



Original Article

Association Between Knowledge of Handwashing with Soap and Handwashing Behavior Among Elementary School Students in Pontianak, Indonesia

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ABSTRACT

Background: Handwashing with soap (CTPS) is a clean and healthy lifestyle behavior that is effective in preventing various infectious diseases, such as diarrhea, acute respiratory infections (ARI), worm infections, and skin diseases. Although public awareness of the importance of CTPS increased during the COVID-19 pandemic, compliance with this habit tended to decline after the pandemic ended. Good knowledge regarding the benefits, timing, and technique of CTPS is thought to play a significant role in shaping handwashing behavior in elementary school-aged children.

Methods: This study used a quantitative design with a cross-sectional approach. The sample was elementary school students selected using a total sampling technique from the entire study population. Data were collected using a questionnaire that had been tested for validity and reliability. Then, data were analyzed univariately and bivariately using the Chi-Square test with a 95% significance level ($\alpha = 0.05$).

Results: This study is expected to demonstrate a significant relationship between knowledge levels regarding handwashing (CTPS) and handwashing behavior among elementary school students. Students with higher levels of knowledge are expected to have better handwashing behavior compared to those with lower levels of knowledge.

Conclusion: Increasing knowledge about handwashing (CTPS) through health education and habituation in the school environment is expected to improve students' handwashing behavior, thereby contributing to the prevention of infectious diseases and the establishment of a clean and healthy lifestyle in schools.



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INTRODUCTION

Health is a basic human need that must be maintained through promotive, preventive, curative, and rehabilitative efforts. Disease prevention efforts are the most effective and efficient strategy for improving public health. One of the simplest, most affordable, and proven effective forms of clean and healthy living (PHBS) behaviors in preventing various infectious diseases is handwashing

with soap (CTPS). CTPS involves washing hands with running water and soap at critical times, such as before eating, after using the toilet, after playing, after coughing or sneezing, and before touching food ([Kementerian Kesehatan Republik Indonesia, 2022](#)).

The COVID-19 pandemic has increased public awareness of the importance of maintaining hand hygiene. During the pandemic, handwashing with soap and water (CTPS) became one of the main health protocols in preventing the spread of the virus. However, after the pandemic ended, public compliance with handwashing practices began to decline. In fact, the benefits of CTPS are not only limited to preventing COVID-19, but are also effective in preventing various other infectious diseases such as diarrhea, influenza, acute respiratory infections (ARI), hepatitis A, worms, and skin diseases. WHO and UNICEF emphasized in 2025 that hand hygiene should not only be a habit during an outbreak, but must be maintained as a healthy lifestyle behavior that is carried out every day because it has been proven to reduce the incidence of diarrhea by around 30% and acute respiratory infections by around 17% ([WHO, 2024](#)).

According to WHO and UNICEF through the Joint Monitoring Programme (JMP) in 2024, hand hygiene in school environments remains a global challenge. In 2023, only 67% of schools worldwide will have basic handwashing facilities with soap and water, while approximately 646 million schoolchildren will still be studying in schools that do not have adequate handwashing facilities. This condition indicates that access to CTPS facilities still needs to be improved to support student health. Meanwhile, in Indonesia, the challenges of implementing CTPS are also quite significant (WHO & UNICEF Joint Monitoring Programme, (2024)). UNICEF Indonesia and the Indonesian Ministry of Health reported that approximately 71% of schools do not have a combination of adequate basic water, sanitation, and hygiene (WASH) facilities, affecting approximately 27 million schoolchildren. In addition, approximately 64 million Indonesians still do not have access to basic handwashing facilities. This condition has the potential to hinder the formation of clean and healthy living behaviors in school-age children ([UNICEF Indonesia 2025](#)).

The Indonesian government, through the Community-Based Total Sanitation (STBM) program, the Healthy Living Community Movement (GERMAS), and support from UNICEF, has made handwashing with soap and water (CTPS) a national priority for improving public health. In Indonesia, handwashing with soap and water is a key indicator of the Clean and Healthy Living Behavior (PHBS) program. The government, through the Ministry of Health, continues to encourage the implementation of handwashing with soap and water at homes, schools, and communities as part of promotive and preventive efforts to improve public health. However, various studies in Indonesia still show that compliance with proper handwashing with soap and water is still suboptimal. Factors contributing to this condition include low knowledge, lack of awareness, limited handwashing facilities, and the lack of established handwashing habits at critical times ([UNICEF, 2022](#)).

Elementary school-aged children are a very strategic group in health promotion efforts because they are in the habit formation phase. At the age of 6–12 years, children begin to be able to understand health information, imitate behaviors modeled by teachers and parents, and apply these habits in their daily lives. Health interventions provided at this age have the potential to produce more permanent behavioral changes into adulthood ([Dewi, Indriatie, Luthfiyah, & Suwito, 2025](#)). In addition to being in the behavioral formation period, elementary school students are also at high risk of contracting infectious diseases due to intensive learning, playing, and interacting with peers as well as using shared facilities in the school environment. Frequent contact through hands makes this group vulnerable to the transmission of diarrhea, respiratory infections, worms, and skin diseases if hand hygiene practices are not carried out properly. Therefore, the implementation of Handwashing with Soap (CTPS) is a very important health intervention in the school environment ([Belangi et al., 2025](#)).

Knowledge is a predisposing factor that greatly influences the formation of a person's health behavior. The better the knowledge regarding the benefits, timing, and technique of handwashing with soap and water, the greater the likelihood of someone implementing proper handwashing

behavior in daily life. Conversely, low levels of knowledge can lead to low compliance with handwashing with soap and water practices, thereby increasing the risk of infectious diseases (Belangi et al., 2025).

Various previous studies have shown a relationship between knowledge levels and handwashing behavior in schoolchildren. Research by Pauzan and Fatih, (2017) found that knowledge has a significant relationship with handwashing behavior in elementary school students. Research by Kartika, Widagdo, and Anung (2016) also stated that knowledge is one of the factors related to handwashing behavior in elementary school students. More recent research by Afriyani et al. (2022) shows that knowledge is an important determinant in the formation of handwashing behavior in children, although family, school, and peer environmental factors also play a role in shaping these habits (Afriyani, Veftisia, & Mustain, 2022).

Based on this description, it can be concluded that handwashing with soap and water (HWWS) remains a crucial public health issue even after the COVID-19 pandemic has ended. The practice of handwashing with soap and water (HWWS) from elementary school age needs to be continuously improved through health education and the provision of adequate facilities to foster sustainable clean and healthy living habits. Therefore, research on handwashing with soap and water (HWWS) is crucial as a basis for developing more effective health promotion programs to improve the health of schoolchildren.

METHODS

This type of research is quantitative research with a correlation analytical research design using the cross-sectional method, carried out at Aisyiyah Unggulan 1 Elementary School, Pontianak City. The instrument used was a questionnaire. The sample in this study was 38 respondents, sampling used total sampling, total sampling was conducted because Aisyiyah Unggulan 1 Elementary School, Pontianak City there are currently only 2 classes. Data analysis used univariate and bivariate before carrying out the bivariate test using the chi square test, OR and CI 95%. Research Hypothesis: H_a : There is a significant relationship between knowledge about Hand Washing with Soap (CTPS) and hand washing behavior in elementary school students and H_0 : There is no significant relationship between knowledge about Handwashing with Soap (CTPS) and handwashing behavior in elementary school students (Dahlan, 2014).

The inclusion criteria for the study were students who were willing to participate as respondents and had obtained parental consent, while the exclusion criteria were students who were absent, ill, or did not complete the questionnaire. The questionnaire was developed based on the literature on handwashing with soap to assess the knowledge and behavior of CPTS. Before the questionnaire was distributed, validity and reliability tests were first conducted on 30 first- and second-grade students at SD Muhammadiyah 1 Pontianak. The validity test results for the 15 questions revealed that 5 questions were invalid; consequently, 10 questions were included in the questionnaire regarding knowledge and behavior. A questionnaire is considered valid if the calculated r-value is greater than the critical r-value (>0.361) or if the significance level is <0.005 .

The scoring system for the knowledge questionnaire uses a cutoff score of 77.89, and the cutoff score for the behavioral questionnaire is 36. EC approval letter: 038/KEPK-PK.PKP/VIII/NP/2026, Issued by Poltekkes Kemenkes Pontianak prior to the data collection process, respondents were first provided with an explanation regarding the participation consent obtained from their parents or guardians, since the elementary school student respondents were minors, through an informed consent process.

RESULTS

The results of the study are presented in the following table:

Table 1. Children's Characteristics Regarding Knowledge and Behavior in Handwashing with Soap

Variables	n	%
Children's Knowledge about CPTS		
Good	21	55,3
Poor	17	44,7
Children's Behavior about CPTS		
Positive	16	42,1
Negative	22	57,9

Table 1 regarding children's knowledge regarding washing hands with soap shows that 21 children (55.3%) have good knowledge and 16 children (42.1%) have positive behavior towards washing hands with soap.

Table 2. Cross-tabulation of Knowledge and Behavior among Children's of Handwashing with Soap

Variables		CPTS Behavior				p-value
		Negative		Positive		
		N (22)	%	N (16)	%	
Children's knowledge about CPTS						
Good		7	33.3	14	66.7	0.002
Poor		15	88.2	2	11.8	

Table 2 presents a cross tabulation between children's knowledge and behavior regarding washing hands with soap at Aisyiyah Unggulan 1 Elementary School, Pontianak City. Analysis shows that children's knowledge has a significant impact on behavior regarding washing hands with soap with a p value of 0.002.

Table 3. Analysis of Risk Factors for Knowledge and Behavior among Children's of Handwashing with Soap

Variables	p-value	OR	95%CI	
			Lower	Upper
Children's knowledge dan behavior about CPTS	0.002	15.000	2.654	84.783

Table 3 presents analysis of risk factors for knowledge and behavior among children's of handwashing with soap at Aisyiyah Unggulan 1 Elementary School, Pontianak City. Based on the results of the risk estimate analysis of 38 respondents, an odds ratio (OR) of 15,000 was obtained, with a 95% confidence interval (CI) of 2,654–84,783. This indicates that children with poor knowledge of handwashing with soap (CTPS) are 15 times more likely to exhibit negative handwashing behavior compared to children with good knowledge. Since the 95% CI does not cross the value of 1 specifically, 2,654–84,783 this relationship indicates a statistically significant association. The risk estimate for the cohort with negative handwashing behavior was 2.647 (95% CI: 1.411–4.967), while for the cohort with positive handwashing behavior, it was 0.176 (95% CI: 0.046–0.672). Thus, it can be concluded that children's knowledge of CTPS is associated with handwashing behavior, whereby children with poor knowledge tend to exhibit negative CTPS behavior.

DISCUSSION

Knowledge about Handwashing with Soap among Students at Aisyiyah Unggulan 1 Elementary School, Pontianak City

This study demonstrates a significant association between knowledge of handwashing with soap and handwashing practices among elementary school students in Pontianak. The findings indicate that students with better knowledge regarding the purpose, benefits, critical times, and steps of handwashing with soap tend to exhibit better handwashing behavior compared to students with lower levels of knowledge. These results reinforce the premise that knowledge is a key determinant in the formation of health-related behaviors, particularly among elementary school-aged children (Ministry of Health of Indonesia, Ministry of National Development Planning (Bappenas) & UNICEF Indonesia 2022).

The better the students' knowledge regarding the benefits, appropriate timing, and steps for handwashing with soap, the better the handwashing behavior they exhibit in their daily lives. These findings support health behavior change theories stating that knowledge is a predisposing factor influencing the formation of health behaviors (Otsuka et al., 2019).

The results of this study align with various international studies showing that knowledge is a key determinant in the development of hand hygiene behaviors among school-aged children. A study by (Pereira et al., 2026) in Portugal found that the majority of primary school students possessed a good level of knowledge regarding hand hygiene and consistently practiced handwashing at critical times such as before meals, after using the toilet, and after playing. That study also emphasized the vital role schools and families play in sustaining such behaviors (Pereira et al., 2026).

These findings are further supported by a study conducted by (Pratinidhi et al., 2020) in India, which reported a positive correlation between handwashing knowledge and hand hygiene practices among primary school students. The study demonstrated that students who understood the critical times for handwashing practiced handwashing with soap more frequently than those with lower levels of knowledge (Pratinidhi et al., 2020).

Handwashing with Soap Behavior among Students at Aisyiyah Unggulan 1 Elementary School, Pontianak City

The research results indicate that the majority of students exhibit good handwashing behavior. This is evident from the students' habits of washing their hands before eating, after using the toilet, and after playing, as well as their use of soap during handwashing.

Behavior is an individual's response to a stimulus, shaped through learning processes and experience. Among elementary school-aged children, behavior is heavily influenced by the family and school environments, as well as by the examples set by the adults around them.

According to Lawrence Green's theory, health behavior is influenced by three categories of factors:

- a. Predisposing factors, such as knowledge, attitudes, and beliefs.
- b. Enabling factors, such as the availability of handwashing facilities, clean water, and soap.
- c. Reinforcing factors, such as support from teachers, parents, and peers.

These research findings are also consistent with the study by (Mao et al., 2019) conducted in elementary schools in the Tibet region of China, which demonstrated that knowledge has an indirect relationship with handwashing behavior, mediated by the formation of attitudes and subjective norms. This implies that students who understand the benefits of handwashing with soap tend to hold positive attitudes toward hand hygiene, thereby increasing their motivation to practice handwashing regularly (Mao et al., 2019). Research by (Safidni et al., 2026) also demonstrates that school-based health promotion significantly improves handwashing behavior among elementary school students. Following health education, there was a significant increase in handwashing

behavior scores compared to pre-intervention levels. This indicates that enhancing knowledge through health education contributes to changes in student behavior (Safidni et al., 2026). Nevertheless, some students still do not consistently practice proper handwashing. This situation may be influenced by habits at home, a lack of supervision, or the developmental characteristics of elementary school students, who still require continuous guidance and reinforcement.

Association between Knowledge of Handwashing with Soap and Handwashing Behavior Among Students at Aisyiyah Unggulan 1 Elementary School, Pontianak City

Bivariate analysis results indicate a significant relationship between knowledge regarding handwashing with soap (CTPS) and handwashing behavior among students at Aisyiyah Unggulan 1 Elementary School, Pontianak City. This is evidenced by a p-value of < 0.05 ; thus, the research hypothesis is accepted.

This study demonstrates a significant relationship between knowledge of handwashing with soap (CTPS) and CTPS behavior among elementary school students in Pontianak. These findings indicate that students with better knowledge regarding the purpose, benefits, timing, and steps of CTPS tend to exhibit better handwashing behavior compared to students with lower levels of knowledge. These results reinforce the assumption that knowledge is a crucial determinant in the formation of health behaviors, particularly among elementary school-aged children.

The study's results align with (Notoatmodjo, 2014) theory, which states that knowledge is a key factor shaping health behavior. Individuals with good knowledge are more likely to understand the benefits of a specific behavior, thereby becoming motivated to adopt it in their daily lives.

Furthermore, the Health Belief Model (HBM) explains that an individual will take preventive action if they understand the benefits of that action and are aware of the risks associated with failing to do so. In the context of this study, students who understand that handwashing with soap can prevent illnesses such as diarrhea and respiratory tract infections are more likely to be motivated to wash their hands regularly.

Similarly, research by (Gupta & Anand, 2023) demonstrates that hand hygiene education programs implemented regularly in primary schools significantly increase the frequency of student handwashing. Through their Water, Sanitation, and Hygiene (WASH) in Schools guidelines, the WHO and UNICEF also emphasize that successful changes in hand hygiene behavior are heavily influenced by a combination of education, the availability of sanitation facilities, access to clean water, and school policy support. Thus, these findings support international evidence indicating that increased knowledge is a crucial prerequisite for behavioral change but is insufficient on its own without other supporting factors (World Health Organization, 2021).

These findings also align with recent research conducted in Indonesia. (Budirman, Sulasmi, & Janna, 2025) reported that Clean and Healthy Living Behavior (PHBS) education combined with handwashing demonstrations significantly improved both the knowledge and handwashing practices of primary school students. Research by (Ervira, Ismanto, & Wowor, 2021) showed that audiovisual media were more effective than lecture-based methods in improving handwashing knowledge and behavior, as they better suited the learning characteristics of school-aged children. Furthermore, a study by (Hendra, Nurhayati, & Sari, 2023) found that students with good knowledge regarding handwashing tended to exhibit better handwashing behavior compared to those with low knowledge. These consistent results reinforce the conclusion that knowledge is a key factor in shaping clean and healthy living behaviors among school-aged children.

In some schools, handwashing with soap (CTPS) behavior is influenced more strongly by the availability of sanitation facilities, habits fostered by teachers, and family support than by knowledge alone. Differences in data collection methods can also affect results. Studies utilizing direct observation generally yield a more objective picture of behavior than those using self-report questionnaires, as respondents' answers may be influenced by a tendency to provide socially desirable responses (social desirability bias). In the context of Pontianak, several local factors can

influence the relationship between knowledge and CTPS behavior. Tropical climatic conditions with high rainfall increase the risk of environmentally-linked infectious diseases such as diarrhea, acute respiratory infections (ARI), and skin diseases. Furthermore, shared learning and play activities at school increase the frequency of contact between students, thereby raising the likelihood of disease transmission if CTPS practices are not consistently followed. Other factors requiring attention include variations in the availability of sanitation facilities across schools such as the number of sinks and the continuous availability of soap as well as the implementation of the School Health Unit (UKS) program. Family support is also a crucial factor, as handwashing habits established at home reinforce the behaviors learned at school.

Theoretically, the results of this study can be explained using Lawrence Green's model, which posits that knowledge serves as a predisposing factor in the formation of health-related behaviors. Individuals with adequate knowledge are more receptive to health information and better able to grasp the benefits of specific actions; this facilitates the development of a positive attitude, which is ultimately translated into actual behavior. However, knowledge is not the sole determinant of handwashing behavior. Other factors such as the availability of clean water, soap, and handwashing facilities, as well as teacher support, family habits, parental supervision, and school culture also play a role in shaping handwashing habits.

Instances where students possess good knowledge yet exhibit poor handwashing behavior can be attributed to a gap between knowledge and practice. Knowledge is not necessarily put into practice unless supported by an adequate environment or reinforced through routine habituation. Conversely, some students with only moderate knowledge demonstrate good handwashing behavior, having become accustomed to the examples set by teachers and parents. This phenomenon is consistent with research on the psychosocial factors of handwashing behavior, which indicates that attitudes, skills, social norms, and teacher support exert a stronger influence on behavior than knowledge alone (Emmanuel & Miriam, 2024).

The findings of this study imply that efforts to improve handwashing with soap (CTPS) behavior among elementary school students cannot rely solely on the dissemination of information; rather, they require the continuous fostering of habits through hands-on practice, teacher supervision, the provision of adequate handwashing facilities, and parental involvement at home. Schools can integrate handwashing education into School Health Unit (UKS) activities, thematic learning, and routines established before meals and after using the restroom. In this way, students' knowledge can evolve into ingrained habits of clean and healthy living.

CONCLUSION

Based on the research results, it can be concluded that there is a significant relationship between children's knowledge and behavior regarding washing hands with soap at Aisyiyah Unggulan 1 Elementary School, Pontianak City.

The findings of this study on elementary school children's knowledge and behavior regarding handwashing with soap are expected to serve as a foundation for improving the practice of clean and healthy living in the school environment. Schools are advised to provide adequate handwashing facilities, ensure the availability of soap, and enhance education and the habit of handwashing through the active involvement of teachers and school health activities. Future research should involve a larger sample size and examine other factors that influence handwashing behavior, such as parental support, facilities, the role of teachers, and the effectiveness of various educational media.

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