

THE RELATIONSHIP BETWEEN KNOWLEDGE AND ATTITUDES AND SANITATION HYGIENE BEHAVIOR AMONG WORKERS ON CONSTRUCTION PROJECT X

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Abstrak

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Construction Workers

Diarrhea remains a global environmental health problem closely linked to poor hygiene and sanitation practices, including in the construction sector, which is characterized by intensive, dynamic work and is often accompanied by limited on-site sanitation facilities. This study aims to analyze the relationship between knowledge, attitude toward behavior, and perceived behavioral control (availability of sanitation facilities) and hygiene and sanitation behaviors among workers at Project X, using a modified Theory of Planned Behavior (TPB) framework that incorporates the knowledge antecedent. This is a quantitative, cross-sectional study conducted from April to July 2026. The sample consisted of 100 workers selected using accidental sampling based on inclusion and exclusion criteria. Data were collected using a TPB-based structured questionnaire that had been tested for validity and reliability, then analyzed univariately and bivariately using the Chi-Square test. The results showed that 54% of respondents had good knowledge, 50% had a supportive attitude, 51% had good perceived behavioral control, and 52% demonstrated good sanitation hygiene behavior. Bivariate analysis revealed a significant association between knowledge and sanitation hygiene behavior ($p=0.000$; $OR=5.429$; 95% CI: 2.302–12.799) and between attitude and sanitation hygiene behavior ($p=0.000$; $OR=6.641$; 95% CI: 2.769–15.927), whereas perceived behavioral control did not show a significant association with sanitation hygiene behavior ($p=0.423$; $OR=1.490$; 95% CI: 0.677–3.279).

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INTRODUCTION

Environmental health and clean living behaviors are critical factors in maintaining human health, particularly in high-risk work environments such as the construction sector. The nature of the work—which involves heavy physical activity as well as exposure to diverse and dynamic work environments—means that every activity in this sector has the potential to pose hazards to workers' safety and health. If not optimally controlled, these conditions can lead to work-related illnesses—health issues arising from exposure to physical, chemical, biological, ergonomic, or psychosocial risk factors in the workplace—which ultimately result in reduced productivity and increased economic burdens for workers, companies, and the nation (Wenas & Dwiseli, 2025). Unsanitary work environments and inadequate sanitation can serve as transmission vectors for various environment-related diseases (Rananda, 2025).

Diarrhea is one such environment-related disease that remains a global health issue to this day, with approximately 4 billion cases and more than 2.2 million deaths each year—the majority of which are linked to poor sanitation and inadequate hygiene practices (Aisiyah et al., 2022). The World Health Organization notes that approximately 842,000 deaths from diarrhea each year are caused by environmental factors such as unsafe drinking water, poor sanitation, and inadequate hygiene practices; in fact, more than half of the world's diarrhea cases are directly linked to these conditions (Preventing Diarrhea through Better Water, Sanitation, and Hygiene, n.d.). In Indonesia, limited access to clean water, inadequate sanitation facilities, and low awareness of personal hygiene are the main factors triggering diarrhea, with water quality, access to toilets, and handwashing habits proven to be significantly associated with the incidence of diarrhea (Rananda, 2025; Zain, 2025). National historical data has even recorded diarrhea incidence rates exceeding 400 per 1,000 people (Rasyidah, 2019), underscoring that this issue still requires serious attention.

Hygiene relates to individual behaviors in maintaining personal cleanliness, such as the habit of washing hands with soap, while sanitation relates to environmental conditions, including the provision of clean water. Poor hygiene and sanitation can lead to the contamination of food and water by pathogenic microorganisms, which are the primary causes of diarrhea (Simpang & Subulussalam, 2025). In construction projects, the risk of environment-related diseases such as diarrhea is higher because working conditions often involve limited sanitation facilities, such as a lack of access to clean water, inadequate toilet facilities, and low worker awareness of the importance of hygiene.

Based on the Theory of Planned Behavior (TPB) framework proposed by Ajzen (1991), individual behavior is shaped by behavioral intention, which is influenced by attitude toward behavior, subjective norm, and perceived behavioral control. In the context of this study, the TPB framework was modified by adding knowledge as an antecedent that shapes behavioral beliefs, which in turn shape attitudes toward sanitation hygiene behavior. Perceived behavioral control reflects workers' perceptions of the availability and ease of access to sanitation facilities at the project site; thus, when knowledge and perceived control are weak, good sanitation hygiene behavior is difficult to achieve.

Based on the above, the research questions for this study are: (1) Is there a relationship between knowledge and sanitation hygiene behavior among workers at Project X? (2) Is there a relationship between attitudes and sanitation hygiene behavior

among workers at Project X? and (3) Is there a relationship between perceived behavioral control and sanitation hygiene behavior among workers at Project X? This study aims to analyze the relationship between knowledge, attitudes, and perceived behavioral control on sanitation hygiene behavior among workers at Project X, and is expected to enrich scientific research in public health as well as serve as a basis for developing promotive and preventive programs for construction workers. The values of cleanliness examined in this study are also consistent with Islamic teachings, as mentioned in Surah Al-Baqarah, verse 222, and a hadith narrated by Muslim, which states that cleanliness is part of faith; thus, the implementation of hygiene and sanitation in the workplace is also part of efforts to maintain health based on religious values.

Several previous studies have shown that environmental factors also contribute significantly to the incidence of diarrhea. The availability of sanitation facilities and clean water has been shown to be associated with the incidence of diarrhea in the Sememi Community Health Center area of Surabaya (Studi et al., 2024), while the prevalence of diarrhea in populations with inadequate sanitation can reach approximately 29% (Yitageasu et al., 2025). Furthermore, the habit of not washing hands with soap is also a key factor that increases the risk of diarrhea in the community (Sinaga et al., 2022). These findings underscore the urgency of conducting research on hygiene and sanitation behaviors specifically among construction workers—a group that has received far less attention in studies compared to household populations or healthcare institutions.

In the context of labor regulations, workplace hygiene and sanitation are governed by Ministry of Manpower Regulation No. 5 of 2018, which defines hygiene as preventive health measures focused on individual health and behavior, while sanitation emphasizes the health of the human living environment (Ministry of Manpower et al., 2018). These provisions are reinforced by Director General's Decision No. 185 of 2019, which requires the availability of adequate toilets, handwashing stations, waste management, cleanliness of temporary structures, and control of project-related pollution and waste (KEPDIRJEN, n.d.). This regulation emphasizes that worker hygiene and the cleanliness of facilities or the work environment (sanitation) should be an integral part of the occupational safety and health (OSH) system in every construction project; therefore, compliance with these regulatory requirements must be accompanied by workers' understanding and a positive attitude to ensure effective implementation on-site.

LITERATURE REVIEW

Knowledge and Attitude toward Hygiene and Sanitation Behavior

Knowledge and attitude are widely recognized as essential determinants of health behavior because they influence how individuals perceive, evaluate, and respond to health-related information. Within occupational settings, particularly the construction industry, workers are frequently exposed to environmental hazards that increase their risk of infectious diseases resulting from poor hygiene and sanitation practices. Adequate knowledge regarding personal hygiene, handwashing, sanitation facilities, and disease prevention enables workers to recognize health risks and understand the importance of preventive behaviors. According to the Theory of Planned Behavior (TPB), knowledge serves as a foundation for behavioral beliefs, which subsequently shape an individual's attitude toward performing a particular behavior. Positive attitudes develop when individuals believe that practicing hygiene and sanitation provides meaningful health benefits and reduces occupational health risks. Previous studies consistently demonstrate

that workers with higher levels of knowledge tend to exhibit more positive attitudes and better hygiene practices than those with limited knowledge. Educational interventions, occupational health promotion, and continuous training have also been shown to improve workers' awareness and encourage sustainable behavioral changes. In construction environments, where working conditions are physically demanding and sanitation facilities may be limited, knowledge and favorable attitudes become even more important because they motivate workers to maintain personal cleanliness despite environmental constraints. Therefore, strengthening workers' knowledge through structured education and fostering supportive attitudes toward hygiene and sanitation should be considered fundamental strategies for preventing communicable diseases and improving occupational health outcomes. These concepts provide the theoretical basis for examining how knowledge and attitudes contribute to hygiene and sanitation behavior among construction workers.

Perceived Behavioral Control and Hygiene and Sanitation Behavior

Perceived Behavioral Control (PBC) refers to an individual's perception of the ease or difficulty of performing a particular behavior based on available resources, opportunities, and personal capabilities. Within the Theory of Planned Behavior, PBC is considered one of the primary determinants of behavioral intention and actual behavior because individuals are more likely to perform an action when they believe they possess sufficient control over its implementation. In occupational health settings, perceived behavioral control is closely associated with the availability of sanitation facilities, access to clean water, handwashing stations, and organizational support that enables workers to practice appropriate hygiene behaviors. Construction projects often present unique challenges because workers operate in temporary and dynamic environments where sanitation facilities may be insufficient or difficult to access. Although adequate facilities may facilitate healthy behaviors, previous research indicates that environmental resources alone do not always guarantee behavioral compliance. Individual motivation, knowledge, and attitudes frequently interact with perceived behavioral control in determining whether workers consistently practice hygiene and sanitation measures. Consequently, workplace interventions should not focus exclusively on improving physical facilities but should also strengthen workers' confidence, awareness, and commitment to maintaining hygienic behaviors. Integrating educational programs with adequate sanitation infrastructure can enhance workers' perceived ability to perform healthy behaviors while reducing environmental barriers. This comprehensive approach is expected to promote sustainable hygiene practices, minimize the risk of communicable diseases, and improve occupational health among construction workers operating in challenging workplace environments.

RESEARCH METHOD

This study is a quantitative study with a cross-sectional design, chosen because it aims to analyze the relationship between independent variables (knowledge, attitude, and perceived behavioral control) and the dependent variable (hygiene and sanitation behavior), all measured at the same point in time. This design is considered appropriate because the nature of the variables under study is conditional and situational; therefore, simultaneous measurement provides an accurate and relevant picture. The research was conducted at Project X site, which includes the active work area of a toll road construction project, over a four-month period from April to July 2026, covering the stages of

instrument preparation, field data collection, data processing, and analysis of research results.

The study population consisted of all workers actively employed at Project X during the study period, who were directly exposed to hygiene and sanitation conditions in the construction work environment. The sampling technique used was accidental sampling, which involved selecting workers who were present and met the inclusion criteria at the time of data collection, until the minimum sample size was reached. Inclusion criteria included active workers present at the project site during data collection, who had been working for at least one month, and who were willing to serve as respondents and complete the questionnaire in full after providing informed consent. Exclusion criteria included workers who were absent during data collection or unwilling to complete the questionnaire in full.

The sample size was calculated using the Lemeshow formula (1997) because the exact population size was unknown, based on the proportions P1 and P2 from previous studies for each variable: knowledge ($P1=0.385$; $P2=0.077$) resulted in $n=46$ (Hartini et al., 2022); attitude ($P1 = 0.80$; $P2 = 0.20$) resulted in $n = 15$ (Kurnianih et al., 2020); and perceived behavioral control ($P1 = 0.909$; $P2 = 0.091$) resulted in $n = 7$ (Regency et al., 2024). The largest minimum sample size (46, rounded to 45) was then doubled to 90 respondents, and 10% was added to account for missing data, resulting in a minimum sample size of 100 respondents.

Primary data were collected directly from respondents via a TPB-based structured questionnaire covering four main dimensions: knowledge (16 true-false questions), attitude (11 Likert-scale questions rated on a 1–4-point scale: strongly agree, agree, disagree, strongly disagree), perceived behavioral control (11 questions with response options “yes” = 1 and “no” = 0), and hygiene and sanitation behaviors (14 statements on a scale of always=3, sometimes=2, never=1, preceded by a question on handwashing frequency). The questionnaire also included respondent characteristics such as age, gender, highest level of education, and occupation.

Before use, the instrument was tested for validity and reliability to ensure that each item could measure the variables accurately and consistently. Based on the validity test, several items in the variables of knowledge, attitude, perceived behavioral control and sanitation hygiene behavior were deemed invalid and were subsequently revised to ensure they continued to represent the assessment indicators intended to be measured, given that these items are critical components in measuring sanitation hygiene. This step was taken to clarify the wording of the questions, align the content of the questions with the assessment indicators, and ensure that every component intended to be measured remains represented in the instrument, so that the measurement results can accurately reflect the actual conditions among the project workers who served as respondents.

Table 1. Summary of Operational Definitions of Research Variables

Variable	Definition	Measurement Tools & Methods	Measurement Results	Scale
Knowledge	Ability to answer correctly regarding hygiene and sanitation, including handwashing, use of sanitation facilities, and maintaining the work environment	A 12-item true-false questionnaire (true=1, false=0), scored by sum	Good: score ≥ 9 ; Fair: score 7–8; Poor: score < 7	Ordinal
Attitude (Attitude toward Behavior)	Respondents' assessment of the importance of implementing hygiene and sanitation practices in the workplace	A 13-item 4-point Likert scale questionnaire (SS=4, S=3, TS=2, STS=1; negative items reversed), summed	Supportive: median ≥ 25 ; Not Supportive: median < 25	Ordinal
Perceived Behavioral Control	Workers' assessment of how easy or difficult it is to practice hygiene and sanitation behaviors based on the availability of facilities	8-item Yes/No questionnaire (Yes=1, No=0), summed	Good / Not Good (median split)	Ordinal
Hygiene and Sanitation Behavior	Workers' actual actions in maintaining personal hygiene and the cleanliness of their daily work environment	Frequency questionnaire + 11 scale statements: Always=3, Sometimes=2, Never=1, summed	Good: score 24–30; Fair: score 17–23; Poor: score < 17	Ordinal

Table 1 presents a summary of the operational definitions for the four variables under study, which serve as a reference for the compilation and interpretation of the questionnaire scores in this study.

Table 2. Results of the Validity and Reliability Tests for the Research Instrument

Variable	Initial Number of Items	Number of Invalid Items	Range of calculated r-items (valid items)	Cronbach's Alpha	Final Number of Items
Knowledge	12	3 (P1, P5, P11)	0.350–0.793	0.725	12
Attitude	13	2 (S4, S12)	0.500–0.882	0.884	13
Perceived	8	0	0.352 - 0.795	0.707	8

Variable	Initial Number of Items	Number of Invalid Items	Range of calculated r- (valid items)	Cronbach's Alpha	Final Number of Items
Behavioral Control					
Hygiene and Sanitation Behavior	11	2(PHS10, PHS11)	0.373–0.915	0.847	11

Based on Table 2, all research variables showed Cronbach's Alpha values above 0.70, indicating that the instrument has a good level of internal consistency. Items identified as invalid (calculated r value less than the table r value of 0.361) were revised in terms of wording without altering the substance of the measured indicators; thus, all items were retained in the final instrument to ensure a complete representation of each TPB dimension under study.

This study adhered to research ethics by applying the principle of informed consent, whereby each prospective respondent was provided with an explanation of the study's objectives, procedures, and benefits, as well as their right to refuse or withdraw as a respondent before completing the questionnaire. The confidentiality of respondents' identities and data was safeguarded by using respondent codes on each questionnaire, and all collected data were used solely for the purposes of this study. The principle of voluntariness was also emphasized, given that data collection took place in an active work environment; thus, the researchers made every effort to ensure that workers' participation was not influenced by pressure from project management.

The collected data were processed through the following stages: editing (checking the completeness and consistency of the questionnaires), coding (assigning numerical codes to variables and response categories), data entry (inputting data into the SPSS statistical software), and cleaning (re-checking to detect missing values or data inconsistencies). Univariate analysis was conducted to describe the frequency distribution and percentages for each variable, while bivariate analysis was performed to test the relationship between each independent variable and the dependent variable. Since all variables were on an ordinal scale, the Chi-Square test was used with a significance level of $p < 0.05$.

RESULT AND DISCUSSION

Research Results

1. Overview of the Study Location

This study was conducted at an ongoing toll road construction project as part of transportation infrastructure development. This location was chosen because it features dynamic construction activity and involves many workers exposed to diverse on-site conditions, including earthwork, road structure construction, drainage, paving, and other supporting tasks. These conditions make the project site relevant for examining workers' hygiene and sanitation behaviors, particularly regarding knowledge, attitudes, and the availability of sanitation facilities—or perceived behavioral control.

2. Respondent Characteristics and Univariate Analysis

Table 1. Frequency Distribution of Worker Gender at Project X

Gender	Frequency (n)	Percentage (%)
Male	85	85.0
Females	15	15.0
Total	100	100.0

Of the 100 respondents, 85 (85.0%) were male and 15 (15.0%) were female, indicating that the respondents in this study were predominantly male workers, consistent with the nature of construction work, which generally requires physical labor.

Table 2. Frequency Distribution of Univariate Variables for Workers on Project X

Variable	Category	Frequency (n)	Percentage (%)
Knowledge	Good	54	54.0
	Fair	46	46.0
Attitude	Supportive	50	50.0
	Do Not Support	50	50.0
Perceived Behavioral Control	Good	51	51.0
	Not So Good	49	49.0
Hygiene and Sanitation Practices	Good	52	52.0
	Not Good	48	48.0

Table 2 shows that more than half of the respondents (54.0%) have a good level of knowledge regarding sanitation hygiene. Regarding the attitude variable, the proportion of respondents who support and those who do not support the implementation of sanitation hygiene was found to be equal (50.0%). Regarding the perceived behavioral control variable, the majority of respondents (51.0%) perceived the availability of sanitation facilities as “good,” although the difference from the “fair” category was relatively small. As for the sanitation hygiene behavior variable, more than half of the respondents (52.0%) demonstrated good behavior.

3. Bivariate Analysis

Table 3. Relationship Between Knowledge and Sanitation Hygiene Behavior

Project Workers' Knowledge x	Sanitation Hygiene Behavior		Total		P-Value
	Good		Fair		
	N	%	N	%	
Good	38	70.4	16	29.6	0.000
Not Very Good	14	30.4	32	69.6	
Total	52	52.0	48	48.0	

Based on Table 3, of the 54 respondents with good knowledge, 38 respondents

(70.4%) exhibited good hygiene and sanitation behavior, whereas of the 46 respondents with poor knowledge, only 14 respondents (30.4%) exhibited good behavior. The results of the Chi-Square test showed a p-value of 0.000 ($p < 0.05$) with an OR of 5.429 (95% CI: 2.302–12.799), indicating a significant association between knowledge and sanitation hygiene behavior among workers on Project X.

Table 4. Relationship Between Attitudes and Sanitation Hygiene Behavior

Attitudes of Project Workers	Sanitation Hygiene Behavior		Total		P-Value
	Supportive		Do Not Support		
	N	%	N	%	
Support	37	74.0	13	26.0	0.000
Not Supported	15	30.0	35	70.0	
Total	52	52.0	48	48.0	

Table 4 shows that of the 50 respondents with a supportive attitude, 37 respondents (74.0%) practiced good hygiene and sanitation, whereas of the 50 respondents with a non-supportive attitude, only 15 respondents (30.0%) practiced good hygiene and sanitation. The results of the Chi-Square test showed a p-value of 0.000 ($p < 0.05$) with an OR of 6.641 (95% CI: 2.769–15.927), indicating a significant association between attitude and sanitation hygiene behavior among workers on Project X.

Table 5. Relationship Between Perceived Behavioral Control (PBC) and Sanitation Hygiene Behavior

Perceived Behavioral Control	Sanitation Hygiene Behavior		Total		P-Value
	Good		Fair		
	N	%	N	%	
Good	37	74.0	13	26.0	0.000
Not Good	15	30.0	35	70.0	
Total	52	52.0	48	48.0	

Table 5 shows that of the 51 respondents with good PBC, 29 respondents (56.9%) exhibited good hygiene and sanitation behavior, while of the 49 respondents with poor PBC, 23 respondents (46.9%) exhibited good behavior. The results of the Chi-Square test showed a p-value of 0.423 ($p > 0.05$) with an OR of 1.490 (95% CI: 0.677–3.279), indicating that there is no significant association between perceived behavioral control and sanitation hygiene behavior among workers at Project X.

Discussion

1. Relationship Between Knowledge and Sanitation Hygiene Behavior

The study results show that there is a significant relationship between knowledge and sanitation hygiene behavior among Project X workers ($p = 0.000$; OR = 5.429; 95% CI: 2.302–12.799). This OR value indicates that workers with good knowledge are approximately 5.4 times more likely to practice good sanitation hygiene behavior compared to workers with less knowledge. This finding is consistent with the Theory of

Planned Behavior, in which knowledge serves as one of the foundations for the formation of behavioral beliefs that influence a person's attitude toward a particular behavior; individuals who understand the benefits of a behavior will more easily form positive beliefs and thus tend to apply them in their daily lives (Bosnjak et al., 2020). In the context of this study, workers who understand the importance of personal hygiene, the use of sanitation facilities, and disease prevention are more motivated to practice good hygiene and sanitation behaviors while at work. These results align with the study by Oriana and Intiyati (2025), which found that respondents with good knowledge tended to exhibit better sanitation hygiene behaviors compared to those with low knowledge, as knowledge serves as the initial factor shaping an individual's awareness of the importance of maintaining personal hygiene and a clean work environment.

2. The Relationship Between Attitudes and Sanitation Hygiene Behaviors

The results of the analysis showed a significant association between attitude and sanitation hygiene behavior ($p=0.000$; $OR=6.641$; 95% CI: 2.769–15.927). This OR value indicates that workers with a supportive attitude are approximately 6.6 times more likely to practice good sanitation hygiene behavior than workers with a less supportive attitude. These results are consistent with the study by Oriana and Intiyati (2025), which showed that a positive attitude toward hygiene and sanitation increases individuals' awareness of the need to consistently maintain personal and environmental cleanliness, as well as the study by Kurnianih et al. (2020), which found that individuals with positive attitudes are more likely to adopt healthy behaviors because they perceive such behaviors as beneficial to their health. These findings reinforce the role of attitude toward behavior as one of the primary determinants of behavioral intention within the Theory of Planned Behavior framework.

3. The Relationship Between Perceived Behavioral Control and Sanitation Hygiene Behavior

In contrast to the previous two variables, the analysis results showed that there was no significant association between perceived behavioral control and sanitation hygiene behavior ($p=0.423$; $OR=1.490$; 95% CI: 0.677–3.279). This finding indicates that workers' perceptions regarding the ease or ability to practice sanitation hygiene do not necessarily translate into actual behavior. These results are inconsistent with the study by Maraş (2024), which found that perceived behavioral control plays a role in explaining hand hygiene behavior among nursing students, where individuals who feel they have greater ability and control tend to be more capable of practicing hygiene behaviors. This discrepancy is likely due to the different characteristics of the construction work environment compared to the formal healthcare setting, where the availability of sanitation facilities does not necessarily correlate directly with compliance with hygiene practices; thus, factors such as knowledge and attitudes become more dominant than the perception of control over facilities. According to the basic TPB concept (Bosnjak et al., 2020), PBC describes an individual's perception of their ability and control to perform a behavior; the greater the perceived control, the higher the likelihood of the behavior being performed. However, in this study, this pattern was not statistically confirmed.

4. Theoretical and Practical Implications

Theoretically, the findings of this study reinforce the relevance of a modified Theory of Planned Behavior—which incorporates the construct of knowledge as an antecedent of attitude—in explaining sanitation hygiene behavior among construction workers, a work context that differs from the clinical or educational settings more commonly used

in previous TPB studies. The strong relationship between knowledge and attitude compared to perceived behavioral control indicates that, among construction workers, the cognitive and evaluative components of the TPB have a more dominant predictive power than the control component; thus, the modified TPB model with knowledge as an antecedent can be considered a more appropriate analytical framework for occupational health contexts in informal and semi-formal sectors such as construction.

Practically, these findings have important implications for occupational health and safety (OHS) management in construction project environments. Given that knowledge and attitudes have been proven to be key determinants, education-based intervention programs—such as periodic training, workplace health outreach, the placement of visual informational materials at strategic project locations, and peer education approaches led by foremen or senior coworkers—have the potential to be more effective in improving hygiene and sanitation behaviors than simply increasing the number of sanitation facilities without accompanying education. However, this does not mean that the provision of sanitation facilities is unimportant; the availability of such facilities remains a basic prerequisite that must be met in accordance with the provisions of Ministry of Manpower Regulation No. 5 of 2018, while the existence of these facilities must be accompanied by efforts to strengthen workers' knowledge and positive attitudes so that the available facilities are truly utilized to their full potential.

5. Research Limitations

This study has several limitations that should be considered in future research. First, some workers were not proficient readers, so the researcher had to help read the questionnaire questions to the respondents, which could potentially affect the objectivity of their answers. Second, the respondents' limited time to complete the questionnaire due to their heavy workloads required the researcher to wait for their free time, which could affect the completeness and accuracy of the

CONCLUSION

Based on the research findings and discussion regarding the relationship between knowledge and attitudes toward sanitation hygiene behavior among workers at Project X, it can be concluded that out of 100 respondents, 54.0% had a good level of knowledge, 50.0% held supportive attitudes, 51.0% had good perceived behavioral control, and 52.0% demonstrated good sanitation hygiene behavior. The results of the Chi-Square test indicate that knowledge is significantly associated with sanitation hygiene behavior ($p=0.000$; $OR=5.429$; 95% CI: 2.302–12.799), and similarly, attitude is significantly associated with sanitation hygiene behavior ($p=0.000$; $OR=6.641$; 95% CI: 2.769–15.927). In contrast, perceived behavioral control did not show a significant association with sanitation hygiene behavior ($p = 0.423$; $OR = 1.490$; 95% CI: 0.677–3.279). These findings confirm that knowledge and attitudes are the primary determinants of sanitation hygiene behavior among construction workers, whereas the mere availability of sanitation facilities is insufficient to promote good behavior without being accompanied by reinforcement of knowledge and positive attitudes.

Based on these findings, companies are advised to enhance their efforts to guide and monitor workers' adherence to sanitation hygiene behaviors through regular educational activities, outreach, and training on the importance of maintaining personal and workplace hygiene, in accordance with Law No. 1 of 1970 on Occupational Safety, which requires employers to provide a safe, healthy work environment free from factors

that may endanger workers' health. In addition, companies must provide sanitation facilities that meet standards, such as clean water, handwashing stations with soap, adequate restrooms, and sufficient waste disposal areas, in accordance with Minister of Manpower Regulation No. 5 of 2018 on Occupational Safety and Health in the Workplace.

Workers are encouraged to increase their awareness and compliance with hygiene and sanitation practices while on the job, such as washing their hands with soap before eating and after using the restroom, maintaining personal hygiene, and making optimal use of the sanitation facilities provided by the company. As for future researchers, this study is expected to serve as a reference, with a recommendation to explore other variables not yet examined in this study, such as subjective norms, social support from coworkers or supervisors, and organizational factors such as the company's occupational safety and health (OSH) policies, which have the potential to provide a more comprehensive picture of the determinants of hygiene and sanitation behavior among the construction worker population at various project sites.

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