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Nurses' knowledge and attitudes towards hand hygiene in Aceh, Indonesia: A correlational study among surgical nurses

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ABSTRACT

This study aims to thoroughly examine nurses' knowledge and attitudes about hand hygiene and investigate how these factors are related. Conducted in a hospital environment, the research aims to gather detailed information to help develop better hand hygiene practices among nurses. Healthcare-associated infections (HAIs) pose a global issue, impacting numerous people each year. However, consistent hand hygiene can greatly reduce these infections. Nurses are vital in preventing HAIs, and this study looks at the hand hygiene behaviors of thirty-three surgical nurses. The research involved collecting data through three questionnaires and analyzing it with the Pearson correlation test. The results revealed that the average knowledge score of the nurses was 11.6, and their average attitude score was 16.33. There was a strong correlation (r=0.688) between the nurses' knowledge and their attitudes towards hand hygiene practices. Moreover, a significant positive correlation (ρ-value of 0.000) was observed, indicating a meaningful relationship between knowledge levels and attitudes towards hand hygiene. The findings suggest that enhancing knowledge about hand hygiene results in a more positive attitude towards its practices. The role of the hospital ward manager is crucial in maintaining proper hand hygiene among staff. As a role model, supervisor, and evaluator, the ward manager significantly influences awareness and adherence to good hand hygiene practices. Additionally, the hospital should provide adequate support and resources to enable staff to perform hand hygiene effectively.

1. Introduction

Healthcare-associated infections (HAIs) are a significant health and safety concern worldwide (Chou et al., 2012; Cruz-López et al., 2023; Gidey et al., 2023). Several independent factors have been linked to these infections, including age over 65 years, admission to the emergency or intensive care unit (ICU), hospitalization for more than seven days, insertion of invasive medical devices, surgery, immunosuppression, and impaired functional or coma status (Allegranzi et al., 2011). Studies conducted by the World Health Organization (WHO) and other organizations indicate that HAIs affect between 5% and 15% of inpatients in developed countries, with up to 37% of patients in ICUs being affected (WHO, 2009; 2015). These infections can prolong hospital stays, lead to long-term impairment, and increase therapy and care costs for patients and their families (Putra et al., 2022a). Yousif et al. (2020) have identified the lack of adequate hospital facilities, absence of disease control teams, and insufficient personnel training as contributing factors to the high incidence of HAIs.

There has been a growing concern among healthcare providers, regulators, and patients about the incidence of infections acquired during treatment. These infections can lead to severe problems, such as increased morbidity, mortality, and treatment costs. Fortunately, there is increasing awareness that these infections can be prevented through basic infection prevention practices, such as hand hygiene (Chou et al., 2012). According to Sands and Aunger (2020), hand hygiene is an immediate step towards reducing the spread of infections in hospitals. However, despite its effectiveness, healthcare workers' compliance with hand hygiene is generally weak worldwide (Putra et al., 2022a). Following infection prevention and control measures

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is essential to ensure patients receive safe and appropriate care in all care areas. A recent study by Taryana et al. (2019) found that healthcare workers (HCWs) in the Neonatology Unit had a hand hygiene compliance rate of 74.5%. The study also revealed that HCWs complied with 83.3% of the designated hand hygiene moments before patient contact, 100% before completing aseptic procedures, 90% when exposed to body fluids, 74.5% after patient contact, and 42.2% after patient environmental contact. In addition, amidst the COVID-19 pandemic, the importance of hand hygiene has been brought to the forefront. Although the pandemic has created numerous challenges, it has also provided an opportunity to increase awareness about the crucial role of consistently washing hands and adopting healthy hygiene practices (Jacob and Srijayanth, 2021).

Ensuring proper hand hygiene is a critical precaution individuals can take to safeguard themselves against COVID-19 and its transmission during the pandemic (Putra et al., 2022b). It serves as a fundamental component of infection control, acting as the first line of defense against the spread of harmful microorganisms (Jacob and Srijayanth, 2021). Rhee et al. (2020) found that with rigorous infection control measures in place, hospital-acquired infections (HAIs) were infrequent during a pandemic. These findings offer valuable insights to other healthcare organizations and can reassure patients concerned about contracting COVID-19 while in the hospital. The survey results by Jacob and Srijayanth (2021) further support this claim, showing a significant reduction in HAIs during the COVID-19 pandemic. Consequently, it is safe to say that adhering to proper infection control protocols during the pandemic can effectively decrease the incidence of hospital-acquired infections.

In November 2021, a General Hospital in Banda Aceh, Indonesia, reported 23 cases of hospital-acquired infections (HAIs), with eight cases occurring in the surgical inpatient ward. These findings are consistent with previous studies on HAIs at RSUDZA Banda Aceh in 2016. The study showed that the leading causes of HAIs were Ventilator-Associated Pneumonia (VAP) at 19%, Primary Blood Flow Infection (IADP) at 12%, Urinary Tract Infection (UTI) at 1%, and Surgical Wound Infection at 1%. Therefore, nurses must play a significant role in reducing the number of hospital-acquired infections by utilizing their knowledge and skills to facilitate patient recovery while minimizing infection-related complications.

Practicing good hand hygiene is a crucial and effective method for curbing the transmission of infections. The WHO (2009, 2015) offered valuable guidelines that must be adhered to for optimal protection against infections. Nurses hold a critical responsibility in halting the spread of infections and maintaining patient safety (Putra et al., 2022b) by consistently performing the six steps of hand hygiene at the five essential moments (Before Touching a Patient, Before Clean/Aseptic Procedures, After Body Fluid Exposure Risk, After Touching a Patient, and After Touching Patient's Surroundings), as recommended by the WHO (Chou et al., 2012; Putra et al., 2022a). They are essential in reducing the incidence of hospital-acquired infections and supporting patient recovery by minimizing infection complications. To achieve this, nurses must utilize their knowledge and competencies in the nursing practice (Putra et al., 2022a). In this study, we aim to investigate nurses' knowledge and attitudes towards hand hygiene in one of the hospital rooms where infection rates are high and explore the correlation between these two variables.

2. Methodology

2.1. Study design and instrument

A cross-sectional study design using descriptive correlation (Sugiyono, 2018) was conducted in a research study analyzing data collected from thirty-three surgical nurses. The data collection process was carried out between May and June 2019, and three measuring instruments were utilized during the study. First, a demographic questionnaire will be used to identify the characteristics of respondents, including age, gender, education, work period, and infection prevention and control training. Second, a questionnaire on nurses' knowledge about hand hygiene was developed using WHO concepts (Chou et al., 2012; WHO, 2015). The Nurse Knowledge Instrument comprises a series of 15 multiple-choice questions, each with a score of 1 for correct answers and 0 for incorrect responses. The total score on the instrument ranges from 0 to 15, providing a comprehensive measure of knowledge and understanding in nursing.

Third, the attitude of nurses towards adhering to hand hygiene protocols was assessed by closely monitoring their performance in applying five-moment hand hygiene and six-step handwashing. The WHO has established guidelines for both these protocols, and this assessment tool consists of 11 checklists based on them (WHO, 2009, 2015). Each nurse was observed three times before and after performing nursing or other collaborative actions. The observation was done to check if the nurse followed the recommended protocols. The score was 1 (if applied) or 0 (if unapplied), and the overall score ranged from 0 to 33. By employing this approach, the researchers could accurately assess the nurses' adherence to hand hygiene protocols. This information could help identify areas that require improvement and develop interventions to reduce the risk of HAIs.

2.2. Instrument test

Before the data was collected, the researcher conducted rigorous instrument tests to ensure the instrument's validity and reliability. Firstly, we used

Experts in their respective fields to review the questionnaire to ensure its validity (Face Validity). After being declared valid, a product-moment validity test was conducted, and the calculated r-value was 0.632, indicating the questionnaire's reliability and validity (Sugiyono, 2018). Additionally, the questionnaire underwent a reliability test, with the Cronbach Alpha being 0.920, demonstrating its reliability (Arikunto, 2013).

Finally, the researchers utilized the Kappa statistical test to verify that the data collectors' perceptions aligned with their own. A Kappa coefficient value of over 0.6 or a p-value of less than 0.05 would indicate a shared perception. Conversely, a Kappa coefficient value below 0.6 or a p-value exceeding 0.05 would suggest a difference in perception. This study yielded a Kappa coefficient test value of 0.800 and a p-value of 0.010. These outcomes demonstrate that the Kappa coefficient exceeds 0.6, and the p-value is below 0.05, indicating that the researchers and data collectors share similar perceptions and that there is no significant difference between them. In summary, the study provides a comprehensive account of the data collection process, measuring instruments used, and the questionnaire's reliability and validity.

2.3. Data analysis

In this study, we processed both univariate and bivariate data. Firstly, we used a computer application to conduct univariate data processing, which provided a comprehensive description of the demographic data of nurses (Sugiyono, 2018). Through this process, we also obtained an overview of nurses' knowledge and attitudes towards Hand Hygiene.

Secondly, to ensure that the data was normally distributed, we conducted the Shapiro-Wilk test, which confirmed that the data met the normality assumption. Then, we conducted the Pearson correlation test to determine the correlation between knowledge and attitudes (Arikunto, 2013; Sugiyono, 2018). This thorough investigation facilitated a more profound comprehension of the correlation between variables and the revelation of noteworthy discoveries. The knowledge obtained can aid decision-making and direct future research endeavors (Sugiyono, 2018). Finally, we interpreted the strength of the Pearson correlation relationship and presented it in Table 1.

3. Results

3.1. Characteristics of respondent

Table 2 of the study reveals some intriguing discoveries. It indicates that the most significant respondents were women in early adulthood (72.7%) who had obtained a Diploma in Nursing education (69.7%), meaning they were likely in their twenties or thirties and held a diploma in nursing. Notably, most nurses had less than a decade of experience (90.9%), hinting at a relatively youthful workforce in the area. Moreover, almost all surveyed nurses had undergone infection prevention and control training (81.8) while employed in hospitals. This finding is significant because it implies that hospitals in the region are taking measures to decrease the likelihood of HAIs. Overall, the study's findings offer a valuable glimpse into the nursing workforce in the area and underscore the significance of ongoing training and development for ensuring the provision of top-quality healthcare services.

Table 1: Pearson correlation relationship

Coefficient interval	Correlation strength
0.00	No correlation
0.01-0.09	Correlation is meaningless
0.10-0.29	Weak
0.30-0.49	Moderate
0.50-0.69	Strong
0.70-0.89	Very strong
>0.90	Close to perfect correlation

Table 2: Characteristics of respondent

Characteristic	Frequency	%
Age		
Late adolescence (17-25)	5	15.2
Early adult (26-35)	24	72.7
Late adults (36-45)	4	12.1
Gender		
Woman	24	72.7
Man	9	27.3
Education		
Diploma	23	69.7
Bachelor	10	30.3
Work period		
< 10 Years	30	90.9
> 10 Years	3	9.1
Infection prevention and control training		
Once	27	81.8
Never	6	18.2

3.2. Nurses' knowledge and attitudes towards hand hygiene in hospitals

As illustrated by the findings in Table 3, the mean value of nurses' attitudes is 16.33, indicating a predominantly positive outlook towards their work. Notably, this mean value is higher than the mean value of nurses' knowledge, suggesting that nurses possess a stronger positive disposition towards their work than their level of knowledge. Additionally, the standard deviation for attitudes is 5.616, reflecting a considerable variation in nurses' attitudes towards their work. These insights could be instrumental in identifying areas where additional training or support might be helpful to ensure that nurses maintain a positive and productive attitude toward their work (Deepak et al., 2020; Jacob and Srijayanth, 2021).

Table 3: Nurses' knowledge and attitudes toward hand hygiene in hospitals (n=33)

Variable	Mean	Min-Max	SD
Knowledge	11.61	8-15	1.676
Attitude	16.33	6-31	5.616

3.3. Practicing hand hygiene according to five moments and six steps of handwashing

The information presented in Table 4 indicates that most hospital nurses exhibit a favorable attitude toward practicing proper hand hygiene. This assumption is substantiated by the fact that every participant (100%) in the study reported correctly washing their hands during moments 2, 3, and 4 and effectively executing the initial two stages of the handwashing process. Nevertheless, it is crucial to promote awareness among nurses concerning the importance of hand washing, particularly given that 27.3% failed to wash their hands before coming into contact with a patient, and 18.2% neglected to do so after touching the patient's surroundings. Such revelations can potentially increase HAIs and compromise patient safety (Putra et al., 2022a).

3.4. Correlation of knowledge and attitude of nurses in the application of hand hygiene

The evidence in Table 5 points to a strong correlation between knowledge and attitude, with a positive direction (r=0.688). The value of Sig (2-tailed) confirms the statistical significance of this relationship is 0.000 for knowledge and attitude, which is less than 0.05. This result suggests a high probability that the correlation is not due to chance but rather a genuine connection between knowledge and attitude. In other words, as knowledge levels increase, attitudes towards the subject in question will also improve. This finding could have significant implications for organizations or individuals who wish to enhance attitudes toward a particular subject or area of knowledge (Deepak et al., 2020; Mohaithef, 2020).

Table 4: Overview of the practicing of hand hygiene nurses in hospitals (n=33)

Five moments hand hygiene	Category	Frequency	%
Before touching a patient	Applied	24	72.7
	Unapplied	5	27.3
Before clean/Aseptic procedures	Applied	33	100
After body fluid exposure risk	Applied	33	100
After touching a patient	Applied	33	100
After touching the patient's surroundings	Applied	27	81.8
	Unapplied	6	18.2
Six steps of handwashing			
Rub hands palm to palm	Applied	33	100
Right palm over left dorsum with interlaced fingers and vice versa	Applied	33	100
Palm to palm with fingers interlaced	Applied	32	96.9
	Unapplied	1	3.1
Backs of fingers to opposing palms with fingers interlocked	Applied	28	84.8
	Unapplied	5	15.2
Rotational rubbing of left thumb clasped in right palm and vice versa	Applied	28	84.8
	Unapplied	5	15.2
Rotational rubbing, backward and forwards, with clasped fingers of the right hand in the left palm and vice versa	Applied	29	87.8
	Unapplied	4	12.2

Table 5: Correlation of knowledge and attitude of nurses in the application of hand hygiene

		Knowledge value	Attitude value
Knowledge	Pearson correlation sig (2-tailed)	1	0.688**
Attitude	Pearson correlation sig (2-tailed)	0.688**	1

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

4. Discussion

According to a recent study, the average score for nurses' hand hygiene knowledge is 11.61 out of a possible 15. This indicates that nurses' knowledge level is relatively high, with a strong understanding of the best practices for maintaining hand hygiene (Baier et al., 2020). The results suggest that nurses are well-equipped to promote and maintain high standards of hygiene in healthcare settings, which is essential for preventing the spread of infectious diseases (Putra et al., 2022a).

Deepak et al. (2020) conducted a study to evaluate the knowledge and perceptions of hand hygiene among healthcare professionals (dental students, trainee nurses, and medical and technical assistants in training) with varying levels of education. The study discovered that nurses possess a moderate level of knowledge concerning hand hygiene, while dental students, trainee nurses, and medical and technical assistants in training were also included in the study. The research illuminated that healthcare professionals often make assumptions regarding non-compliance with hand hygiene (Deepak et al., 2020). The study found that healthcare professionals frequently neglect or forget hand hygiene (Baier et al., 2020).

A recent study has highlighted a significant gap in knowledge and training regarding hand hygiene in the healthcare industry (Deepak et al., 2020). To address this issue, it is recommended that healthcare professionals at all levels receive comprehensive education on the topic, including proper techniques to follow. This assumption emphasizes the importance of raising awareness and educating on the significance of practicing proper hand hygiene in healthcare settings (Putra et al., 2022a). Jacob and Srijayanth (2021) identified several obstacles to maintaining hand hygiene, such as low sensitivity, inadequate practice, limited resources, and inadequate facilities. Therefore, ensuring that nurses comply with hand hygiene protocols is crucial. This finding is consistent with Sofiana et al. (2020)

research, which demonstrated a significant relationship between knowledge and hand hygiene adherence (p=0.001).

The average attitude score for nurses regarding hand hygiene is 16.33 out of 33, indicating that most nurses hold a positive perspective on the importance of good hand hygiene practices. However, there is room for improvement, as the maximum score was 33, indicating that not all nurses fully embraced these practices. According to Mohaithef's (2020) study, 65.4% of nurses demonstrated appropriate hand hygiene practices, while 10.3% showed inappropriate practices. These results suggest that despite positive attitudes, some nurses do not always follow good hand hygiene practices (Putra et al., 2022b). Moreover, the study found that women (88%) had significantly higher rates of good hand hygiene practices than men (44%) (Mohaithef, 2020). This finding highlights the need to consider gender-specific approaches in hand hygiene education and training programs.

Additionally, the study by Deepak et al. (2020) suggested that hand hygiene awareness and education can improve healthcare workers' attitudes and practices to reduce HAIs. This study emphasizes the importance of ongoing training and education programs to ensure that healthcare workers consistently follow good hand hygiene practices (Putra et al., 2022a). Overall, while the findings indicate that nurses generally hold a positive attitude toward hand hygiene practices, improved compliance is still needed. Gender-specific training programs and ongoing education and training efforts can help to enhance hand hygiene practices among healthcare workers, minimize the risk of HAIs, and ultimately improve patient outcomes (Deepak et al., 2020; Jacob and Srijayanth, 2021).

The study observed six steps of handwashing among nurses and discovered that the initial two steps were executed with 100% precision. The third step, which entails rubbing the inside of the fingers, was accurately performed by 96.9% of the nurses. The fourth stage, which necessitates a locking movement, was executed by 84.8% of the nurses. Similarly, the fifth stage, which involves cleaning gaps and thumbs in a circular motion, was also performed by 84.8% of the nurses. The sixth stage, which involves rubbing fingertips against the palms in a counterclockwise circle, was well-executed by 87.8% of the nurses. In conclusion, the results indicate that most nurses perform hand hygiene's first and second stages exceedingly well. However, for the fourth to sixth stages, there were instances where approximately 3-15.2% of nurses failed to execute the hand hygiene steps correctly (refer to Table 4).

During the observation of hand hygiene practices, it was noticed that nurses tended to wash their hands less frequently before contacting patients and more frequently after treating them. This finding could indicate a lack of awareness of the importance of hand hygiene before contact and a heightened awareness of the need for cleanliness after treatment to prevent the spread of germs and infections (Putra et al., 2022a). Hand hygiene is a critical aspect of healthcare, but unfortunately, not all healthcare workers take it seriously (Taryana et al., 2019). According to a recent study by Putra et al. (2022a), most healthcare workers do not fully implement hand hygiene in all five necessary moments. The study revealed that only 25% of the respondents adhered to the recommended guidelines for hand hygiene, while the remaining 75% did not fully apply them.

Moreover, the study also highlighted that nurses, in particular, were less attentive to hand hygiene before patient contact and in maintaining aseptic conditions. This result is concerning, as HAIs can have severe consequences for vulnerable patients (Chou et al., 2012). Healthcare workers must take hand hygiene seriously and follow the recommended guidelines to prevent the spread of infections and protect patients (WHO, 2015).

Hospital administration can employ various effective strategies to promote and reinforce the practice of hand hygiene in hospitals. One such strategy, proposed by Mohaithef (2020), involves using signage and other visual aids containing important hand hygiene information. These aids educate nurses and other healthcare workers on the significance of hand hygiene while reminding them to implement this practice regularly. Another practical approach to teaching and promoting hand hygiene is outlined in a brief review by Baier et al. (2020), which focused on health education establishments and students. The authors suggest that teaching efforts should concentrate on the different indications for hand hygiene and the best practices for implementation in real-world settings. To accomplish this, Baier et al. (2020) recommend that teaching efforts should include both theoretical and practical components that cater to the needs and preferences of Gen Z students. This recommendation will ensure that the information is relevant and applicable to students, whether in an educational setting or the workplace (Putra et al., 2022a).

The relationship between nurses' knowledge and their attitudes towards hand hygiene is essential in healthcare research. An analysis of research findings has demonstrated a significant correlation between nurses' knowledge and their attitudes towards hand hygiene. The study found that a high level of knowledge about hand hygiene is positively related to improved attitudes towards it, as demonstrated by a substantial R-value of 0.688. This means that nurses with superior knowledge of hand hygiene practices are likelier to have a positive attitude. The significance of hand hygiene in healthcare cannot be overstated, and it is crucial to prioritize efforts to improve hand hygiene practices. According to Hammerschmidt and Manser (2019), nursing administrators should focus on implementing policies that encourage using supportive hand hygiene equipment, such as hand sanitizers, in nursing work units. They should also prioritize gaining knowledge about the impact of their

leadership models and applying this knowledge to their daily habits. However, maintaining hand hygiene is not an easy task, and it requires the involvement of all parties (Putra et al., 2022a). Simply having enough knowledge and the right attitude is not enough. It is also essential to have the support of the facility (Jacob and Srijayanth, 2021), a leadership role, and a positive working culture to achieve a successful outcome (Putra et al., 2022a). Therefore, healthcare facilities should prioritize creating a culture of safety and accountability, where hand hygiene is viewed as an essential component of patient safety, and everyone is responsible for promoting it.

5. Conclusions

Recent studies have highlighted the significant impact nurses' knowledge and attitudes towards hand hygiene have on patient safety. The research found a strong correlation between nurses' knowledge and attitudes, with a p-value of 0.000. Additionally, the study revealed that better knowledge leads to improved attitudes toward hand hygiene, as demonstrated by a high proximity level with an R-value of 0.688 in a positive direction. It is essential to recognize nurses' crucial role in maintaining patient safety, and their knowledge and attitudes toward hand hygiene are critical components in achieving this goal. Therefore, healthcare facilities must prioritize improving hand hygiene practices by implementing policies that promote supportive hand hygiene equipment and foster a positive working culture.

As healthcare professionals, we must prioritize a safe and hygienic environment. One effective way to do this is by promoting hand hygiene equipment, such as sanitizers, in nursing work areas. Effective communication, regular training, and monitoring are essential for all staff members to ensure compliance with this policy. As nursing administrators, we must lead by example and be knowledgeable about the impact of our actions. By fostering a positive workplace culture emphasizing the importance of hand hygiene, we can significantly enhance patient safety and overall well-being. Implementing proactive policies that encourage hand hygiene practices is critical to providing the highest levels of patient care.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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