

# Factors Associated with Wash Behavior Using Theory Of Planned Behaviour Among Adolescents in Islamic Boarding School

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## ABSTRACT

**Background:** The behavior of Handwashing with Soap (HWWS) is a method of hand hygiene maintenance that protects oneself and those around from diseases. However, the habit of washing hands with soap might not be a routine practice among adolescent students in maintaining daily personal hygiene. The purpose of this study was to analyze the factors related to HWWS behavior among the students of Islamic boarding school based on the Theory of Planned Behavior (TPB).

**Method:** This research was an observational study with a cross-sectional design. The sample consists of 104 students, aged 10 to 21 years old (53 male and 51 female) selected purposively. The data analysis conducted to assess the strength of relationships between four elements in the TPB and HWWS behavior as well using the contingency coefficient and Spearman correlation.

**Result:** The results of the study show that behavioral intention was strongly associated with HWWS behavior ( $C = 0.609$ ,  $p < 0.001$ ). Meanwhile, the four TPB elements had moderate level of associations ( $C = 0.484 - 0.594$ ,  $p < 0.001$ ). To conclude, efforts are needed to improve HWWS facilities and strengthen HWWS behavior through programs tailored to the students' characteristics and needs.

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## INTRODUCTION

Clean and healthy living behavior is a health practice that must be implemented to achieve optimal public health, and it should be carried out in various settings, including households and educational institutions such as Islamic boarding schools or usually referred to as pesantren in Indonesia, based on Law No. 17 of 2023 concerning Health, in Article 32 paragraph 3.(1) Clean and healthy living behavior in pesantren is practiced based on awareness as a result of learning, enabling the pesantren community to prevent diseases, improve health, and actively contribute to creating a healthy environment. One of the seven indicators of clean and healthy living behavior in pesantren set by the Indonesia government is the behavior of washing hands with soap (HWWS),(2) which is a simple, easy, and effective way to prevent various diseases by keeping hands clean from dirt and germs.

The implementation of HWWS supports the goals of the Sustainable Development Goals (SDGs), focusing on good health and well-being goals by ensuring

healthy lives and promoting well-being for all at all ages.(3) HWWS has the potential to prevent deaths, improve healthcare outcomes, and support progress in education, equality, and WASH (Water, Sanitation and Hygiene).(4) Proper HWWS can prevent various diseases including diarrhea, gastrointestinal illnesses, and respiratory illnesses.(5–7)

The incidence of diarrhea and acute respiratory infections remains a significant health issue in Indonesia. According to data from the Ministry of Health Republic Indonesia, in 2019, East Java ranked as the second-highest province for diarrhea cases, with a prevalence of 7.6%, and Surabaya City treated 78,463 cases, nearly 50% of the total diarrhea cases in East Java.(8) Meanwhile, for the incidence of acute respirator, data from the 2018 Indonesia Basic Health Research showed that East Java is among the top ten provinces with the highest number of acute respiratory infection cases according to the diagnoses of health care providers.(9)

The Indonesian government has launched the Healthy Living Community Movement or called

GERMAS (Gerakan Masyarakat Hidup Sehat) to raise awareness and enhance the community's ability to lead healthy lives, including in schools and pesantren.(10) The pesantren health center or also called "Poskestren" in Indonesia is a part of community-based health efforts in pesantren, focusing on promotive and preventive services under the guidance of the local Indonesia health center.(11,12) According to the Ministry of Health Regulation No. 1 of 2013, the goal of Poskestren is to achieve self-reliance among the pesantren community in practicing clean and healthy living behavior, including washing hand with soap.

Islamic boarding school "X" is one of the pesantren located in Surabaya City. According to the data obtained from the pesantren clinic, acute respiratory infection was the most common illness, which accounted for 45.4% of the total diagnoses among the top five diseases in December 2023. Additionally, preliminary interviews with the management of pesantren clinic in Islamic boarding school revealed that the most frequent health complaints include acute respiratory infections and diarrhea. The preliminary study indicated that 65% of the students still do not wash their hands with soap before eating, which aligns with the clinic doctor's findings on the low awareness of handwashing with soap among the students.

Maintaining personal hygiene such as handwashing with soap (HWWS) should be a routine habit to prevent diseases such as acute respiratory infections and diarrhea.(13) This study used the Theory of Planned Behavior (TPB) to analyze the factors influencing HWWS behavior among the students of the Islamic boarding school Assalafi Al-Fithrah. TPB explains that an individual's intention to perform a behavior is influenced by attitude, subjective norms, and perceived behavioral control. These three constructs synergize together to perform a behavior, and perceived behavioral control predicted to have direct link with the behavior.(14) The aim of this study is to analyze the factors related to HWWS behavior among the students of Islamic boarding school in Surabaya, Indonesia.

## **METHOD**

### **Design and Participants**

This study employed an observational design. The approach was quantitative with a cross-sectional research design. Independent and dependent variables were measured or collected simultaneously at the same time.

The population for this study included all students of Islamic boarding school "X" for the academic year 2023/2024 at the Wustho (similar to junior high

school) and Ulya (similar to senior high school) levels. The total number of students in these two levels is 2,874. Sample selection criteria included students residing in the pesantren and willing to participate by signing an informed consent form. The sample size was determined using the Lemeshow formula with an additional 10% to account for potential dropouts, resulting in a minimum sample size of 104. The sample comprised 53 students from the junior high school level and 51 students from the senior high school level. Sampling was conducted using non-probability sampling, specifically purposive sampling, based on the criterion of students residing in the pesantren. The study was conducted at Islamic Boarding School "X" in Surabaya over a period of 3 months, from March to May 2024.

### **Variables and Data Collection**

The dependent variable in this study is health behavior, specifically handwashing with soap among students, that measured using a questionnaire consisting of 8 items regarding handwashing before and after meals and during other activities. The scoring categories are as follows: for attitude toward behavior, negative = 9-12 and positive = 23-36; for subjective norms, weak = 7-13, moderate = 14-20, and strong = 21-28; for perceived behavioral control, weak = 9-17, moderate = 18-26, and strong = 27-36; and for behavioral intention, low = 5-9, moderate = 10-14, and high = 15-20. To test the validity and reliability of the questionnaire, validity and reliability tests were conducted with 67 out-of sample respondents. The results showed that the questionnaire for measuring four elements of TPB and HWWS behavior had coefficient correlations  $r > 0.240$  and Cronbach's alpha value 0.673 to 0,861, indicating that the questionnaire is valid and reliable.

Observations were conducted to assess the facilities for handwashing with soap (HWWS) in the pesantren (Islamic boarding school) environment and the procedures followed by students in performing HWWS. The statements in the observation were based on the HWWS 2020 Guidelines of the Ministry of Health, Republic of Indonesia. The condition of HWWS facilities at the boarding school that met the criteria was given a score of 1, while those that did not meet the guidelines were assigned a score of 0. The maximum total score was 12. Subsequently, the HWWS facilities were categorized as poor (scores ranging from 0 to 6) or good (scores ranging from 7 to 12).

In addition, observations were conducted to provide supplementary data using the 2020 HWWS Guidelines from the Ministry of Health Republic of Indonesia, which specify the facilities and the correct HWWS steps. Scoring was done using a Likert scale with

response options: never, rarely, often, and always. Behavior categories are classified as poor (score 8-15), adequate (score 16-23), and good (score 24-32).

The independent variables in this study include attitude toward behavior, subjective norms, perceived behavioral control, and behavioral intention regarding HWWS behavior among students. Attitude towards behavior is measured based on behavioral belief and outcome evaluation, subjective norms are assessed based on normative belief and motivation to comply, and perceived behavioral control is measured based on control belief and perceived power.<sup>(15)</sup> These variables, along with behavioral intention, are evaluated using a 4-point Likert scale. Positive questions use a scale where 1 represents ‘strongly disagree’ and 4 represents ‘strongly agree’, while negative questions use a scale where 1 represents ‘strongly agree’ and 4 represents ‘strongly disagree’.

**Data Analysis**

Statistical analysis was performed using IBM SPSS 25. Demographic variables were presented using descriptive statistics. Given the non-probability sampling method, bivariate analysis was used only to measure the strength of relationships between the variables studied. The strength of the bivariate analysis is based on the contingency coefficient (C) for nominal data and Spearman correlation for ordinal data. This study was approved by Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission (approval number 0257/HRECC.FODM/III/2024). During the study, we removed the identities of all respondents from the dataset.

**RESULT AND DISCUSSION**

The number of students who participated as respondents in this study was 104. The results of the study show the distribution of respondents' characteristics based on gender, age, and education level, which can be seen in Table 1.

As shown in the Table 1.2, the respondents consisted of 53 male students (51%) and 51 female students (49%). The majority of the students (78.8%) were aged 14-17 years old. In terms of educational level, 53 students (51%) were at the Wustho level (equivalent to middle school), and 51 students (49%) were at the Ulya level (equivalent to high school).

This research was an application of the Theory of Planned Behavior, consisting of attitude toward behavior, subjective norms, perceived behavioral control, behavioral intention and behavior. The variable *attitude towards behavior* was measured based on *behavioral belief* and *outcome evaluation*. In this study, there were 9 statements which were divided into 5 behavioral *belief statements* and 4 *outcome evaluation statements*. The category of *attitude towards behavior variables* was classified into 2 categories, namely negative and positive. *Subjective norms variables* were measured based on *normative belief* and *motivation to comply*.

In this study, there were 7 statements which were divided into 3 normative *belief statements* and 4 *motivational to comply statements*. The categories of *subjective norms variables* were classified into 3 categories, namely weak, moderate, and strong. The variable *perceived behavioral control* was measured based on *control belief* and *perceived power*.

**Table 1.** Respondent characteristics

Respondent Characteristics	n	%
<b>Gender</b>		
Male	53	51
Female	51	49
<b>Age</b>		
Early Adolescence	12	11.5
Middle Adolescence	82	78.8
Late Adolescence	10	9.6
<b>Education Level</b>		
Junior high school	53	51
Senior high school	51	49
<b>Total</b>	<b>104</b>	<b>100</b>

**Table 2.** Frequency distribution of Theory of Planned Behavior variables and HWWS behavior

Variable	n	%
<b>Attitude towards behavior</b>		
Negative	12	11.5
Positive	92	88.5
<b>Subjective norms</b>		
Weak	5	4.8
Moderate	24	23.1
Strong	75	72.1
<b>Perceived behavioral control</b>		
Weak	5	4.8
Moderate	33	31.7
Strong	66	63.5
<b>Behavioral intention</b>		
Low	4	3.8
Moderate	21	20.2
High	79	76.0
<b>Handwashing with soap behavior</b>		
Poor	10	9.6
Adequate	32	30.8
Good	62	59.6
<b>Total</b>	<b>104</b>	<b>100</b>

In this study, there were 9 statements which were divided into 5 statements of *control belief* and *perceived power* and 4 statements of *perceived power*. The category of *perceived behavioral control variables* was classified into 3 categories, namely weak, moderate, and strong. The behavioral *intention* variables in the study were classified into 3, namely low, moderate, and high.

In this study, there were 5 statements regarding the intention of students to carry out CTPS behavior. The category of hand washing behavior using soap (CTPS) in students was classified into 3, namely poor, adequate, and good. In the study, there were 8 statements regarding the daily behavior of CTPS students, which were compiled based on 5 important times of hand washing. The frequency distribution in each of these variables can be found in the following table 2.

Table 2. shows that the majority of the students have a positive attitude towards handwashing with soap (HWWS), with 92 students (88.5%) agreeing that HWWS is beneficial in preventing illness, while 12 students (11.5%) have a negative attitude. Most students (72.1%) have strong subjective norms regarding HWWS supported by their families and teachers, while fewer students (23.1%) and few students (4.8%) have moderate and weak subjective norms respectively. Strong perceived behavioral control is observed in 66 students

(63.5%), while 32 students (31.7%) have moderate control, and 3 students (4.8%) have weak control. High intention to perform HWWS is reported by 79 students (76%), with 21 students (20.2%) having moderate intention, and 4 students (3.8%) having low intention. A total of 62 students (59.6%) exhibits good HWWS behavior, 32 students (30.8%) show moderate behavior, and 10 students (9.6%) have poor behavior. Respondents most frequently perform HWWS after meals and least frequently after urination and before meals.

Table 3 shows that the strength of the relationships between variables in the Theory of Planned Behavior (TPB) in this study. According to Table 3, all relationships are positive. The strongest relationship is between students' behavioral intention and their HWWS behavior.

Observations in the Islamic boarding school show that the facilities for handwashing with soap (HWWS) facilities are fairly well-established, with 74 facilities distributed across various locations such as the canteen, the field, the mosque, and the classrooms. These facilities are equipped with running water from the municipal supply, educational posters, and trash bins. However, soap and hand dryers are not available at all facilities. Soap is a crucial component of HWWS facilities.(16)

**Tabel 3.** The correlation between four elements of Theory of Planned Behavior (TPB) variables with HWWS behavior

Variables		Coefficient	Strength of Relationship
Variable-1	Variable-2		
Attitude Towards Behavior	Behavioral Intention	0,484*	Moderate
Subjective Norms	Behavioral Intention	0,484*	Moderate
Perceived Behavioral Control	Behavioral Intention	0,594*	Moderate
Behavioral Intention	Hand washing with soap behavior	0,609*	Strong

Note = \*Significant at  $p < 0.001$

The observations also indicate that HWWS facilities are not evenly distributed on each floor of the dormitories, despite the importance of maintaining cleanliness in the dorms due to the high interaction among students, which increases the risk of disease transmission.(17) The availability of facilities and infrastructure, ease of access, as well as knowledge, beliefs, and behavior are barriers and enablers for someone to wash their hands with soap.(18)

The research findings indicate that there are more male than female respondents, reflecting the larger male population among the students. However, the majority of students with the highest ratings on each variable are female, who are generally more likely to engage in socially acceptable behavior.(19) The majority of respondents are aged between 14 and 17 years. Although age is very weakly related to attitudes, subjective norms, and perceived behavioral control, one study showed that the older someone is, the more likely they will access HWWS facilities.(20) Wushto's education level (junior high school equivalent) is more dominant than Ulya (high school equivalent). The Wustho (equivalent to junior high school) level of education is more dominant compared to the Ulya level (equivalent to senior high school). The relationship between educational level and HWWS behavior is very weak, as a study showed, some percentages of students do not practice HWWS despite having a higher education, in which, the role of a teacher as an educator to provide an example to their students has a very serious effect on the behavior of the students.(21)

Behavioral intention is an individual's tendency to perform a particular behavior, and in the Theory of Planned Behavior (TPB), intention is considered the best predictor of behavior.(22) Intention is influenced by attitudes towards behavior, subjective norms, and perceived behavioral control. In this study, the students' intentions showed a strong relationship with their HWWS behavior at school. Cross-tabulation results indicated that students with high intentions tended to exhibit good HWWS behavior. Correlation tests revealed a positive and strong relationship between intention and

HWWS behavior. These findings are consistent with the study showing high hand hygiene compliance occurs when behavioral belief is positive and control belief is strong, which influences intention.(23)

Attitude towards behavior refers to an individual's psychological tendency to respond favorably or unfavorably to a behavior.(22) In this study, the students' attitudes towards handwashing with soap (HWWS) were measured through their beliefs and evaluations of the outcomes associated with this behavior. The analysis results showed that the majority of students had a positive attitude towards HWWS, primarily because they believed that this behavior could prevent diseases. This positive attitude correlated with a high behavioral intention to perform HWWS, indicating a significant positive relationship between attitude and the student intention.(24)

Subjective norms refer to an individual's belief about the approval or disapproval of a behavior by those around them.(15) In this study, the subjective norms of students regarding handwashing with soap (HWWS) were measured through normative beliefs and motivation to comply with the people around them. The results showed that most students had strong subjective norms, particularly because they followed the habits and advice of their families and ustaz/ustazah. These strong subjective norms were positively correlated with the students' behavioral intention to perform HWWS, indicating that the stronger the subjective norms, the higher the students' intentions to act in accordance with those norms.(25)

Perceived behavioral control refers to an individual's sense of control over their ability to perform a behavior, including the factors that either support or hinder the behavior.15 In this study, the perceived behavioral control of students was measured and categorized as weak, moderate, or strong. The results showed that most students had strong perceived behavioral control regarding handwashing with soap (HWWS). The most common statement was that the availability of HWWS facilities encourages this behavior; the availability of facilities increases the likelihood of

handwashing.(26,27) Cross-tabulation revealed a positive and moderate relationship between perceived behavioral control and behavioral intention, with the highest correlation among these variables. Students with strong perceived behavioral control tended to have a high intention to perform HWWS, and indicating that perceived behavioral control is the strongest predictor of behavioral intention compared to attitude towards behavior and subjective norms.(28) Another study in Indonesia also found that students with high self-efficacy were more likely to have behavioral intentions twice as high as students with low self-efficacy.(29)

Limitations of this study include the use of non-probability sampling techniques, specifically purposive sampling, which makes the results not generalizable to the population. The sample was selected based on specific criteria without having a corresponding population list. Moreover, this study only examined demographic background factors (gender, age, and education level) within the Theory of Planned Behavior (TPB), despite the existence of many other background factors that could influence TPB variables.

## CONCLUSION

The majority of respondents in this study were male students aged 14 to 17 years and were at the Wustho education level. The study found that although handwashing facilities at the pesantren were generally adequate, the distribution of soap and hand dryers was not consistent across all facilities. Most respondents had a positive attitude towards the behavior, strong subjective norms, and strong perceived behavioral control. Additionally, the majority of students had a high intention to practice handwashing with soap (HWWS) and demonstrated good HWWS behavior. Correlational analysis revealed that the strongest relationship was found between intention and HWWS behavior. Routine mentoring and supervision by teachers can be carried out to form a habit of handwashing in students.

## Conflict of Interest

No potential conflicts of interest relevant to this article were reported.

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