

## **Influencing Factors on Nurses' Hand Washing Compliance**

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### **ABSTRACT**

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Poor hand washing of nurses and unhealthy hospital environments contribute to the occurrence of nosocomial infections. Nurses who do not wash their hands before and after the procedure can become an intermediary for infection in patients at the service site or hospital and spread various multi-resistant organisms. This research aims to identify nurses' hand washing compliance and related factors. A descriptive correlation design was conducted in a hospital in West Java. Data on nurse characteristics and hand washing compliance were taken using a five moments test questionnaire cross-sectionally among nurses using the total sampling method and analyzed univariately and bivariately using descriptive analysis and the chi square test. A total of 67 nurses were involved in this research, the majority of respondents were aged 25-35 years (43/64.2%), women (42/62.7%), had a bachelor's degree (36/53.8%), had worked less than 5 years (42/62.7%), lack of knowledge (35/52.2%), and have a positive attitude (38/56.7%), generally do not comply with hand washing protocols (34/50.7%). The nurse's age is related to hand washing compliance ( $p\ 0.002 < \alpha\ 0.05$ ), while gender ( $p\ 0.242$ ), education ( $p\ 0.534$ ), length of work ( $p\ 0.874$ ), knowledge ( $p\ 0.907$ ), and attitude ( $p\ 0.397$ ) have  $\alpha$  value  $> 0.05$ . Nurses' hand washing compliance is still less than the target. Age is related to nurses' compliance in implementing hand hygiene. Meanwhile, gender, education, length of work, knowledge and attitudes are not related to nurse compliance. Efforts are needed to increase nurses' knowledge to increase nurses' compliance in washing hands.

**Keywords:** Compliance, hand washing, nurse

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## **1. INTRODUCTION**

Nosocomial infections are currently a major health problem in the world. Nosocomial infections are contribute to increasing mortality and morbidity rates for hospitalized patients. Data shows that as many as 15% of patients receive further treatment in hospital due to nosocomial infections [1]. Nosocomial infections develop due to an unhygienic environment originating from patients, hospital personnel, instruments and the hospital environment [2], [3]. The prevalence of nosocomial infections in developing countries can reach 19.1% compared to the incidence in developed countries of 3.5% [1], [4].

Nosocomial infections increase the financial burden for patients [1]. Patients with nosocomial infections are treated longer than they should be. Hospitals have to incur additional costs to provide antibiotic drugs and treatment costs. Patient visitors have the potential to become carriers after leaving the hospital. This condition can reduce public trust in hospitals and reduce the quality of hospital services [5]. Several studies show a relationship between hand hygiene of health care providers and the transfer of microorganisms that cause 40% of nosocomial infections and 50% of deaths. This is proven by the discovery of a large number of the same microorganisms between patients and hospital staff [6]. According to the World Health Organization (WHO), hand washing is an effective method for preventing nosocomial infections if carried out according to standards [7]. Hand washing must be done at 5 hand washing moments, namely before meeting the patient, before carrying out the procedure, after carrying out the procedure, after meeting the patient and after being exposed to the patient's body fluids [8].

Several previous studies reported several factors related to hand washing implementation. Internal factors include health workers' knowledge, work experience, education, attitudes, and negative impacts that arise such as dryness or skin irritation. External factors include the small number of health workers, the unavailability of facilities for washing hands, the absence of sanctions or warnings from supervisors, and workloads that are too high [9], [10], [11]. Failure to comply hand washing procedures can cause infections in hospital. Low compliance with hand washing can also spread various multi-resistant organisms [11], [12].

Hand washing practices according to WHO standards have been implemented since 2015 at our institution. However, there has been no evaluation regarding the level of nurses' compliance with hand washing protocols. This study aims to determine the level of nurses' compliance with hand washing and analyze the factors related to their compliance in implementing the hand washing protocol. The results of this research can be used as a basis for improving infection control management in hospitals. So it is hoped that it can improve the quality of health services in hospitals.

## 2. METHOD

This research is a correlative observational study using a cross sectional approach. The research was carried out at Cirebon Hospital, West Java, Indonesia in June 2024. The population in this study were nurses who worked at Cirebon Hospital when the research was conducted. The sample was taken using the total sampling method, namely 67 nurses. Inclusion criteria included working as a clinical nurse at Cirebon Hospital when the research was carried out, and being willing to be a research respondent. Nurses who were on leave, non-clinical nurses, and unwilling to take part in the study were excluded from the study.

The data taken is nurse characteristics data consisting of age, gender, education, length of work, knowledge, and nurses' attitudes towards hand washing protocols according to standards. The outcome measured is compliance with hand washing according to standards using a questionnaire related to five hand washing moments. The data obtained was then subjected to univariate and bivariate statistical analysis using descriptive analysis and the chi square test.

This research was carried out after obtaining permission and ethical review from the institution. All respondents were given information about the research and signed informed consent before the data collection process.

## 3. RESULTS AND DISCUSSION

### 3.1. Univariate Analysis

Table 1. Characteristic of the respondents (N=67)

	Characteristic	Results
Age (n/%) (year)	25-35	43/64.2
	36-45	24/35.8
Gender (n/%)	Male	25/37.3
	Female	42/62.7
Education (n/%)	Diploma	31/46.2
	Bachelor	36/53.8
Working experience (n/%) (year)	≤ 5	42/62.7
	> 5	25/37.3
Knowledge (n/%)	Poor	35/52.2
	Good	32/47.8
Attitude (n/%)	Negative	29/43.3
	Positive	38/56.7
Compliance (n/%)	comply	33/49.3
	not comply	34/50.7

A total of 67 respondents were involved in the research. Based on the data in table 1, it is known that the majority of respondents are between the ages of 25-35 years (43/64.2%), female (42/62.7%), have a bachelor's degree (36/53.8%), have worked for less than 5 years (42/62.7%), have insufficient knowledge (35/52.2%), and have a positive attitude (38/56.7%). Based on the results of observations, it was found that the majority of respondents did not comply with the hand washing protocol (34/50.7%).

### 3.2. Bivariat Analysis

Table 2. Data Analysis (N=67)

Characteristics	Comply		Not comply		p-value
	n	%	n	%	
Age (year)					
25-35	15	39.4	28	65.1	0.002*
36-45	18	75.0	6	25.0	
Gender					
Male	10	40.0	15	60.0	0.242
Female	23	54.8	19	45.2	
Education					
Diploma	14	45.2	17	54.8	0.534
Bachelor	19	52.8	17	47.0	
Length of working					
≤ 5 years	21	50.0	21	50.0	0.874
> 5 years	12	48.0	13	52.0	
Knowledge					
Poor	17	48.0	18	51.4	0.907
Good	16	50.0	16	50.0	
Attitude					
Negative	16	55.2	13	44.8	0.397
Positive	17	44.8	21	55.2	

Based on the data obtained in table 2, it is known that the majority of nurses who comply with the hand washing protocol are aged 36-45 years (18/75.0%), female (23/54.8%), have a bachelor's degree (19/ 52.8%), worked less than 5 years (21/50%), and had a negative attitude (16/55.2%). The length of work variable obtained a balanced value. Some nurses who worked for less than 5 years (21/50%) adhered to the protocol, and some (21/50%) did not. Likewise with the knowledge variable. It was found that 17 nurses (48.0%) complied with nurses who had good knowledge of hand washing protocols and 51.4% did not comply. The percentage of compliance among respondents with less knowledge was slightly higher, namely 50%. Compliance with hand washing among respondents who have a negative attitude is higher than respondents who have a positive attitude (55.2% vs 44.8%).

The relationship between variables is measured by analyzing the relationship between nurse characteristics and nurse compliance in washing hands. This relationship was analyzed using the chi square test. Based on the results of statistical calculations, it was found that the variables that had a significant relationship with hand washing compliance were the nurse's age ( $p\ 0.002 < \alpha\ 0.05$ ), while gender ( $p\ 0.242$ ), education ( $p\ 0.534$ ), length of work ( $p\ 0.874$ ), knowledge ( $p\ 0.907$ ), and attitude ( $p\ 0.397$ ) did not have a significant relationship ( $\alpha > 0.05$ ).

### DISCUSSION

This study aims to determine the level of nurses' compliance in carrying out hand washing protocols, and analyze related factors. Based on the data obtained, the majority of respondents were between the ages of 25-35 years, female, had a bachelor's degree, had worked for less than 5 years, had insufficient knowledge, and had a positive attitude. Nurses in hospitals are generally dominated by women. This is in accordance with several previous studies which also reported the same thing [13].

Based on the data in this study, it was found that not more than 50% of respondents complied with the existing hand washing protocol. The results of data analysis also show that age is related to hand washing compliance. Meanwhile, gender, education, length of work, knowledge and attitudes were not related to nurses' compliance with hand washing protocols.

Nurses' compliance with washing hands according to protocol is one of the essential things. Apart from the health and safety of patients, washing hands also aims to protect nurses themselves from disease transmission. Low hand washing compliance has been reported in several studies, mainly in Asia and Africa. The range of hand washing compliance among nurses varies between 14.9% to 36% [2], [14]. In this study, compliance was found to be higher than in previous studies, namely 49.3%. However, this level of compliance is still not enough to reduce nosocomial infections in hospitals. At least a hand washing compliance level of 60% is needed to achieve the target of reducing the number of nosocomial infections in hospitals [15].

Various conditions and circumstances can be the cause of health workers not complying with hand washing procedures, namely the number of health workers is not proportional to the high number of patients so that nurses often forget to wash their hands and wash their hands if they look dirty, they feel safe from the possibility of being infected by using gloves, the condition of infrastructure and the location of hand washing equipment are less strategic,

some health workers also complain of experiencing irritation from washing their hands too often [16]. To improve the quality of hand washing, nurses must be educated about the types of patient care activities that can result in hand contamination as well as the advantages and disadvantages of hand washing methods. In addition, health workers' compliance with recommended hand washing should be provided with information regarding their performance [17]. Continuous training, increasing infrastructure availability and optimizing monitoring make hand washing role models, or supervision can be an effective method in increasing hand washing compliance [18], [19].

Nurse characteristics related to hand washing compliance have also been widely studied. In this study, it was found that the age factor influenced nurses' hand washing compliance. The 36-45 year age group tends to be more compliant with hand washing protocols than the 25-35 year age group. A study reported that the young adult age group tends to be less compliant with hand hygiene than the middle adult age group [10]. This is different from the results of research in Africa which reported that age did not have a significant effect on hand washing compliance [13]. Increasing age will also cause the development of a person's thinking patterns and grasping power. Psychologically, maturity will increase with increasing age. Apart from that, increasing age also increases a person's ability to think, act and make decisions [17].

The level of education and knowledge in this study was found to have no significant relationship with hand washing compliance. Knowledge about hand hygiene in this study was dominated by insufficient knowledge. This was also reported in several previous studies [20], [21]. Theoretically, education influences the learning process. The higher a person's education, the easier it is for that person to receive information. With higher education, it tends to be easier to receive information both from other people and the mass media. Knowledge is closely related to education. The higher a person's education, the broader their insight and knowledge [22]. In this study, most respondents had undergraduate education, but this did not seem to increase their knowledge about hand hygiene. Even though knowledge is fundamental to changing nurses' awareness of practicing good hand hygiene. This is an important note for hospitals to increase nurses' knowledge through continuous training [18].

In this study, it was found that length of work was not related to nurses' compliance with washing hands properly. This was also reported by other research [13]. The on-the-job learning experience that is developed will increase knowledge and skills, and can develop the ability to make decisions. Nurses who have worked for a long time will know hand hygiene protocols better than nurses who have just started working [23]. A person understands the duties of a job based on the length of a person's work. The longer a person's working period, the more skilled they are at work.

In this study, it was discovered that female nurses tend to be more compliant than male nurses in carrying out hand hygiene. However, there was no significant relationship between gender and hand washing compliance. This was also reported by other research which stated that gender was not related to their knowledge, attitudes or compliance in carrying out hand washing procedures [13]. A study reports that women tend to have a better level of personal protection than men, including compliance with hand washing procedures [24].

Nurses with negative attitudes in this study were found to tend to be more compliant than nurses with positive attitudes. This can be caused by their lack of knowledge about good hand hygiene. However, attitude does not have a real influence on hand washing compliance. A study reported that age, gender, and length of work had no effect on a person's attitude towards hand washing procedures [13]. However, this is different from the results of other research which states that attitude is a predictor of good hand washing practices [25].

Nurses' compliance on washing hands properly must also be supported by awareness to protect themselves and patients from infectious materials. Washing hand also become an effort to prevent nosocomial infections. The nurses washing hands habits in hospitals is a fundamental behavior to prevent cross infection to improve the quality of health services [26].

#### 4. CONCLUSION

Nurses' hand washing compliance is still lacking. Age is related to nurses' compliance in implementing hand hygiene. Meanwhile, gender, education, length of work, knowledge and attitudes were not related to nurses' compliance with hand washing protocols. Strategic efforts are needed to increase nurses' knowledge and to increase nurses' compliance in washing hands.

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