN Singonegaran 1 Kediri City. Before the intervention, most students were categorized as having moderate knowledge (70.58%), and none achieved the good knowledge category. Following the health education intervention, which consisted of interactive lectures supported by PowerPoint presentations, animated videos, educational leaflets, and demonstrations of the six-step handwashing with soap (HWWS) technique, students' knowledge improved considerably. This improvement was reflected in the increase in the proportion of students with good knowledge to 52.96%, accompanied by a decrease in the proportions of students with moderate and poor knowledge.

The improvement in knowledge indicates that health education is an effective promotive intervention for enhancing school-aged children's understanding of disease prevention (Ciptaningrum et al., 2024). School-aged children are in the concrete operational stage of cognitive development, enabling them to understand information more effectively when it is delivered through visual media, demonstrations, and hands-on learning experiences (Marsari et al., 2021). The combination of educational methods used in this program allowed students not only to receive information passively but also to observe, practice, and reinforce what they had learned. Such an approach has been shown to improve attention, learning motivation, and knowledge retention more effectively than conventional lecture-based methods alone (Dinengsih & Hakim, 2020).

The educational media used in this program included PowerPoint presentations, animated videos, educational leaflets, and practical handwashing demonstrations (Yulianti & Yuniati, 2026). These instructional media provided both visual and kinesthetic stimulation that suited the learning characteristics of elementary school students. Audiovisual media have been shown to improve concentration, facilitate conceptual understanding, and enhance long-term information retention compared with verbal instruction alone. Furthermore, demonstrations followed by return demonstrations enabled students to apply the acquired skills directly, making the learning process more meaningful. These findings are consistent with those reported by (Widhayanti & Abduh, 2021), who

found that health education using audiovisual media and demonstrations effectively improved handwashing skills among elementary school students.

One of the main components of this program was education on the WHO-recommended six-step handwashing technique. Handwashing with soap is one of the simplest yet most effective interventions for preventing infectious diseases, including diarrhea. According to the World Health Organization (WHO), regular handwashing with soap at critical times, such as before eating and after using the toilet, significantly reduces the risk of diarrheal diseases (Uribe et al., 2021). Besides removing pathogenic microorganisms from hands, proper handwashing interrupts fecal–oral transmission, which remains the primary route of diarrhea transmission among children (Wantiyah et al., 2015).

In addition to handwashing education, the program also emphasized the importance of selecting safe and healthy snacks. School-aged children frequently purchase snacks within or around the school environment, and foods that do not meet hygiene and sanitation standards may serve as vehicles for pathogens causing diarrheal diseases. Therefore, education on healthy food choices, food hygiene, and the importance of handwashing before meals is an essential component of diarrhea prevention. This approach is consistent with the Clean and Healthy Living Behavior (PHBS) promoted by the Health Ministry of the Indonesia as a promotive and preventive strategy in school settings (Nova, 2015).

The success of this program was also supported by the high level of student participation throughout the educational activities. Students actively engaged in discussions, question-and-answer sessions, and practical demonstrations. Active participation is an important indicator of successful health education because it facilitates two-way learning and enhances participants' understanding. In addition, teachers' involvement in guiding students during the program is expected to strengthen the sustainability of the intervention by reinforcing clean and healthy living behaviors within the school environment.

Despite the positive outcomes, this community service program had several limitations. The relatively small number of participants and the immediate post-intervention evaluation limited the ability to assess long-term behavioral changes. Improved knowledge does not necessarily translate into sustained behavioral change unless it is reinforced through continuous practice. Therefore, follow-up activities, including regular health education, adequate handwashing facilities, and active involvement of teachers and parents, are needed to promote sustainable clean and healthy living behaviors among school-aged children (Poernomo et al., 2016).

Overall, this community service program demonstrated that health education delivered through interactive lectures, audiovisual media, educational leaflets, and practical handwashing demonstrations is an effective approach to improving students' knowledge of diarrhea prevention (Nanda et al., 2025). This educational model has the potential to be replicated in other elementary schools as a promotive strategy to support the implementation of the School Health Program (UKS) and the Healthy Community Movement (GERMAS), thereby contributing to the reduction of diarrheal diseases among school-aged children.

## CONCLUSION

This community service program on diarrhea prevention among school-aged children at SDN Singonegaran 1 Kediri City, Indonesia, was successfully implemented through health education using interactive lectures, PowerPoint presentations, animated

videos, educational leaflets, and demonstrations of the six-step handwashing with soap (HWWS) technique. All 17 participants actively engaged in the educational sessions, discussions, and practical demonstrations, indicating a high level of enthusiasm throughout the program.

The evaluation results demonstrated an improvement in students' knowledge of diarrhea prevention following the intervention. Before the program, most students were categorized as having moderate knowledge (70.58%), and none were classified as having good knowledge. After the health education intervention, the proportion of students with good knowledge increased to 52.96%, while the proportions of students with moderate and poor knowledge decreased. These findings indicate that health education combined with practical handwashing demonstrations is an effective approach to improving students' knowledge of diarrhea prevention and promoting the adoption of Clean and Healthy Living Behavior (PHBS) in the school setting.

The sustainability of the program requires continuous support from both schools and parents through the promotion of regular handwashing with soap, the provision of adequate hygiene facilities, and periodic health education. Such efforts are expected to transform the knowledge gained into sustainable clean and healthy living behaviors among school-aged children.

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