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Hand Hygiene Education To Improve Healthy Living Behavior At Al-Mahdhuri Islamic Junior High School, West Pesisir Regency, Lampung

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Abstract: Hand hygiene is an effective preventive measure for preventing the transmission of infectious diseases, but its practice among school students remains suboptimal. This study aimed to evaluate the effectiveness of hand hygiene education in improving knowledge and healthy living behaviors among students at SMP IT Al-Mahdhuri in Pesisir Barat Regency, Lampung. The study used a pre-experimental, one-group pretest–posttest design with 107 participants (35 seventh-grade students, 38 eighth-grade students, 34 ninth-grade students, and two teachers). The intervention included educational materials, demonstrations, and practice of the six steps of handwashing according to WHO guidelines. Measurements were conducted using questionnaires before and after the intervention. Data analysis was conducted using descriptive quantitative methods by comparing average pretest and posttest scores, supported by observations of changes in skills and behavior. The results showed an increase in knowledge across all grade levels: seventh-grade students from 56% to 88.8%, eighth-grade students from 61% to 91.6%, and ninth-grade students from 62.3% to 96.5%. Furthermore, there was an increase in students' practical skills and habituation of hygienic behavior. It was concluded that hand hygiene counseling was effective in increasing students' knowledge, skills, and clean and healthy living behavior, thus potentially supporting the prevention of infectious diseases in the school environment.

Keywords: Hand Hygiene, Healthy Living Behavior, Infection Prevention

Introduction

Hand hygiene is an important component in preventing infectious diseases that can be transmitted through direct or indirect contact (Elvira et al, 2021) (Hasanah & Mahardika, 2020) (Hinga & Adu, 2021) (Nita et al, 2025). Various studies show that good handwashing habits can reduce the incidence of infectious diseases such as diarrhea, respiratory tract infections, and skin infections (Akinsulie et al, 2024) (Aqlina et al, 2022) (Gillebaart et al, 2022) (Ross et al, 2023). Children's knowledge of handwashing habits is closely related to the incidence of diarrhea, which remains a dominant health problem in Indonesia (Firdaus & Agustina, 2018) (Harahap et al, 2020) (Mukaromah & Zainurridha, 2025) (Ramdhani, 2024). Additionally, research by Fahira et al. confirms that poor personal hygiene and

sanitation significantly increase the risk of disease. This indicates that hand hygiene education from school age is essential to build sustainable clean and healthy living behaviors (Fahira et al, 2021) (Harahap et al, 2020).

Although a number of health education programs have been conducted in schools, most previous studies have focused solely on increasing knowledge and have not evaluated changes in practical skills and actual behavior after intervention. In addition, there are still limited studies that integrate visual education methods, direct demonstrations, participatory practices, and teacher involvement in a structured intervention series. This research gap indicates the need for studies that not only assess knowledge improvement but also comprehensively evaluate the impact of education on students' skills and behavioral changes.

Initial observations at Al-Mahdhuri Islamic Junior High School show that most students have not yet made it a habit to wash their hands after activities even though facilities are available, and hand hygiene practices have not yet been fully instilled by teachers. This condition confirms the need for health education interventions through targeted socialization activities that not only provide knowledge but also change daily habits. The hand hygiene education program conducted for 107 students consisting of 35 seventh-grade students, 38 eighth-grade students, and 34 ninth-grade students and involving two educators was a strategic step in increasing awareness and clean and healthy living behaviors. These findings are in line with the research by Sari & Agustina that clean living behaviors are not only influenced by the availability of facilities, but also by knowledge, habits, and the role of educators in shaping these behaviors. Clean and healthy living behaviors are greatly influenced by education and habits instilled in school-age children from an early age (Sari & Agustina, 2023).

The novelty of this research lies in the application of an integrated educational approach that combines the dissemination of visual-based materials, demonstrations of the six steps of handwashing according to WHO guidelines, hands-on practice, and quantitative pretest–posttest evaluations and behavioral observations as indicators of intervention effectiveness. This approach provides a more comprehensive assessment than previous studies, which generally only assessed cognitive aspects. In line with the pharmacist's perspective in the educational material provided, proper handwashing practices should be carried out at important times, such as before eating, after using the toilet, after activities, and after touching objects that are potentially dirty (Adista & Yulvia, 2021) (Amalia, 2019) (Thirayo et al, 2021). Pharmacists emphasize that myths such as “hands only need to be washed if they look dirty” are incorrect, because most germs cannot be seen with the naked eye. This is in line with Ernawati's explanation that health education must be able to correct public misconceptions about hygiene and provide a correct understanding of the risks of infection (Ernawati, 2022).

From a pharmaceutical perspective, pharmacists also emphasize the importance of using soap when washing hands because soap can dissolve lipids in the membranes of microorganisms and remove dirt that serves as a medium for the growth of bacteria and

fungi. The recommendation to use hand sanitizers with an alcohol content of more than 60% when soap and water are not available further strengthens the scientific basis of this socialization program (Ariyanto et al, 2023) (Kahusadi et al, 2018) (Romadonika et al, 2023) (Zakiah et al, 2024)

By strengthening education through socialization, hands-on practice, and teacher support in instilling a culture of clean living, proper handwashing habits are expected to become part of the health culture in schools, thereby improving clean and healthy living behaviors and contributing to the prevention of infectious diseases among adolescents. Therefore, this study aims to evaluate the effectiveness of hand hygiene education in improving knowledge, practical skills, and clean and healthy living behaviors among students at Al-Mahdhuri Islamic Junior High School in Pesisir Barat Regency, Lampung.

Methodology

This hand hygiene education activity used a one group pretest–posttest design and was conducted at SMP IT Al-Mahdhuri in Pesisir Barat Lampung Regency with 107 participants consisting of 35 seventh grade students, 38 eighth grade students, 34 ninth grade students, and 2 educators. The implementation methods included observation and brief interviews to determine initial handwashing habits, pretest questionnaires to measure students' initial knowledge levels, educational material dissemination using posters, and demonstrations and hands-on practice of the six steps of handwashing according to WHO guidelines. The pretest and post-test instruments consisted of a structured questionnaire designed to assess students' knowledge regarding hand hygiene practices. The questionnaire included five indicators covering the importance of handwashing, the use of soap, critical times for handwashing, knowledge of the WHO six-step technique, and awareness of invisible germs. Each correct answer was scored as 1 and each incorrect answer as 0. The total score was converted into percentage form for analysis. The detailed variables and indicators of the pretest and post-test questionnaire are presented in Table 1.

Table 1. Variables and Indicators of Pretest and Post-test Questionnaire

No	Variabel	Indicators	Questions	Question Type	Score
1.	Importance of Handwashing	Understanding that handwashing prevents disease	Can washing your hands prevent disease?	True/False	1 = Correct, 0 = Incorrect
2.	Use of soap	Knowledge that soap is necessary to remove germs	Is washing hands without soap sufficient?	True/False	1 = Correct, 0 = Incorrect
3.	Important times to wash hands	Knowledge of important moments (before eating, after toilet, etc.)	When is the right time to wash hands?	Multiple Choice	1 = Correct, 0 = Incorrect
4.	WHO 6-step technique	Knowledge of correct number and sequence of steps	How many steps are there in the correct hand washing method	Multiple Choice	1 = Correct, 0 = Incorrect

No	Variabel	Indicators	Questions	Question Type	Score
			according to the WHO?		
5.	Awareness of invisible germs	Understanding that germs are not always visible	Do hands need to be washed even if they don't look dirty?	True/False	1 = Correct, 0 = Incorrect

After the educational activities and practice were completed, participants filled out a post-test questionnaire using the same instrument to assess knowledge improvement, and the data was analyzed descriptively by comparing the pretest and post-test average scores and supported by observations of changes in student behavior during the activities.

Result and Discussion

The implementation of the hand hygiene education program at SMP IT Al-Mahdhuri in Pesisir Barat Regency, Lampung, involved 107 participants consisting of seventh, eighth, and ninth grade students and two educators. The activities included material delivery, demonstration of the six steps of hand washing according to WHO guidelines, hands-on practice, and evaluation using pre-tests and post-tests. The results of the activity showed a significant increase in hand hygiene knowledge and skills after the education was provided.

1. Increase in Student Knowledge

Before the education, most students did not understand the difference between washing their hands with soap and just rinsing their hands with water. This was evident from the students' pretest scores in the three grade levels, which showed that the majority of students were in the low to moderate knowledge category. After the presentation of the material and hands-on practice, there was an increase in post-test scores across all grade levels.

Tabel 2. Variables and Indicators of Pretest and Post-Test Questionnaire Results

No	Variabel	Indicators	Correct Responses (%)					
			Class VII (35 students)		Class VIII (38 students)		Class VII (34 students)	
			Pre-test	Post-Test	Pre-test	Post-Test	Pre-test	Post-Test
1.	Importance of Handwashing	Understanding that handwashing prevents disease	58	90	63	93	64	97
2.	Use of soap	Knowledge that soap is necessary to remove germs	55	89	60	92	62	96
3.	Important times to wash hands	Knowledge of important moments (before eating, after toilet, etc.)	57	88	61	90	63	95
4.	WHO 6-step technique	Knowledge of correct number and sequence of steps	52	86	58	89	60	94
5.	Awareness of invisible germs	Understanding that germs are not always visible	58	91	63	94	62.5	98.5

Overall Knowledge Score (%)	56	88.8	61	91.6	62.3	96.5

Table 3. Increase in Student Knowledge Based on Pretest and Post-Test Results

Class	Number of Participants	Overall Knowledge Score (%)		Improvement
		Pre-test	Post-test	
VII	35 students	56	88.8	Improved
VIII	38 students	61	91.6	Improved
IX	34 students	62.3	96.5	Improved

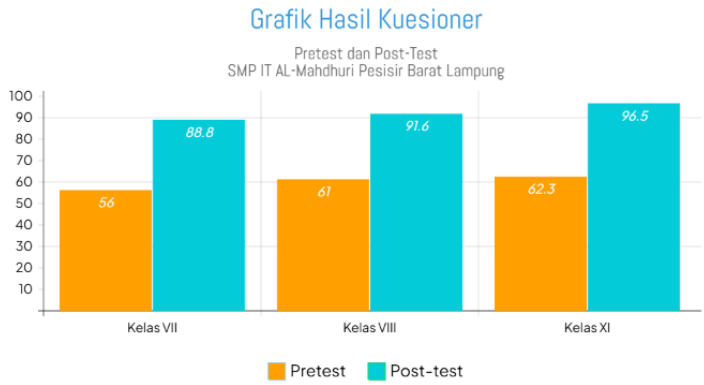

Figure 1. Graph of Questionnaire Results for Students at Al-Mahdhuri Islamic Junior High School, West Coast of Lampung

Table 3. and **Figure 1.** show that the pretest results indicate that most students do not understand the importance of using soap and the important times for washing their hands. After the education, the average score for the entire class increased consistently. This increase shows that health education based on demonstrations and hands-on practice is effective in improving students' knowledge. These findings are in line with the research by (Zakiah et al, 2024) which reported that education on the six steps of hand washing can significantly improve students' understanding. Research by (Hasanah & Mahardika, 2020) also confirms that handwashing education from an early age has a real impact on improving children's health knowledge (Hasanah & Mahardika, 2020) (Zakiah et al, 2024). These results reinforce the theory that knowledge is an initial determinant of health behavior change. (Harahap et al, 2020) found a significant relationship between children's knowledge of handwashing and the incidence of diarrhea, suggesting that increasing knowledge through education has the potential to reduce the risk of infectious diseases (Harahap et al, 2020).

2. Improvement in Handwashing Skills

In addition to increased knowledge, there were significant changes in students' practical skills. During the practice session, students were able to follow the six steps of proper handwashing, although some students required additional assistance with rubbing the back of their hands and between their fingers. This change in skills shows that hands-on practice is far more effective than lectures alone, as confirmed by (Safitri et al, 2025)

research that practice-based learning provides better skill retention effects in children (Safitri et al, 2025).

Teachers also actively participated in guiding students, thereby reinforcing the habit of hand washing. Educator support is an important factor in the sustainability of PHBS behavior in schools, according to the findings of Sari & Agustina, who stated that teacher involvement can accelerate hygienic behavior change in students (Sari & Agustina, 2023).

3. Impact of Student Behavior Change

The real impact can be seen from the change in student behavior after the program was implemented. Based on direct observation and feedback from teachers:

a. Students began washing their hands before eating, after using the toilet, and after playing outside the classroom.
b. Students demonstrated a new awareness that most germs are invisible, so handwashing does not have to wait until hands appear dirty.
c. Teachers began integrating handwashing reminders into daily routines.

Observations showed real behavioral changes after the intervention. These findings confirm that participatory health education can produce short-term behavioral changes. These results are in line with the research by (Sarashy et al, 2023), which shows that CTPS education in schools significantly increases student compliance with hand hygiene practices. This change is in line with the results of research by (Harahap et al, 2020), which shows that hand hygiene education is directly proportional to a decrease in the risk of infections such as diarrhea in children.

In addition, research by Sumarto & Lestari states that the success of hand washing programs is not only influenced by education, but also by the availability of facilities and environmental support. The condition at SMP IT Al-Mahdhuri, which already had handwashing facilities, was a supporting factor for the success of the intervention in this study (Harahap et al, 2020) (Sarashy et al, 2023) (Sumarto & Lestari, 2021).

4. Comparison with Other Community Service Programs

Compared to various other community service studies, this program shows similar effectiveness:

a. The program by (Nurhayati et al, 2020), proves that PHBS education increases handwashing compliance among school children.
b. Lubis & Usiono, (2023) research on the CTPS program in public spaces during the pandemic also shows that the availability of facilities and education significantly improves hand hygiene practices.
c. Education using visual media such as posters, as conducted in (Ernawati, 2022) research, effectively improves public understanding because visuals strengthen memory.

These findings support the results of this activity that a combination of visual lectures, hands-on practice, demonstrations, and the role of teachers has a stronger impact than one-way education.

5. Impact Before and After the Program

Before the program:

a. The majority of students did not wash their hands after activities.
b. Knowledge about handwashing techniques was still low.
c. Myths such as “it is enough to wash your hands if they look dirty” were still prevalent.
d. Teachers had not yet instilled a culture of handwashing in school activities.

After the program:

a. Students understood the importance of washing their hands with soap.
b. Six-step handwashing skills improved.
c. Teachers' and students' awareness of preventing environment-based diseases increased.
d. A culture of handwashing began to form and be applied in school activities.

These behavioral changes show that participatory health education and hands-on practice can have a significant short-term impact and the potential to become a long-term habit.

Figure 2. Delivery of Material and Completion of Questionnaires at Al-Mahdhuri Islamic Junior High School in Pesisir Barat Regency, Lampung

The activity of delivering hand hygiene education materials to students at SMP IT Al-Mahdhuri in Pesisir Barat Regency, Lampung, was carried out through interactive explanations and poster media, followed by the completion of pretest and post-test questionnaires to measure students' knowledge levels before and after the counseling as part of the evaluation of the effectiveness of the health education program.

Figure 3. Individual and Group Handwashing Practice

The handwashing practice activity was carried out individually and collectively by students of SMP IT Al-Mahdhuri, West Pesisir Regency, Lampung, with the assistance of the implementation team and teachers, using soap and running water and following the six steps of handwashing according to WHO guidelines as an effort to improve skills, habits, and the application of clean and healthy living behaviors in the school environment.

Figure 4. Teachers Participating in Handwashing Practice

Participation of teachers at SMP IT Al-Mahdhuri in Pesisir Barat Regency, Lampung, in handwashing practice with students, as a form of role modeling and support from educators in instilling a culture of hand hygiene and strengthening the habit of clean and healthy living behaviors in the school environment.

Figure 5. Photo with the Principal of SMP IT Al-Mahdhuri, West Pesisir Regency, Lampung

A photo with the principal of SMP IT Al-Mahdhuri, West Pesisir Regency, Lampung, symbolizes the school's institutional support for the implementation of health education programs and the application of clean and healthy living behaviors in the school environment.

Conclusion

The implementation of hand hygiene education activities at SMP IT Al-Mahdhuri demonstrated that a combination of interactive lectures, visual media, demonstrations, and hands-on practice is an effective approach to improving students' knowledge, skills, and awareness of clean and healthy living behaviors. This improvement is reflected in the increase of the overall knowledge scores across all grade levels. The average pre-test score of Class VII increased from 56% to 88.8% in the post-test, while Class VIII improved from 61% to 91.6%, and Class IX from 62.3% to 96.5%. These results indicate a substantial increase in students' understanding after the educational intervention. Students find it easier to understand the material when given direct examples and practical guidance, so that physical involvement and direct interaction are proven to increase interest, understanding, and learning retention. In addition, teacher participation during activities strengthens the process of internalizing healthy behaviors and supports the formation of a culture of hygiene in the school environment. However, time constraints and the large number of participants pose challenges because not all students receive optimal individual guidance. This indicates the need for a more structured implementation strategy, such as dividing students into small groups or holding follow-up sessions so that the practice can be carried out more thoroughly and evenly. The practical implications of this study confirm that a hands-on hand hygiene education program can be used as a model for promotive-preventive interventions in schools. Continuous implementation through teacher support, the availability of handwashing facilities, and regular reminders are essential to maintain

long-term behavioral change. Further research is recommended using an experimental design with a control group, a larger sample size, and long-term evaluation to assess the sustainability of behavioral change and the effectiveness of the intervention more comprehensively.

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