

## The Influence of Perceived Subjective Norms on Nurses' Hand Hygiene Behavior: Intention as an Intervening Variable

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### ABSTRACT

Hand hygiene is one effort to reduce the risk of Healthcare-Associated Infections (HAIs). Nurses' compliance with hand hygiene is still low. The study aimed to analyze the influence of perceived subjective norms on nurses' hand hygiene behavior through intention as an intervening variable. The type of study is observational analytic with a cross-sectional design. The sample was nurses at Hospital X in Jember Regency (116 respondents) using a total sampling technique. The results show that most of the respondents were aged 26 – 35 years (52.59%), male (56.03%), had a diploma (43.97%), and had a working period of 1 – 5 years (39.66%). Model analysis showed the model fit with good predictive relevance (SRMR = 0.090; NFI = 0.851; Q2 = 0.608). Perceived subjective norms and intentions could explain hand hygiene behavior by 74.6% ( $R^2 = 0.746$ ;  $f^2 = 0.146$ ). Perceived subjective norms positively affected hand hygiene behavior directly ( $p = 0.001$ ) and indirectly through intention ( $p = 0.001$ ). Perceived subjective norms can increase nurses' hand hygiene intentions and compliance. Leaders of health institutions can improve the nurses' perceived subjective norms through regular monitoring and evaluation to increase hand hygiene intentions and behavior and reduce the risk of HAIs and patient mortality.

**Keyword:** Behavior, Hand hygiene, Intention, Subjective norm

### ABSTRAK

Hand hygiene merupakan salah satu upaya dalam menurunkan risiko Healthcare-Associated Infections (HAIs). Tujuan penelitian adalah menganalisis pengaruh persepsi norma subjektif terhadap perilaku hand hygiene perawat melalui niat sebagai variabel intervening. Jenis penelitian adalah observasional analitik dengan desain cross-sectional. Sampel penelitian adalah perawat di rumah sakit X di Kabupaten Jember dengan besar sampel adalah 116 responden dengan teknik total sampling. Variabel adalah persepsi norma subjektif (independen), perilaku hand hygiene (dependen), dan niat (intervening). Data dikumpulkan dengan kuesioner dan dianalisis dengan analisis jalur SEM-PLS. Hasil penelitian menunjukkan sebagian besar responden berusia 26 – 35 tahun (52,59%), laki-laki (56,03%), berpendidikan diploma (43,97%), dan masa kerja 1 – 5 tahun (39,66%). Analisis model menunjukkan model fit dengan relevansi prediktif yang baik (SRMR = 0,090; NFI = 0,851; Q2 = 0,608). Persepsi norma subjektif dan niat mampu menjelaskan perilaku hand hygiene sebesar 74,6% ( $R^2 = 0.746$ ;  $f^2 = 0.146$ ). Persepsi norma subjektif berpengaruh positif terhadap perilaku hand hygiene secara langsung ( $p = 0.001$ ), maupun secara tidak langsung melalui niat ( $p = 0.001$ ). Persepsi norma subjektif dapat meningkatkan niat dan kepatuhan hand hygiene perawat. Pemimpin institusi kesehatan dapat meningkatkan persepsi norma subjektif perawat melalui monitoring dan evaluasi secara berkala sehingga dapat meningkatkan niat dan perilaku hand hygiene sehingga dapat menurunkan risiko HAIs dan mortalitas pasien.

**Kata Kunci:** Hand hygiene, Niat, Norma subjektif, Perilaku.

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## Introduction:

Healthcare-associated infections (HAIs) are a global problem that is currently a priority. The incidence of HAIs is still high in various countries, so this case becomes a burden on the country in the health sector. This problem does not only occur in developing countries; it also still appears in developed countries. Until now, no government has claimed that they are free from HAIs. At least seven out of 100 patients in hospitals in developed countries experience HAIs per day, while as many as one in 15 patients experience HAIs per day in developing countries (Centers for Disease Control and Prevention, 2021; World Health Organization, 2022). One effort to reduce the incidence of HAIs or nosocomial infections is to increase compliance with hand hygiene. However, the problem is that the hand washing compliance rate still needs to be lowered, namely 54.7% (World Health Organization, 2022). Likewise, the implementation of hand washing compliance in Indonesia is still far below the standard set by the Indonesian Ministry of Health, namely 85%, while the average performance of hand hygiene compliance in Indonesia is only 35% - 55.3% (Daulay et al., 2021; Handiyani et al., 2019; Kementerian Kesehatan RI, 2022).

The role of the policy leadership of health service institutions is vital to increase hand hygiene compliance. In this case, it is one of the duties and responsibilities of the infection prevention and control team. Data showed that infection prevention and control teams in health services, especially hospitals, already exist, but their role could be more optimal; supportive supervision activities are still at 47% (World Health Organization, 2022).

Previous studies stated several strategies regarding hand hygiene compliance, stating that role models or leadership roles are essential in increasing and maintaining hand hygiene compliance (Al-Maani et al., 2022; Daulay et al., 2021; Hammerschmidt & Manser, 2019; Handiyani et al., 2019; Krishnamoorthi et al., 2022).

Ajzen and Fishbein (2002) explain that subjective norms are social pressures from people considered necessary for carrying out or

not carrying out behavior. Behavior is closely related to the individual's internal intentions. Individuals will carry out a behavior if an intention precedes it. Intention or intention is a person's motivational factor in generating a behavior, and it is how strong a person's desire or belief is to behave (Glanz et al., 2015). Several previous studies stated that subjective norms influence hand hygiene behavior, which was previously preceded by the intention of health workers to implement hand hygiene. The better the subjective norm, the higher the hand hygiene behavior (Han & Choi, 2020; Park & Jang, 2019; Sands & Aunger, 2020; Sin & Rochelle, 2022). Other studies identified a significant negative relationship between subjective norms and hand hygiene behavior. The subjective norm component in other literature is considered weak (Rahimi et al., 2019). The study aims to determine the influence between subjective norms and hand hygiene behavior and the influence of intention as an intervening variable on subjective norms for hand hygiene

## Methods:

This research is an observational analytical study with a cross-sectional design conducted in June 2023 – August 2023. The inclusion and exclusion criteria were nurses at X Jember Hospital, with the inclusion criteria being (1) providing direct services to patients, (2) not off work or study assignment, and (3) being willing to be a respondent. The sample size was 116 nurses, using the total sampling technique. The research variables were perceived subjective norms, intention to hand hygiene, and hand hygiene behavior.

Data was collected using a questionnaire tested for validity and reliability by researchers in other locations with the same characteristics as the research location. The perceived subjective norm of the hand hygiene questionnaire was modified from the subjective norm questionnaire (Ismara et al., 2018), consisting of 6 items with a Likert scale of 1 – 4. The validity and reliability test results showed that the questionnaire is valid and reliable with  $r = 0.534 - 0.924$  Chronbach's

alpha = 0.910. Perceived subjective norms of hand hygiene were categorized as low (< 12), medium (12 – 18), and high (> 18). The intention to hand hygiene questionnaire was modified from the intention questionnaire (Ismara et al., 2018), consisting of 4 items using a Likert scale of 1 – 4. The validity and reliability test results show that the questionnaire is valid and reliable with  $r = 0.827 - 0.910$  and Chronbach's alpha = 0.890. Intention to hand hygiene was categorized as low (< 8), medium (8 – 12), and high (> 12). The hand hygiene behavior questionnaire was modified from the hand hygiene behavior questionnaire (World Health Organization, 2010) and consists of 12 items with a Likert scale of 1 – 4. The validity and reliability test results show that the questionnaire is valid and reliable with  $r = 0.550 - 0.960$  and Chronbach's alpha = 0.962. Hand hygiene behavior was categorized as low (< 24), medium (24 – 36), and high (> 36).

Data collection was carried out by direct interviews with respondents with the help of enumerators. Before collecting the data, potential respondents were given a general description of the research, objectives, benefits, and possible risks. Prospective respondents willing to become respondents are asked to sign an informed consent sheet. Data analysis used descriptive analysis with SPSS Version 25 software and inferential analysis in path analysis with SEM-PLS using SmartPLS Version 3.2.9 software. This study has received ethical approval from The health research ethics committee of the Faculty of Dentistry, Universitas Jember, with No. 1956/UN25.8/KEPK/DL/2023.

## Results: Respondent Characteristics and Study Variables

The study results show that most respondents were aged 26 – 35 years (52.59%), male (56.03%), education level was diploma (43.97%), work period 1 – 5 years (39.66%),

and had received hand hygiene training (82.76%). The research results also show that most respondents have perceived subjective norms of hand hygiene, intention to hand hygiene, and hand hygiene behavior in the high category (43.97%, 60.34%, and 60.34%)(Table 1).

**Table 1. Respondent Characteristics and Study Variables (n = 116)**

Characteristics	n (%)	Mean ± SD
<b>Age (years)</b>		
18 – 25	7 (6.03)	1.44 ± 0.498
26 – 35	61 (52.59)	
36 – 45	38 (32.76)	
> 46	10 (8.62)	
<b>Gender</b>		
Male	65 (56.03)	
Female	51 (43.97)	
<b>Education level</b>		
Diploma	51 (43.97)	
Bachelor in Nursing	23 (19.83)	
Registered Nurse	39 (33.62)	
Master	3 (2.59)	
<b>Work Period (years)</b>		2.92 ± 0.896
< 1	1 (0.86%)	
1 – 5	46 (39.66%)	
6 - 10	30 (25.86%)	
> 10	39 (33.62%)	
<b>Hand hygiene training</b>		
Once	96 (82.76%)	
Never	20 (17.24%)	
<b>Perceived subjective norm</b>		20.18 ± 2.945
Low	18 (15.52%)	
Medium	47 (40.51%)	
High	51 (43.97%)	
<b>Intention to hand hygiene</b>		14.59 ± 1.689
Low	28 (24.16%)	
Medium	18 (15.50%)	
High	70 (60.34%)	
<b>Hand hygiene behavior</b>		43.93 ± 5.095
Low	35 (30.18%)	
Medium	11 (9.48%)	
High	70 (60.34%)	



## Evaluation of Outer Model (Measurement Model)

**Table 2. Outer or Measurement Model Test Results**

Variable	Indicator	Outer loading	Cross Loading	AVE	Composite Reliability
Perceived subjective norm (X)	X1	0.798	0.798	0.758	0.862
	X2	0.938	0.938		
Intention to hand hygiene (Y)	Y1	1.000	1.000	1.000	1.000
Hand hygiene behavior (Z)	Z1	0.861	0.861	0.836	0.939
	Z2	0.946	0.946		
	Z3	0.934	0.934		

Table 2 shows that the variables and indicators for each variable are valid and reliable, with the outer loading value for each indicator  $> 0.5$ , meaning that the indicators used can explain the construct. The Average Variance Extract (AVE) value  $> 0.70$  and the cross-loading value  $> 0.70$  mean that the variable meets convergent and discriminant validity criteria. A composite reliability value  $>$

0.6 indicates that the construct used is reliable (Hair et al., 2016).

## Evaluation of Inner Model (Structural Model)

Structural model evaluation is used to determine the relationship between latent variables, namely model fit test, coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), and predictive relevance test ( $Q^2$ ) (Hair et al., 2016).

**Table 3. Inner or Structural Model Test Results**

Variable	Model Fit		$R^2$	$Q^2$	$f^2$
	SRMR	NFI			
Perceived subjective norm	0.090	0.851	0.366	0.353	Intention to hand hygiene
Intention to hand hygiene					0.576
Hand hygiene behavior					0.146
Hand hygiene behavior			0.746	0.608	1.211

Table 3 shows that the model prepared is fit (SRMR = 0.90  $<$  0.10; NFI = 0.851) with good relevant predictive value ( $Q^2 = 0.353$ ;  $0.608 > 0$ ). The value of  $R^2 = 0.366$  means that the perceived subjective norm variable can explain the intention to hand hygiene variable by 36.6% (moderate category), while other variables outside this study describe the remaining 63.4%. The value of  $R^2 = 0.746$  means that the variables' perceived subjective norm and intention to hand hygiene can explain the hand hygiene behavior variable

by 74.6% (strong category). In contrast, variables outside the study variables explain the remaining 25.4%. Based on the results of the effect size test, it can be seen that perceived subjective norms influence intention to hand hygiene in the large category ( $0.576 > 0.500$ ) and hand hygiene behavior in the small category ( $1.000 > 0.146 > 0.300$ ). The influence of hand hygiene intention on hand hygiene behavior is in the large category ( $1.211 > 0.500$ ).

## 1. Path Analysis and Significance Test

**Table 4. Results of path analysis and significance tests**

Variable	Path coefficient	t statistic	p values	Notes
Perceived Subjective Norm → Intention to Hand Hygiene	0.605	8.757	0.001	Direct effect, significant
Perceived Subjective Norm → Hand Hygiene Behavior	0.241	4.024	0.001	Direct effect, significant
Intention to Hand Hygiene → Hand Hygiene Behavior	0.696	11.823	0.001	Direct effect, significant
Perceived Subjective Norm → Intention to Hand Hygiene → Hand Hygiene Behavior	0.421	7.862	0.001	Indirect effect, significant

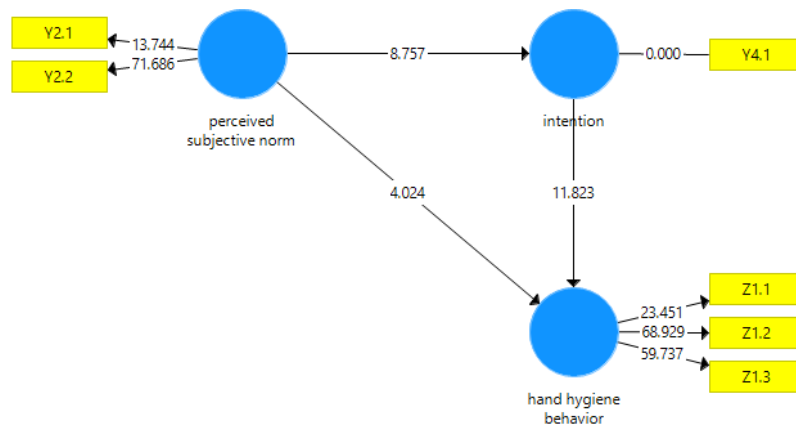


Figure 1. Path Analysis Model: The influence of perceived subjective norms on Hand Hygiene Behavior through Intention to Hand Hygiene

Table 4 and Figure 1 show that perceived subjective norms directly, positively and significantly influence intention to hand hygiene ( $t=8.757$ ;  $p=0.001$ ) and hand hygiene behavior ( $t=4.024$ ;  $p=0.001$ ). The intention variable also directly, positively, and significantly affects hand hygiene behavior ( $t = 11.823$ ;  $p = 0.001$ ). The results of the indirect influence test show that perceived subjective norms have a positive and significant indirect influence on hand hygiene behavior through intention to hand hygiene ( $t=7.862$ ;  $p=0.001$ ). It shows that the intention variable can mediate the perceived subjective norm and hand hygiene behavior variables with a positive relationship direction.

### Discussion:

#### The influence of perceived subjective norms on intention to hand hygiene

The study results show that perceived subjective norms positively and significantly influence the intention to hand hygiene (Table 4; Figure 1). The results of this study are consistent with several previous studies which stated that subjective norms influence a person's intention to take specific actions or behave. The role of someone considered necessary motivates a person to carry out particular actions desired by the person who is considered essential. In context, hand hygiene influences people who think it is required to affect a person's behavior when carrying out hand hygiene. Subjective norms are also defined as social pressure that is felt to do or

not do a specific behavior (Ajzen, 2020; Al-Maani et al., 2022; Bosnjak et al., 2020).

This study shows that perceived subjective norms affect hand hygiene behavior directly or indirectly through intention (Table 4). More specifically, the magnitude of the influence of perceived subjective norms has a moderate effect on the intention of hand hygiene (Table 3). One of the considerations may be due to the collective and exemplary nature applied in Indonesia, especially in the research hospital. The culture in Indonesia, which values respecting elders, for example, is a trigger for the strong influence of subjective norms on behavior. This finding also aligns with other research that states a strong relationship exists between subjective norms and hand hygiene behavior (Sin & Rochelle, 2022; Trifiletti et al., 2022). Information openness between leaders and staff influences the intention to behave. Staff involvement in decision-making increases staff intention and motivation so that it can increase responsibility for behavior (Sands & Auger, 2020). It is in line with the theory put forward by Ajzen and Fishbein (2008) that subjective norms influence intentions. Subjective norms consist of two indicators: beliefs about other people's expectations and motivation to achieve these expectations. When people consider it is essential to think that hand hygiene is a positive action, then this also positively influences someone to carry out this behavior, which is preceded by an intention (Ajzen, 2020; Bosnjak et al., 2020).

### **The influence of intention to hand hygiene on hand hygiene behavior**

The study results show that intention to hand hygiene positively and significantly affects hand hygiene behavior (Table 4; Figure 1). The study supports the theory put forward by Ajzen (2005) that a person's behavior is influenced first by intention. Intention can take the form of behavior or not, depending on the conditions. Intention is essential in encouraging someone to produce a behavior (Ajzen, 2020; Bosnjak et al., 2020). The study results align with previous studies showing that intention plays a vital role in a person's behavior. The higher a person's intention, the

higher the hand hygiene compliance behavior (Han & Choi, 2020).

The study results show that intention to hand hygiene influences hand hygiene in the large category (Table 3). This study follows the results of previous studies, which stated that the strongest predictor of hand hygiene behavior is intention (Aschwanden et al., 2021; Han & Choi, 2020; Sin & Rochelle, 2022). Intention and subjective norms increase hand hygiene behavior (Liddel et al., 2023; Sands & Auger, 2020; Sin & Rochelle, 2022). According to Ajzen and Fishbein (2005), a person behaves because it is preceded by intention. Intention can be empirically assessed and predicted through behavioral attitudes, subjective norms and perceived behavioral control. A large enough intention has been proven to give rise to behavior (Ajzen, 2020; Bosnjak et al., 2020).

The influence of attitudes, subjective norms and perceived behavioral control on intention can vary according to conditions because these three Theory of Planned Behavior constructs do not always make the same contribution. It could be that attitudes and perceptions influence intention in one particular situation, but in other conditions, subjective norms or the influence of people who are considered necessary trump a person's intention to behave. (Rosidah & Mahfiana, 2020). Someone can carry out a behavior because of other things. It could be because of subjective norms that motivate them to act. It could also be due to a person's perception that they are capable of carrying out the behavior, or the behavior arises because of a spontaneous attitude (Aschwanden et al., 2021; Rosdiana et al., 2023; Sin & Rochelle, 2022).

### **The influence of perceived subjective norms on hand hygiene behavior through intention to hand hygiene**

The research results show that perceived subjective norms positively and significantly indirectly influence hand hygiene behavior through intention to hand hygiene (Table 4; Figure 1). This study's results follow previous studies stating that perceived subjective norms influence a person's behavior. The success of a



program has a vital role for leaders (Han & Choi, 2020; Park & Jang, 2019; Sin & Rochelle, 2022).

One of the roles of the leadership of an institution in improving hand hygiene behavior is supervision. Supervision carried out by leaders of health institutions influences the habit of complying with hand hygiene in preventing infection (Al-Maani et al., 2022; Daulay et al., 2021; Hammerschmidt & Manser, 2019; Handiyani et al., 2019; Krishnamoorthi et al., 2022). The results of this study align with several other studies, including research conducted in Hong Kong, which states that positive perceived subjective norms can increase intentions and then increase hand hygiene behavior (Sin & Rochelle, 2022). Other studies conducted in Iran and the United States also identified that increasing subjective norms has a strong influence on a person's intention to take action, which ultimately has an impact on improving hand hygiene behavior (Aschwanden et al., 2021; Ghaffari et al., 2020). An intention precedes a person's behavior, so when an intention of behavior arises (Ajzen, 2020; Aschwanden et al., 2021; Bosnjak et al., 2020). An increase in perceived subjective norms will be followed by an intention to carry out hand hygiene behavior. Intention can mediate perceived subjective norms of behavioral control to carry out a behavior. The higher a person's intention, the higher the hand hygiene compliance behavior (Sin & Rochelle, 2022; Trifiletti et al., 2022).

### Conclusions:

Based on the study results, it can be concluded that perceived subjective norms directly influence hand hygiene behavior or indirectly through intention. The leader of a health service agency has a vital role in efforts to improve nurses' hand hygiene behavior by acting as a role model and carrying out continuous supervision. The study results also show that other variables can influence perceived subjective norms and intentions. Therefore, further study can be carried out by analyzing the influence of different variables on hand hygiene intention and behavior. Further studies can also be carried out in the form of interventions to increase perceived subjective

norms regarding nurses' hand hygiene behavior and prevent HAIs.

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