International Journal of Multicultural and Multireligious Understanding

http://ijmmu.com
editor@ijmmu.com
ISSN 2364-5369
Volume 8, Issue 11
November, 2021
Pages: 96-103

Factors Analysis Related to Handwashing Behavior Among the Students to Prevent Third Wave Pandemic

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http://dx.doi.org/10.18415/ijmmu.v8i11.3064

Abstract

This study aims to developed a habit model of handwashing to identify the factors and variables influencing handwashing habits. Testing model of a set of empirical data collected from 160 randomly selected students of Mining Engineering students. Furthermore, the data was collected, sorted, and analyzed statistically using descriptive statistics and correlation tests. Data representation, validation, and data correlation were conducted in MS Excel and SPSS 20. Model testing showed no relation between knowledge and washing hand habit; attitude was strongly related with handwashing attitude (Pearson correlation value of 0.688), and clean water facilities had a moderate relationship with handwashing attitude (Pearson correlation value of 0.582). Testing of determination coefficient from the model showed that knowledge, attitudes, and clean water facilities contributed 56.2% from all variables relating to hand wash habit. Variable findings that influenced hand wash habits could be a suggestion for the decision-maker to arrange the policy of handwashing development in the campus to prevent the covid-19 virus.

Keywords: *Correlation test; Handwashing; Knowledge; Clean water; Attitude*

Introduction

A The covid-19 virus spread in Indonesia in almost two last years, and it is called a global health crisis (Yalcinkaya, Balay, & Senoglu, 2021). Virus spreading has been analyzed in many counties through several statistical methods (KUMAR, L, & ANBARASI, 2021). The experts expected that the covid-19 virus was easier to spread at low temperature and humidity, like the United States, China, Italy, and Spain, where these countries were experiencing severe attacks of covid-19 infection. Nevertheless, this virus has been spread in several sub-tropicals in dry and humid conditions, like Australia, Belgium, Brazil, Canada, Czech Germany, Mexico, and other sub-tropical countries. Moreover, this virus spread warm and tropical countries such as Indonesia, the Philippines, Ecuador, Malaysia, and Brazil, which caused very high infections and deaths (Giarno, 2021; Sari, Alfian, & Firdani, 2021).

It seems like other countries, Indonesia is one of the countries affected by the Covid-19 virus, and it affected various sectors, like health, economic, educational, socio-cultural, and tourism sectors (KHAIRULBAHRI, 2021; PUTERA, WAHYUNITA, & YUSUP, 2021). One of the impacts in the education field that was field by society was the online teaching-learning process, and it applied to the students at all levels, from kindergarten to university. Online learning could be a solution during the pandemic, but there were several weaknesses, such as the students would bore if the online method applied for a long time because the students could not interact with their friends (Munawaroh, Sarkadi, & Makmuri, 2021). In Indonesia, the Minister of Education and Culture Indonesia has given the schools and

parents options to conduct online or face-to-face teaching-learning processes for areas with low to moderate covid-19 transmission, and it must apply health protocols.

The stakeholders must apply strict health protocols during the face-to-face teaching-learning process during the pandemic. In ITATS, the students, especially mining engineering students, are the students who come from several cities in Indonesia, like Papua, Maluku, Sulawesi, Kalimantan, Nusa Tenggara, West Java, and other cities. Students from various cities in Indonesia would increase the possibility of Covid-19 spreading, which is currently subsiding. Therefore, stakeholders' behavior greatly affected the third wave pandemic on the campus—all health protocols to prepare face-to-face learning.

One of the health protocols helping prevent Covid-19 was washing hands to kill the virus stuck in the hands (Fakhira et al., 2021). Human skin is a media that can carry out delicate objects or viruses. The result showed that plant pollen could stick to hands around 0.36% - 2.74% after washing and drying our hands using WHO protocols (Hunt & Morawska, 2020). It described that the covid-19 virus had great potential to stick to hands and get into humans' bodies through the nose, mouth, eyes, and other body parts.

The size of the covid-19 virus makes this virus easy to attach to human skin, and research has been conducted to develop human behavior for covid-19 prevention. The study of patients' behavior suffered chronic diseases showed that 68% of patients participated in covid-19 prevention (Gautam et al., 2021). Another research explained that social media influenced the behavior of covid-19 prevention (Liu, 2021). Another researcher stated that someone's education influenced their behavior to the covid-19 prevention, but it was not influenced by knowledge and attitudes (Hossain et al., 2020). A previous study found several factors that could affect the behavior of covid-19 prevention, but it did not discuss the effect of several factors like knowledge, attitudes, and clean water facilities used for handwashing.

In the conceptual framework model, the additional clean water facilities were caused by clean water, a basic human need, including maintaining body hygiene. Handwashing must use clean water means it is free from contaminants, and the water has met the clean water quality standard (Kusdarini, Malik, Utamakno, & Budianto, 2021; Kusdarini, Purwaningsih, & Budianto, 2018; Kusdarini, Suyadi, Yanuwiyadi, & Hakim, 2019b, 2019a). The relation to the handwashing development using clean water on the campus, it must be noted that every policy was taken by campus management may not necessarily put into practice. Handwashing development was significant to discuss the factors that could influence the policy implementation (Kassas & Nayga Jr, 2021). The research result could be input for campus management to take the steps in hand wash development for the students.

Methods

The researchers developed the model of handwashing behavior by developing a conceptual framework (Figure 1) and hypotheses testing.

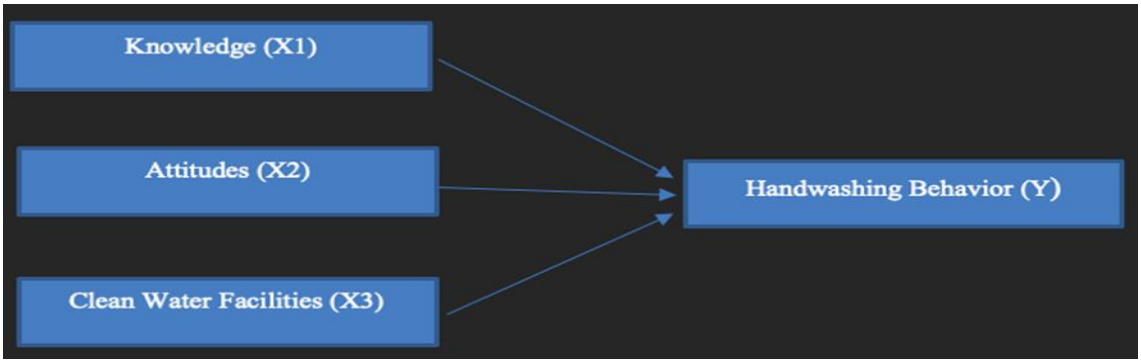

Figure 1 Conceptual Framework

Figure 1 showed that the conceptual framework consisted of 3 independent variables; knowable (X1), attitude (X2), clean water facilities (X3), and there was a dependent variable; handwashing behavior (Y). Every variable was developed into questions in the questionnaire (Eryanti, Danim, Yulistio, & Chandra, 2021). Furthermore, three hypotheses were tested in this study. There were:

H1: Knowledge correlated with handwashing behavior
H2: Attitude correlated with handwashing behavior
H3: Clean water facilities was correlating with handwashing behavior.

The research samples were students from Mining Engineering Department in Institut Teknologi Adhi Tama Surabaya, East Java, Indonesia. The samples were taken from 160 randomly selected societies and 300 randomly selected students of mining engineering. The amount of the samples has met the calculation based on *Slovin* Formula in equation (1) with an error margin was 5%, and the minimum was 114 people (Ryan, 2013).

$$n = \frac{N}{1+Ne^2} \quad (1)$$

n is sample numbers, N is population, and e is error margin.

There were 24 questions in the questionnaire about respondents' characteristics (8 questions), respondents' knowledge of Covid-19 (4 questions), respondents' attitude towards covid-19 (3 questions), clean water facilities (6 questions), and respondents' behavior to handwashing (3 questions). The questionnaire answers based on the Likert Scale were 1 (strongly disagree) to 4 (strongly agree). The validity was measured based on the p-value. Each question item was declared valid if the p-value was less than 0.05 (Sujarweni, 2015). Reliability was measured based on Cronbach's alpha, and the questionnaire was declared reliable if the value was more significant than 0.60 (Hair, Anderson, Tatham, & Black, 1998).

Model formations of hand wash behavior were conducted using hypotheses testing with correlation tests. There were closeness testing levels of 3 independent variables (X1 = knowledge; X2 = attitude; X3 = clean water facilities) to the dependent variable of handwashing variables. Correlation tests were looking at Pearson Correlation values and using SPSS 20 application (KUSDARINI, HAKIM, YANUWIADI, & SUYADI, 2021). In this test, the test was only to know the relationship of correlation test. Determination of the strength of the relationship is assessed if the value is close to 1 or -1. If the value is close to 0, the relationship between the two variables is weak. The relation could be positive, negative, or unrelated. Pearson Correlation was presented in Equation (2) (Djordjevic, Mane, & Krmac, 2021; Linke et al., 2020).

$$r = \frac{\frac{\sum_{i=1}^{n} x_i y_i}{n} - \hat{X} * \hat{Y}}{S_x * S_y} \quad (2)$$

r was Pearson Correlation Coefficient, $\hat{X} and \hat{Y}$ were the average of x and y, S_x was obtained from equation (3). S_y was obtained from equation (4).

$$S_x = \sqrt{\frac{\sum_{n=1}^{n} x^2}{n} - \hat{X}^2} \quad (3)$$

$$S_y = \sqrt{\frac{\sum_{n=1}^{n} y^2}{n} - \hat{Y}^2} \quad (4)$$

After the researchers obtained the Pearson correlation coefficient value, they conducted model testing by looking at correlation coefficient value and determination coefficient to determine the relationship between independent and dependent variables to the dependent variable.

Results and Discussion

The sample was 160 randomly selected students from Mining Engineering Department, Institut Teknologi Adhi Tama Surabaya, East Java, Indonesia. The sample was 72.5% for male students and 27.5% for female students. The sample aged 21 years was 24.4%. Respondents aged at least 17 years as much as 0.6%. Most of the samples lived in boarding houses of 67.5%, the samples who lived in their own houses were 26.9%, and the minority samples were the students who rented houses of 5.6%. Descriptive statistics of respondents' responses to questionnaire questions are presented in Table 1.

Table 1 Descriptive Statistics of Respondents' Responses

Variables	Min	Max	Mean	Std. Deviation
Knowledge	0.00	7.00	3.9313	0.65514
Attitudes	0.00	12.00	9.8437	2.23339
Clean Water Facilities	6.00	24.00	18.8750	2.97738
Handwashing Behavior	3.00	12.00	10.3000	1.95162

Validity testing showed that all questionnaire questions were valid with a p-value of 0 or less than 0.5 (Hair et al., 1998). Reliability testing explained that Cronbach's alpha variable was 0.632 – 0.916 or greater than 0.60. So that, the questionnaire was declared reliable (Hair et al., 1998). Hypothesis testing through correlation test was presented in Table 2.

Table 2 Correlation Test Results

		Knowledge	Attitudes	Facilities	Behavior
Knowledge	Pearson Correlation	1	0.263**	-0.156*	0.011
	Sig. (2-tailed)		0.001	0.049	0.887
	N	160	160	160	160
Attitudes	Pearson Correlation	0.263**	1	0.483**	0.688**
	Sig. (2-tailed)	0.001		0.000	0.000
	N	160	160	160	160
Facilities	Pearson Correlation	-0.156*	0.483**	1	0.582**
	Sig. (2-tailed)	0.049	0.000		0.000
	N	160	160	160	160
Behavior	Pearson Correlation	0.011	0.688**	0.582**	1
	Sig. (2-tailed)	0.887	0.000	0.000	
	N	160	160	160	160

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The correlation coefficient test (R) and the coefficient of determination (R2) are presented in Table 3.

Table 3 Correlation Coefficient (R) and Coefficient of Determination (R2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.749[a]	0.562	0.553	1.30460

a. Predictors: (Constant), Knowledge, Attitude, Facilities

The validity and reliability test of the questionnaire showed that a valid and reliable questionnaire could be an instrument to test the factor or independent variables to influence handwashing behavior, and

it was one of the practices to covid-19 preventive in campus area (Agarwal et al., 2021). Further, a hypothesis test was presented in Table 2, and Table 2 showed that H1 did not meet the requirement, H2 and H3 met the requirement because both attitudes and clean water facilities were significantly related (sig.< 0.05) to the handwashing behavior. Furthermore, H1 did not meet the requirement because knowledge did not significantly relate to handwashing behavior (sig. >0.05) (Table 2.). Testing strength of the model obtained correlation coefficient (R) and determination coefficient (R2). Correlation coefficient (R), the value was between 0.61 to 0.80 of 0.749, so the relationship between independent and dependent variables was strong (Hair et al., 1998). Next, the determination coefficient (R2) explained that the independent variable had a high contribution of 56.2% from all variables related to handwashing behavior (Table 3). The correlation test described that knowledge did not become strong enough to encourage the students to wash their hands. The students would wash their hands if given stimulus and clean water facilities (Notoatmodjo, 2003).

Handwashing behavior could be grown through simulation provisions like socialization, banners, and posters (S.Bashirian et al., 2020). Meanwhile, the availability of clean water facilities is the campus's responsibility. Campus managers could organize, cooperate, mobilize, and involve all stakeholders to foster an attitude of handwashing in students' life and it ensured clean water availability on the campus. The meaning of stakeholders were lecturers, education staff, cleaning staff, clean water providers, and parents of the students. It was following previous research related to the behavior of water treatment adoption, which was influenced by facility availability. Whereas, a person's attitude could be positive if he supported the importance of handwashing after stimulation like socialization and the availability of clean water (Kusdarini, Yanuwiadi, Hakim, & Suyadi, 2020). A clean water facility means a container filled with clean water, and it was completed with a faucet for handwashing which was placed in every corner of the campus and front of the class (Notoatmodjo, 2010). The research result completed previous research related to variables that affected the behavior.

Previous research explained that trust in the government could develop behaviors to carry out the policies from the government (Min, Shen, Yu, & Chu, 2020). A research result explains that fear and anxiety during a pandemic can affect people's compliance with health protocols (Qureshi, Saud, & Mahmood, 2020). Social media, official websites, and other online news sources positively affect pandemic prevention behavior (Farooq, Laato, Islam, & Isoaho, 2021). Educating adolescents' attitudes, subjective norms, and behavior control can improve COVID-19 prevention behavior (Miao, Im, Fu, Kim, & Zhang, 2021; Shukla, Mishra, & Rai, 2021; Sunhee Park PhD & Sumi Oh PhD, 2021)

Conclusion

The Pearson correlation test showed that the knowledge variable was not correlated with handwashing behavior. The attitude variable was strongly correlated with handwashing behavior (Pearson correlation value was 0.688). The clean water facility variable was moderately correlated with handwashing behavior (Pearson correlation value was 0.582). The model test described that the correlation coefficient (R) was 0.749, the overall correlation of the knowledge, attitudes, and clean water facilities on the variable of handwashing behavior were strong. The model test also explained a coefficient of determination (R2) of 0.562, so the contribution of knowledge, attitudes and clean water facilities to handwashing behavior was 56.2% from all variables that affected handwashing behavior; other variables influenced 43.8%. Because attitudes and clean water facilities were correlated with handwashing behavior, the implication was that campus managers could provide socialization to students through posters, banners, and socialization during lectures; provide clean water in front of the classroom and the campus corners, involving students in the process of installing posters, banners, and providing clean water facilities. Model completing could be done with further research to find out other variables which affected handwashing behavior. Next to preset a third wave pandemic in face-to-face learning. This research needed to be developed by making other models of pandemic prevention behavior, such as wearing masks, keeping the distance from others, staying away from crowds, and reducing mobility.

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