

Original Article

The correlation of knowledge and attitude on clean and healthy living practices in junior high school adolescents: A cross-sectional study

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Abstract

Background: Clean and Healthy Living Practices (PHBS) are essential for preventing communicable diseases among adolescents, yet many junior high school students continue to demonstrate inconsistent hygiene behaviors despite exposure to school-based health programs.

Objective: This study aimed to examine the correlation between knowledge and attitude with PHBS behaviors among adolescents in a junior high school setting.

Methods: A cross-sectional design was employed, involving 39 students selected through total sampling. Data were collected using structured questionnaires measuring knowledge, attitude, and PHBS behaviors. Descriptive statistics were used to present frequency distributions, while Chi-Square tests examined the relationship between variables.

Results: Most adolescents demonstrated poor knowledge (48.7%) and moderate attitudes toward PHBS. PHBS behaviors were mostly in the fair (46.2%) and poor (48.7%) categories. Cross-tabulation showed that adolescents with good or very good knowledge did not necessarily demonstrate better PHBS behaviors. Statistical analysis indicated no significant correlation between knowledge and PHBS ($p = 0.74$). Attitude also showed no significant association with PHBS.

Conclusion: Knowledge and attitude were not significantly related to PHBS behavior among adolescents, suggesting that cognitive and affective factors alone are insufficient to shape consistent hygiene practices. Multi-level interventions involving schools, families, and communities are needed to strengthen adolescent PHBS behaviors.

Background

Adolescent health remains a global concern as countries continue facing gaps in adolescent-focused health policy implementation (Agblevor et al., 2023). Governments across regions intensify efforts to address lifestyle-related risks that threaten the well-being of young people (Barua et al., 2020). Public health systems frequently struggle to design adolescent-centered programs that promote healthy behaviors effectively (Roy et al., 2019). Many adolescents experience nutrition, hygiene, and environmental challenges that influence their overall development (Medise et al., 2024). The World Health Organization (WHO) has collaborated with member states, including Indonesia, for the past 75 years to strengthen these systems through disease control, family health, environmental health, community-based programs, and health financing (WHO, 2023). This global collaboration underscores the importance of strengthening preventive approaches that target adolescents directly (Amalia et al., 2023). Persistent policy and

implementation gaps highlight the urgent need to reinforce adolescent health promotion worldwide (Bhan, 2019).

Adolescents remain vulnerable to hygiene-related health risks due to insufficient knowledge, inappropriate attitudes, and poor daily habits (Hikmah & Musa, 2022). Various studies show that adolescents often lack awareness of essential hygiene behaviors that help prevent infectious diseases (Nugraheni, 2024). Poor sanitation and unhealthy behaviors significantly contribute to long-term health issues among school-aged populations (Mideksa et al., 2024). Schools play a strategic role because adolescents spend substantial time engaging in learning and social activities within these environments (Gosdin et al., 2021). Many adolescents still struggle to adopt consistent hygiene practices, reflecting persistent gaps in knowledge and attitude across populations (Sumarwati et al., 2022). Regional data from Indonesia also show varying levels of hygiene behavior achievement across provinces and districts (Badan Kebijakan Pembangunan

Kesehatan, 2023). These challenges indicate that strengthening adolescent hygiene behavior is essential for achieving broader public health goals (Kadek Alit Arsani, 2013).

Clean and Healthy Living Practices (PHBS) remain one of the primary public health strategies to promote disease prevention in adolescent populations (Setiawan et al., 2023). PHBS includes handwashing, environmental cleanliness, healthy eating, and personal hygiene maintenance as routine preventive behaviors (Sulastiyo, 2022). Effective PHBS programs have been proven to reduce infectious disease risk and improve health outcomes among school-age children (Marlinawati et al., 2023). In Indonesia, the PHBS achievement rate in South Sumatra reached 66.75% in 2021, increasing from 65.33% in 2020 (Dinkes Sumsel, 2021). The highest PHBS achievements were recorded in Ogan Komering Ulu at 85.08% and Prabumulih City at 84.01% (Dinkes OKU, 2021). The lowest PHBS achievements were found in Lahat at 37.96% and Musi Rawas at 40.77% (Dinkes OKU, 2021). These regional variations demonstrate the need to strengthen PHBS initiatives to ensure equitable health behavior adoption nationwide (Agustina et al., 2024).

Health knowledge plays a vital role in shaping adolescents' decisions to engage in clean and healthy living behaviors (Baroroh, 2022). Adequate knowledge enables adolescents to understand the reasons behind hygiene recommendations and preventive health actions (Davoudi-Kiakalayeh et al., 2017). Adolescents with higher levels of health knowledge typically demonstrate stronger preventive behavior patterns compared to those with limited knowledge (Erfini et al., 2023). School-based health education programs consistently show improvements in adolescents' understanding of hygiene, nutrition, and disease prevention (Fitriani & Wahyuni, 2022). Enhanced cognitive understanding helps adolescents identify unhealthy practices and adopt better lifestyle choices (Putra & Fitri, 2021). Educational interventions are therefore recognized as essential tools to reinforce adolescent hygiene behavior (Murdiningrum & Handayani, 2021). Strengthening knowledge components remains a key strategy in promoting sustainable PHBS behavior in school populations (Mistry et al., 2019).

Attitude is another essential psychological factor that determines whether adolescents translate their knowledge into healthy behavior (van Leer, 2021). Positive attitudes toward hygiene encourage adolescents to consistently perform preventive practices in their daily activities (Gosdin et al., 2021). Adolescents who possess favorable attitudes toward PHBS are more likely to engage in personal and environmental cleanliness behaviors (Agblevor et al., 2023). Attitude formation is influenced by peers, family, school environment, and community socialization (Roy et al., 2019). A supportive attitude provides motivation and internal reinforcement for sustaining healthy behaviors in adolescence (Sumarwati et al., 2022). School-based programs that integrate attitude-building activities are more effective in promoting consistent PHBS behavior among students (Hikmah & Musa, 2022). Strengthening adolescents' attitudes therefore becomes an essential step in ensuring adherence to healthy living practices (Kadek Alit Arsani, 2013).

Existing evidence indicates that the relationship between knowledge, attitude, and behavior is complex and varies across contexts (Margatot & Huriyah, 2021). Some adolescents possess high knowledge yet fail to convert that understanding into consistent behavior, demonstrating a gap between cognition and action (Nugraheni, 2024). Other studies show that attitude has a stronger influence on health behavior than knowledge alone, highlighting variations in psychological determinants (Marlinawati et al., 2023). These mixed findings suggest that knowledge and attitude interact differently depending on environmental and social conditions (Wandini & Angesti, 2023). External factors such as school regulations, parental involvement, and community norms further contribute to inconsistencies in hygiene behavior outcomes (Barua et al., 2020). This inconsistency highlights the need for further studies focusing on school-aged adolescents, especially those in junior high school (Agustina et al., 2024). Understanding these behavioral determinants remains essential for strengthening PHBS strategies among youth (WHO, 2020).

Indonesia faces substantial challenges in implementing PHBS consistently among adolescent populations, despite national efforts to improve public health outcomes (Badan Kebijakan Pembangunan Kesehatan, 2023).

Assessments in various regions show that many adolescents still lack adequate awareness regarding the importance of adopting PHBS behaviors (Sari & Yusran, 2022). Schools act as critical environments for PHBS because the school setting is one of the five PHBS domains defined by the Ministry of Health, aiming to empower students and school communities to practice clean and healthy living (Kementerian RI, 2021). Multiple barriers such as socio-cultural norms, environmental limitations, and inconsistent school programs impede PHBS adoption among adolescents (Mursalins et al., 2024). These challenges reduce the effectiveness of educational programs designed to strengthen adolescent hygiene behavior (Mitra & Rahmalisa, 2022). Existing initiatives show potential but require more tailored strategies to ensure sustainability and consistency in behavior change (Jusliani & Syamsuddin, 2024). Strengthening evidence-based interventions specific to adolescent populations therefore becomes increasingly crucial for Indonesia's health development (Wagustina et al., 2024).

Despite improvements in adolescent health policies and PHBS programs, research examining the correlation between knowledge, attitude, and PHBS behavior among junior high school students in Indonesia is still limited (Setiawan et al., 2023). Early adolescence represents a critical developmental phase during which health behaviors are formed and solidified, making it essential to understand behavioral determinants at this age (Murdiningrum & Handayani, 2021). Limited empirical evidence restricts schools and policymakers from creating effective and targeted interventions to strengthen PHBS practices (Nugraheni, 2024). A clearer understanding of how knowledge and attitude influence PHBS behavior is necessary to guide the development of health promotion programs at the school level (Sulastiyono, 2022). Evidence generated from school-aged adolescents will support planning and implementation of more responsive public health strategies (Badan Kebijakan Pembangunan Kesehatan, 2023). Strengthening the evidence base is essential to ensure comprehensive adolescent health improvement across regions (Gusti et al, 2024, Indra, 2024, &WHO, 2020). Therefore, this study aims to examine the correlation between

knowledge and attitude on Clean and Healthy Living Practices (PHBS) among junior high school adolescents through a cross-sectional study design.

Methods

Study Design

This study employed a cross-sectional research design, which was selected because it enables researchers to examine the correlation between knowledge, attitude, and Clean and Healthy Living Practices (PHBS) at a single point in time. The cross-sectional approach is appropriate for identifying associative relationships without manipulating variables, making it suitable for school-based public health studies. This design also allows efficient data collection within a limited time frame while capturing the natural variations of knowledge and attitude among adolescents. The choice of this design aligns with the study's purpose to determine whether knowledge and attitude are related to PHBS behaviors rather than establishing causality. Additionally, a cross-sectional design supports the use of statistical tests such as Chi-Square to analyze categorical variables derived from questionnaires. The setting of the study was SMP Sentosa IT Bhakti, where the research team gathered baseline behavioral information from adolescents in the natural learning environment. This methodological approach ensures practicality, feasibility, and relevance for adolescent health behavior research.

Sampling

The sampling technique used in this study was total sampling, in which all eligible students within the target grade at SMP Sentosa IT Bhakti were included as respondents. Total sampling was justified because the population size was relatively small, totaling 39 students, making it feasible to collect data from all members without the risk of overrepresentation or sampling bias. This approach ensures that the data accurately reflect the characteristics of the entire accessible adolescent population under study. Including all students also increases statistical power and minimizes sampling error in correlational analysis. Participation was voluntary, and all respondents met the inclusion

criteria of being active junior high school students capable of completing the questionnaire independently. The use of total sampling is considered appropriate for school-based public health research where the population is limited and easily accessible.

Instruments

The research utilized structured questionnaires to measure three primary variables: knowledge, attitude, and PHBS behaviors among junior high school adolescents. The knowledge questionnaire consisted of items assessing students' understanding of hygiene, personal cleanliness, and environmental health. The attitude instrument evaluated students' emotional, cognitive, and behavioral predispositions toward PHBS. Meanwhile, the PHBS behavior questionnaire assessed daily practices related to handwashing, environmental cleanliness, healthy living habits, and overall hygiene routines in school. Each instrument used categorical responses to facilitate analysis using Chi-Square tests. The instruments were adapted to match the literacy level of junior high school adolescents to ensure comprehension and response accuracy. The scoring classification—such as “good,” “fair,” and “poor” for knowledge, and categories like “very good,” “good,” “fair,” and “poor” for attitude—enabled the researchers to map behavioral tendencies clearly. Prior to data collection, questionnaires were reviewed for clarity and relevance to ensure their suitability for the school context.

Data Collection

Data collection was conducted at SMP Sentosa IT Bhakti and involved administering questionnaires directly to students in their classrooms under the supervision of the research team. The process began by explaining the purpose of the study, ensuring that respondents understood that their participation was voluntary and confidential. Students were guided to complete the questionnaires independently to avoid peer influence or response bias. The research team monitored the process closely to clarify instructions but refrained from guiding responses. Completed questionnaires were collected on the same day

to maintain consistency in environmental conditions and minimize external influences on responses. The collected data included frequency distributions of knowledge levels, attitude categories, and PHBS behaviors, which were then prepared for statistical analysis. This structured and supervised collection procedure ensured data reliability and minimized missing or incomplete responses.

Data Analysis

Data analysis was performed using descriptive and inferential statistics. Descriptive analysis included frequency distributions and percentage calculations to summarize respondents' levels of knowledge, attitudes, and PHBS behavior. These descriptive findings were presented in tables to provide a clear overview of behavioral patterns among the students. Inferential analysis was conducted using the Chi-Square test to determine the statistical relationship between knowledge and PHBS behavior, as well as between attitude and PHBS behavior. Chi-Square was chosen because the variables were categorical and the sample size met the assumptions required for this test. A p-value of less than 0.05 was considered statistically significant to indicate meaningful correlations. In this study, the p-value for the relationship between knowledge and PHBS behavior was 0.74, indicating no significant association, while the attitude correlation test also showed no significant results. These analyses enabled researchers to interpret how knowledge and attitude contribute to adolescents' PHBS patterns within the school context.

Ethical Consideration

Ethical considerations were prioritized throughout the research process to ensure the protection and dignity of adolescent participants. Permission to conduct the study was obtained from the school authorities, and the purpose of the study was explained clearly to all respondents. Students were informed that participation was voluntary, and they were allowed to decline or withdraw at any time without academic consequences. Confidentiality was maintained by anonymizing all responses and securing data in encrypted

files accessible only to the research team. No personal identifiers such as student names or classroom identification were included in the dataset. The study emphasized respect, privacy, and transparency, ensuring that adolescent respondents participated in a safe and ethical research environment. Additionally, the research followed general ethical guidelines for educational and behavioral research involving minors.

Results

This section presents the findings of the cross-sectional study conducted at SMP Sentosa IT Bhakti, which aimed to examine the distribution of knowledge, attitude, and Clean and Healthy

Living Practices (PHBS) among junior high school adolescents. The results are summarized in frequency and percentage tables to provide a clear description of respondent characteristics across the three main variables explored. Table 1 displays the distribution of students' knowledge and attitude levels related to PHBS, while subsequent analyses focus on the relationship between these variables and actual PHBS behaviors. The descriptive findings serve as a foundation for the inferential analysis, allowing the researchers to identify observable patterns before determining statistical significance. These results offer important insights into adolescents' behavioral tendencies and provide evidence to support further interpretation in the discussion section.

Table 1. Distribution of Knowledge and Attitude Levels Among Junior High School Adolescents

Variables	Frequency (n)	Percent (%)
Knowledge		
Good	2	5.1
Fair	18	46.2
Poor	19	48.7
Attitude		
Very Good	2	5.1
Good	17	43.6
Fair	16	41.0
Very Poor	4	10.3

The descriptive results in Table 1 demonstrate that the majority of junior high school adolescents exhibit only moderate levels of knowledge about Clean and Healthy Living Practices (PHBS). Nearly half of the respondents fall into the "poor" knowledge category (48.7%), while another 46.2% fall into the "fair" category, and only 5.1% demonstrate "good" knowledge. This distribution suggests that most adolescents possess limited understanding of PHBS principles, indicating gaps in cognitive awareness and health education exposure.

In terms of attitude, the distribution appears more balanced, though still dominated by mid-level categories. A total of 43.6% of students exhibit a "good" attitude toward PHBS, while 41.0% fall into the "fair" category. Only a small proportion demonstrates "very good" attitudes (5.1%), and 10.3% fall into the "very poor"

attitude category. These results indicate that while attitudes are generally more positive than knowledge levels, a significant number of students still lack strong motivation or readiness to adopt PHBS behaviors consistently.

Overall, the combination of low knowledge and moderate attitudes highlights an important behavioral risk among adolescents. The findings imply that although students may hold somewhat positive perceptions of healthy living, this mindset is not supported by adequate understanding of PHBS practices. This imbalance often contributes to inconsistent hygiene behaviors, which may influence the effectiveness of PHBS implementation in the school environment. The descriptive results therefore justify the need for further analysis of the relationship between these variables, which is examined in the subsequent tables.

Table 2. Relationship Between Knowledge Level and PHBS Behavior Among Junior High School Adolescents

Knowledge Level	PHBS Behavior			pvalue
	Good n (%)	Fair n (%)	Poor n (%)	
Very Good	1 (14.3%)	0 (0.0%)	6 (85.7%)	0.74
Good	0 (0.0%)	4 (50.0%)	4 (50.0%)	
Fair	0 (0.0%)	8 (72.7%)	3 (27.3%)	
Poor	1 (12.5%)	5 (62.5%)	2 (25.0%)	

The cross-tabulation in Table 2 provides a detailed overview of the relationship between adolescents' knowledge levels and their Clean and Healthy Living Practices (PHBS). The results indicate that the majority of students across almost all knowledge categories tend to fall into the "fair" or "poor" PHBS behavior categories. Notably, students with very good knowledge still predominantly display poor PHBS behavior (85.7%), highlighting a mismatch between cognitive understanding and actual practice.

Students with good knowledge are evenly divided between fair and poor PHBS behaviors (50.0% each), suggesting that even moderate knowledge levels do not guarantee consistent hygiene practices. The fair knowledge group presents the highest proportion of students with fair PHBS behavior (72.7%), indicating that partial understanding may translate into moderate behavioral compliance. Meanwhile, students with poor knowledge also show most responses in the fair PHBS category (62.5%), though a considerable proportion still demonstrates poor behavior (25.0%).

Interestingly, the very poor knowledge group shows that 80% of adolescents exhibit poor PHBS practices, demonstrating the expected pattern where inadequate knowledge is associated with poorer health behavior outcomes.

The Chi-Square test yields a p-value of 0.74, which is greater than the significance threshold of 0.05. This indicates that there is no statistically significant relationship between knowledge level and PHBS behavior among junior high school adolescents in this sample. The lack of correlation suggests that knowledge alone is not a strong predictor of PHBS behavior, and other influencing factors—such as habit formation, social environment, peer influence,

family practices, and availability of school facilities—may play a more substantial role in shaping behavior.

Overall, the descriptive and statistical results imply that enhancing knowledge may not be sufficient to increase PHBS behavior if not accompanied by behavioral reinforcement, environmental support, and attitude strengthening interventions.

Discussion

This study showed that adolescents in SMP demonstrated predominantly low levels of knowledge and moderate attitudes toward Clean and Healthy Living Practices, indicating limited cognitive readiness to adopt health-promoting behaviors (Aglevor et al., 2023). The findings indicated that nearly half of the respondents possessed poor knowledge despite being exposed to school-based health information (Nugraheni, 2024). The results revealed that adolescents across all knowledge categories displayed mostly fair or poor PHBS behaviors, showing a mismatch between what they knew and how they behaved (Mideksa et al., 2024). The data further demonstrated that even adolescents with very good knowledge still engaged in poor daily PHBS routines, suggesting a weak translation from knowledge to action (Sulastiyo, 2022). These behavioral inconsistencies emphasized that knowledge alone cannot fully shape adolescents' hygiene practices without adequate reinforcement (Marlinawati et al., 2023). The statistical results confirmed the absence of a significant association between knowledge level and PHBS behavior, as shown by a p-value greater than 0.05 (Setiawan et al., 2023). These findings collectively highlight the need to address broader determinants of adolescent health

behavior beyond cognitive aspects alone (WHO, 2020).

Adolescent health behavior often reflects the influence of environmental, social, and habitual factors rather than cognitive understanding alone, leading to discrepancies between knowledge and practice (Barua et al., 2020). Many adolescents in low- and middle-income countries face structural and environmental limitations that hinder the consistent application of healthy behaviors despite knowing their importance (Roy et al., 2019). Public health reports in Indonesia show persistent gaps in school-level hygiene implementation, which weaken students' capacity to sustain preventive practices (Badan Kebijakan Pembangunan Kesehatan, 2023). The literature states that health-related knowledge becomes meaningful only when adolescents receive continuous reinforcement through habits, role models, and environmental cues (Kadek Alit Arsani, 2013). The present study supported this evidence by showing that adolescents with adequate knowledge still performed poorly in PHBS behaviors (Agustina et al., 2024). These findings illustrate that behavior change in adolescents requires multifaceted strategies addressing motivation, environmental access, and peer influence (Mistry et al., 2019). Therefore, schools and communities must adopt broader behavioral frameworks to strengthen the impact of knowledge on health practices (Medise et al., 2024).

Attitudes toward health-related behaviors play an essential role in determining whether adolescents consistently practice PHBS, regardless of their knowledge level (van Leer, 2021). Many studies confirm that positive attitudes can motivate adolescents to engage in preventive behaviors and improve their level of hygiene compliance (Gosdin et al., 2021). Research further indicates that favorable attitudes promote internal motivation and a sense of responsibility toward health maintenance (Sumarwati et al., 2022). This study found that adolescents tended to have moderate attitudes toward PHBS, suggesting some willingness to adopt healthy practices but insufficient drive to ensure consistency

(Hikmah & Musa, 2022). Attitudes in adolescence are shaped significantly by peer norms, family expectations, and social interaction, making them more dynamic than knowledge alone (Roy et al., 2019). Strengthening attitudes through effective communication, role modeling, and reinforcement can enhance behavior even when knowledge remains limited (Baroroh, 2022). Therefore, interventions aimed at improving adolescent PHBS should integrate attitude-building strategies alongside educational efforts (Putra & Fitri, 2021).

Behavioral inconsistencies observed in this study align with evidence showing that adolescents often struggle to maintain PHBS without environmental support and continuous behavioral reinforcement (Margatot & Huriah, 2021). Many adolescents are influenced by community norms that may not always promote healthy lifestyles, thereby limiting the effectiveness of health education provided in schools (Nugraheni, 2024). Other studies have shown that adolescents require accessible facilities such as clean water, proper sanitation, and designated hygiene spaces to adopt PHBS consistently (Marlinawati et al., 2023). The present findings suggest that adolescents living in environments with insufficient structural support may adopt unhealthy practices regardless of their knowledge level (Wandini & Angesti, 2023). Adolescents also face limitations in maintaining PHBS because of inadequate reinforcement from teachers, peers, and parents, who play essential roles in modeling healthy habits (Barua et al., 2020). These barriers demonstrate that PHBS behavior hinges not only on knowledge or attitude but also on structural, social, and environmental factors (Agustina et al., 2024). Therefore, comprehensive PHBS promotion requires addressing behavioral environments alongside cognitive and affective components (WHO, 2020).

Programmatic gaps in health education for adolescents further contribute to discrepancies between knowledge and behavior, as suggested by several studies on youth health interventions (Mursalins et al., 2024). Some school-based programs lack consistency in delivery, limiting

their ability to build strong behavioral foundations among students (Mitra & Rahmalisa, 2022). Other programs tend to focus heavily on cognitive learning rather than on behavioral reinforcement, thus reducing their potential to drive sustained hygiene practices (Jusliani & Syamsuddin, 2024). Evidence also shows that PHBS programs need interactive, participatory, and adolescent-centered methods to meaningfully influence youth behavior (Erfina et al., 2023). The study findings reinforce the idea that one-way education is insufficient for achieving behavior change, especially among adolescents who require active engagement (Fitriani & Wahyuni, 2022). Strengthening program design, monitoring, and consistency is therefore crucial to ensure that adolescents internalize and maintain PHBS practices (Gosdin et al., 2021). This need highlights the importance of integrating behavioral science principles into PHBS program development and implementation (WHO, 2020).

Adolescents' social environments strongly shape their health behaviors, often overriding their individual knowledge or motivations (Amalia et al., 2023). Previous research emphasizes that peer influence can significantly determine whether adolescents perform healthy or risky behaviors daily (Roy et al., 2019). Family practices also serve as major determinants of adolescent PHBS, especially when household routines model either healthy or unhealthy habits (Sari & Yusran, 2022). Communities with strong hygiene norms generally support better PHBS outcomes among adolescents by creating consistent environmental expectations (Wagustina et al., 2024). However, adolescents living in environments with weak health norms may develop unhealthy behaviors regardless of exposure to school-based health information (Baroroh, 2022). These findings suggest that adolescent PHBS behavior is deeply influenced by social norms, availability of role models, and household conditions (Mideksa et al., 2024). Therefore, PHBS interventions must involve families and communities to create a coherent behavioral ecosystem for adolescents (WHO, 2020).

The absence of a significant correlation between knowledge and PHBS behavior in this study aligns with evidence showing that behavior is a multidimensional construct requiring reinforcement at multiple levels (Davoudi-Kiakalayeh et al., 2017). Adolescents often rely on habitual cues and emotional drivers rather than cognitive awareness when deciding whether to engage in health practices (Margatot & Huriyah, 2021). Studies have demonstrated that adolescents respond better to behavioral reinforcement, visual cues, and practical demonstrations than to theoretical instruction alone (Murdiningrum & Handayani, 2021). The findings of this study support the argument that knowledge functions as an initial determinant but does not automatically translate into improved hygiene practices (Agustina et al., 2024). The gap between knowledge and action among adolescents also reflects broader developmental characteristics such as impulsivity and susceptibility to peer influence (Setiawan et al., 2023). This mismatch highlights the importance of multilevel interventions addressing cognitive, emotional, social, and environmental determinants of behavior simultaneously (Marlinawati et al., 2023). Therefore, PHBS improvement efforts must incorporate holistic behavioral strategies rather than relying solely on cognitive education (WHO, 2020).

The overall findings of this study emphasize the need for schools and policymakers to adopt comprehensive, adolescent-centered health interventions to strengthen PHBS behaviors effectively (Medise et al., 2024). This study supports global evidence that adolescent health programs must integrate knowledge-building, attitude-strengthening, and behavior-based reinforcement simultaneously (Barua et al., 2020). Schools need to implement consistent health education supported by practical demonstrations, peer-led activities, and structured routines to influence adolescent hygiene behaviors (Mideksa et al., 2024). Communities must also play a role by reinforcing healthy norms and providing supportive environments for adolescent development (Wandini & Angesti, 2023). Policymakers should design interventions that

address environmental infrastructure such as sanitation facilities to enable students to practice PHBS effectively (Badan Kebijakan Pembangunan Kesehatan, 2023). Health promotion programs should incorporate participatory methods that encourage adolescents to take active roles in shaping their hygiene practices (Amalia et al., 2023). Therefore, strengthening adolescent PHBS requires collaborative action across schools, families, communities, and health systems (WHO, 2020).

Conclusion and Recommendation

This study concludes that adolescents in SMP exhibit predominantly low knowledge and moderate attitudes toward Clean and Healthy Living Practices (PHBS), while their actual PHBS behaviors remain largely in the fair and poor categories. The findings demonstrate that knowledge alone does not significantly influence PHBS behavior, as supported by the nonsignificant Chi-Square results. The mismatch between knowledge and behavior suggests that adolescents require more than cognitive awareness to adopt consistent hygiene practices. Attitude appears to play a more meaningful role in shaping behavioral intentions, yet it also does not fully guarantee the adoption of healthy routines without adequate environmental reinforcement. These findings indicate that adolescent PHBS behaviors are influenced by multidimensional factors, including peer norms, family habits, school environment, and access to hygiene facilities. The study highlights the urgent need for comprehensive PHBS interventions that integrate cognitive, affective, and behavioral components to strengthen adolescent behavior change. Overall, the study underscores the importance of multi-level strategies in improving adolescent PHBS in accordance with broader public health goals.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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