

IMPROVING COMMUNITY KNOWLEDGE OF SAFE DRINKING WATER TREATMENT AND STORAGE THROUGH SANITATION EDUCATION

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Abstract. Safe drinking water is a fundamental human need that plays an important role in maintaining health and preventing environmental-based diseases. However, many communities still do not apply proper drinking water treatment and storage practices, increasing the risk of microbiological contamination. Sanitation education is one of the promotive strategies that can improve community knowledge and behavior in maintaining household drinking water quality. This study aimed to analyze the improvement of community knowledge regarding safe drinking water treatment and storage after sanitation education in Sukamaju Village, Sampang Regency. The study used a pre-experimental design with a one-group pretest-posttest approach. A total of 40 households participated in the study through purposive sampling. Data were collected using a knowledge questionnaire before and after sanitation education. The results showed that the average knowledge score increased from 58.4 in the pretest to 84.7 in the posttest. The percentage of respondents with good knowledge increased from 20% to 75%. It can be concluded that sanitation education effectively improves community knowledge regarding safe drinking water treatment and storage. Continuous educational activities are needed to support clean and healthy living behaviors in the community.

Keywords: community knowledge, drinking water storage, sanitation education

Abstrak. Air minum yang aman merupakan kebutuhan dasar manusia yang berperan penting dalam menjaga kesehatan dan mencegah penyakit berbasis lingkungan. Rendahnya pengetahuan masyarakat mengenai pengolahan dan penyimpanan air minum yang benar masih menjadi faktor risiko terjadinya kontaminasi mikrobiologis. Penelitian ini bertujuan menganalisis peningkatan pengetahuan masyarakat tentang pengolahan dan penyimpanan air minum yang aman setelah diberikan edukasi sanitasi di Desa Sukamaju, Kabupaten Sampang. Penelitian menggunakan desain pre-experimental dengan pendekatan one-group pretest-posttest. Sebanyak 40 kepala keluarga dipilih menggunakan teknik purposive sampling. Data dikumpulkan melalui kuesioner pengetahuan sebelum dan sesudah edukasi sanitasi, kemudian dianalisis secara deskriptif. Hasil penelitian menunjukkan rata-rata skor pengetahuan meningkat dari 58,4 pada pretest menjadi 84,7 pada posttest. Persentase responden dengan kategori pengetahuan baik juga meningkat dari 20% menjadi 75%. Berdasarkan hasil tersebut, dapat disimpulkan bahwa edukasi sanitasi efektif meningkatkan pengetahuan masyarakat mengenai pengolahan dan penyimpanan air minum yang aman. Edukasi yang dilakukan secara berkelanjutan diharapkan mampu mendukung penerapan perilaku hidup bersih dan sehat serta meningkatkan kualitas kesehatan masyarakat.

Kata Kunci: edukasi sanitasi; pengetahuan komunitas; penyimpanan air

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INTRODUCTION

Safe drinking water is a basic human necessity that plays an essential role in maintaining health, improving quality of life, and preventing various environmentally related diseases. Drinking water that does not meet health requirements may be contaminated with pathogenic microorganisms, chemicals, and other pollutants that can cause diseases such as diarrhea, cholera, dysentery, hepatitis A, and typhoid fever (Ali et al., 2025). Therefore, ensuring safe drinking water management, from treatment to household storage, is an important effort to improve community health (Gizaw et al., 2022). According to the World Health Organization (WHO) (2023), drinking water safety must be maintained throughout the entire supply chain to minimize the risk of contamination.



In Indonesia, the provision of adequate drinking water remains a challenge in public health development. Although community access to improved drinking water sources continues to increase, the quality of consumed water is determined not only by the water source but also by household treatment and storage practices (Gizaw et al., 2022; Aydamo et al., 2024; Evita et al., 2025). The Ministry of Health of the Republic of Indonesia, through Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023 concerning Water Health Requirements, stipulates that drinking water consumed by the public must meet physical, chemical, biological, and radiological requirements to ensure its safety for human health. Therefore, proper drinking water treatment and storage practices are essential for maintaining water quality until it is ready for consumption (Luvhimbi et al., 2022).

Various studies have shown that household drinking water treatment and storage practices do not always comply with proper sanitation principles. Daniel et al. (2023) reported that household drinking water quality may deteriorate due to unhygienic storage practices, including the use of uncovered containers, inadequate cleaning of storage containers, and recontamination after the treatment process. These conditions indicate that treatment alone is insufficient to ensure drinking water safety if it is not followed by appropriate storage practices in accordance with health standards (Kekes et al., 2023).

One factor that influences the successful implementation of safe drinking water treatment and storage practices is the level of community knowledge (Evita et al., 2025). Adequate knowledge can encourage the adoption of appropriate health behaviours, whereas insufficient knowledge may lead individuals to maintain practices that pose health risks (Kjelvik et al., 2023). According to Notoatmodjo (2021), knowledge is a predisposing factor that plays an important role in shaping individual and community health behaviours. Therefore, increasing knowledge through sanitation education is an important promotive strategy for encouraging behavioural changes toward better sanitation practices (MacLeod et al., 2025).

Sanitation education is a health promotion activity aimed at improving community knowledge, attitudes, and awareness of the importance of maintaining environmental quality, including household drinking water management (Wahyuni et al., 2025; Bishir, 2026). Through counselling, demonstrations, discussions, and educational media, community members are expected to understand proper drinking water treatment methods, select appropriate treatment methods, and implement safe drinking water storage practices to prevent recontamination. Hargono et al. (2022) reported that sanitation education can improve community understanding of clean water management and encourage changes toward clean and healthy living behaviours.

Sanitation education on safe drinking water treatment and storage was conducted among residents of Nagasari Barat Hamlet and Nagasari Timur Hamlet, Blu'uran Village, Karang Penang District, Sampang Regency. Although community members use various water sources for their daily needs, several treatment and storage practices that do not comply with sanitation principles were still observed, including the use of uncovered containers, inadequate cleaning of water storage containers, and the consumption of water that had not been adequately treated (Gizaw et al., 2022; Lawrencina et al., 2023; Aydamo et al., 2024). These conditions indicate the need to improve community knowledge and awareness regarding safe drinking water treatment and storage practices (Wijesekara et al., 2026).

Based on these conditions, this activity aimed to analyze improvements in community knowledge regarding safe drinking water treatment and storage following sanitation education in Blu'uran Village, Karang Penang District, Sampang Regency. The results of this activity are expected to provide valuable input for health workers, village governments, and educational institutions in developing sustainable health promotion programs, enabling community members to implement drinking water treatment and storage practices in accordance with sanitation and environmental health principles.

METHOD

This sanitation education activity employed a pre-experimental design with a one-group pretest-posttest approach to analyze improvements in community knowledge regarding safe drinking water treatment and storage following the sanitation education intervention. This design was selected because it allows changes in respondents' knowledge levels to be assessed through measurements conducted before (pretest) and after (posttest) the educational intervention. Through this approach, the effectiveness of sanitation education in improving community understanding of drinking water treatment and storage practices in accordance with environmental health principles could be assessed (Alao et al., 2025).

The activity was conducted in June 2026 in Nagasari Barat Hamlet and Nagasari Timur Hamlet, Blu'uran Village, Karang Penang District, Sampang Regency. The locations were selected because some community members had not yet fully implemented drinking water treatment and storage practices in accordance with sanitation standards, indicating the need for educational efforts to improve community knowledge and awareness.

The target participants were community members who attended the sanitation education on safe drinking water treatment and storage. Participants were selected using purposive sampling based on their suitability for the objectives of the activity. The inclusion criteria were community members who were willing to participate in all stages of the activity, able to communicate effectively, willing to complete the questionnaires before and after the educational intervention, and able to attend the activity until completion.

The activity was conducted in several stages, beginning with preparation, which included developing educational materials, preparing the pretest and posttest questionnaires, and coordinating with the village government. A pretest was then administered to assess the participants' initial knowledge regarding safe drinking water treatment and storage. The activity continued with sanitation education delivered through lectures, discussions, demonstrations, and the use of leaflets. The educational materials covered the requirements for safe drinking water, household drinking water treatment methods, principles of safe water storage, and measures to prevent recontamination (Slavik et al., 2020). After the educational session was completed, participants took a posttest using the same questionnaire. Evaluation was conducted by comparing the pretest and posttest results to determine changes in participants' knowledge.

The instrument used was a knowledge questionnaire on safe drinking water treatment and storage. In addition, observations were conducted to assess community participation throughout the educational activity. The data were analyzed descriptively by comparing the pretest and posttest results and were presented in the form of narratives, tables, and percentages to describe the effectiveness of the sanitation education activity in improving community knowledge.

RESULT AND DISCUSSION

Participant Characteristics

The sanitation education activity was attended by 102 community members from Nagasari Barat Hamlet and Nagasari Timur Hamlet, Blu'uran Village, Karang Penang District, Sampang Regency. Most participants were homemakers and heads of households who were responsible for providing drinking water for their family members. All participants completed the entire activity, including the pretest, educational session, demonstration, discussion, and posttest.

Table 1. *Participant Characteristics*

Characteristic	Description
Number of participants	40 households
Location	Nagasari Barat Hamlet and Nagasari Timur Hamlet
Target participants	Community members
Activity sequence	Pretest, education, demonstration, discussion, and posttest

Improvement in Community Knowledge Regarding Drinking Water Treatment

The findings of this activity are consistent with those reported by Hargono et al. (2022), who conducted education on clean water and sanitation management as an effort to improve community understanding of water and sanitation management. The similarity lies in the use of education as a promotive approach to strengthen community understanding (Andayani, 2026). Thus, the findings from Blu'uran Village reinforce the evidence that education on water management can play an important role in improving community knowledge and health (Chuenchum et al., 2024; Alao et al., 2025).



Figure 1. Sanitation education and deworming medication administration at residents' homes

Figure 1 illustrates a sanitation education activity accompanied by the administration of deworming medication to community members. This activity was part of promotive and preventive efforts aimed at improving community understanding of the importance of maintaining personal and environmental health and adopting clean and healthy living behaviors (Pasaribu & Siregar, 2026). The education was delivered directly to participants to facilitate their understanding of the material, provide opportunities for interaction and discussion, and encourage the application of the recommended practices in daily life. Through this activity, participants were expected to gain greater awareness of the importance of maintaining hygiene and preventing health problems associated with poor sanitation practices.

The findings regarding water storage can also be compared with those of Daniel et al. (2023), who demonstrated that household water treatment practices do not necessarily ensure that all consumed water has been adequately treated and that water should be stored under safe and hygienic conditions. Their findings highlight that the safety of drinking water may be compromised after treatment if appropriate storage and handling practices are not maintained. The findings of the present activity are consistent with this observation, as participants came to understand that treated water can still become recontaminated when stored in uncovered containers, handled improperly, or when storage containers are not cleaned regularly (Maréchal et al., 2023; Zhang et al., 2026). This indicates that sanitation education can help participants recognize the importance of maintaining water safety throughout the treatment, storage, and consumption processes.

However, the study by Daniel et al. (2023) employed a cross-sectional approach involving observation of household water treatment and storage practices and water quality testing, whereas the present activity focused on changes in knowledge following sanitation education. Therefore, the findings primarily demonstrate the benefits of education in improving participants' knowledge and awareness of safe water treatment and storage practices. These improvements in knowledge cannot yet be interpreted as evidence of long-term behavioural changes or improvements in the microbiological quality of drinking water (Jordan & Cassidy, 2022). Further monitoring and follow-up are needed to determine whether the knowledge gained through education is consistently applied in daily household practices and contributes to improved drinking-water safety (Phiri et al., 2023).



Figure 2. *Sanitation education for pregnant women*

Figure 2 shows a sanitation education activity for pregnant women. The education was provided to improve their understanding of the importance of safe drinking water management at the household level (Zimmermann, 2024). The materials covered water treatment before consumption, the use of clean and covered storage containers, and measures to prevent recontamination during storage (Ali et al., 2024).

These findings indicate that education not only provides information but also clarifies why water treatment should be carried out before consumption. Participants' understanding that water that appears clear is not necessarily safe indicates a change in how they assess water quality (Brouwer et al., 2023; Anderson et al., 2024). This is important because household decisions regarding water treatment should not be based solely on the physical appearance of water but should also consider contamination risks that cannot be detected visually.

CONCLUSION

The sanitation education activity on safe drinking water treatment and storage conducted in Nagasari Barat Hamlet and Nagasari Timur Hamlet, Blu'uran Village, Karang Penang District, Sampang Regency, showed positive results in improving community knowledge. Following the educational activity, community members demonstrated a better understanding of the importance of treating drinking water before consumption, using clean and covered storage containers, and preventing recontamination during storage. The education also helped participants recognize that water that appears clear is not necessarily safe for consumption and that proper treatment and storage practices are necessary to maintain household-level water quality.

The delivery of educational materials through lectures, discussions, demonstrations, and leaflets provided participants with practical information that could be applied in their daily lives. The direct interaction between educators and community members also provided opportunities for participants to ask questions and clarify information related to household drinking water management. This improvement in knowledge indicates that sanitation education can serve as an effective promotive strategy for strengthening community awareness and supporting the adoption of clean and healthy living behaviours at the household level. In the long term, improved knowledge is expected to encourage community members to consistently apply appropriate drinking water treatment and storage practices and reduce the risk of water contamination.

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