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Relationship between Level of Knowledge and 5 moment Hand Hygiene Practice among Assistant Healthcare in Malaysia Teaching Hospital.

Wan Latifah Wan Ahmad[1], Mazlinda Musa*[2], Hamidah Hassan[3], Rohani Mamat[2], Enita Dewi [4], Sharina Abd Kassim[5], Siti Fatimah Sa'at [6] ,Baidi Baddiri[2]

[1]Faculty of Applied Sciences, Open University, Kuala Lumpur
[2]Department of Nursing, Faculty of Medicine& Health Science, University Malaysia Sabah.
[3]Department of Medical Education, Faculty of Medicine, University Tunku Abdul Rahman, Kuala Lumpur
[4] School of Nursing, Faculty of Health Science, Universitas Muhammadiyah Surakarta, Indonesia
[5] Department of Nursing, Hospital UMS, Universiti Malaysia Sabah
[6] Department of Professional Nursing Studies, Kulliyah of Nursing, National Islamic University Malaysia
**correspondence :* mazlinda@ums.edu.my

Abstract: Hand hygiene is a handwashing method that significantly lowers the likelihood of pathogens (dangerous germs) on the hands. While assistant healthcare workers are part of the healthcare team, they always deal with patients' care but did not get proper training like nurses or doctors before becoming assistant healthcare *This study is to assess the relationship between level of knowledge and five moments hand hygiene practice among assistants healthcare in one of the teaching hospitals in Malaysia.* A cross-sectional research methodology was used; 154 Assistants healthcarewere chosen using random number generators after the sample size was calculated. The Knowledge, Attitude, and Practice on Hand Hygiene questionnaire used was adopted from WHO publications. The ANOVA revealed a significant effect of Level of Knowledge on Level of Practice ($F(1, 152) = 3.416$, $p = 0.006$). Specifically, for each unit increase in Level of Knowledge, Level of Practice increased by 57.725 units ($\beta = 57.725$, $p = 0.006$). These findings emphasise the need for targeted interventions and training programmes aimed at bridging the knowledge-practice divide and eventually raising hand hygiene compliance in the medical setting.

Keywords: Hand Hygiene, Compliance, Healthcare Assistants, Knowledge and Attitude

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INTRODUCTION

The practice of hand hygiene, or handwashing, greatly reduces the possibility of pathogens, or harmful germs, on the hands. Hand hygiene is one of the most crucial preventive steps that can be taken to reduce the risk of infection transmission between patients and healthcare professionals (Das, P., et al (2022). Hand hygiene practices include things like washing your hands with soap and water and using hand rubs that contain 60% to 85% alcohol. Alcohol-based hand rub is faster, more convenient, and better at killing harmful bacteria than soap and water. It's often recommended in clinical settings for dirty hands, like those with dirt, blood, or bodily fluids, because it also improves

skin health and causes less dryness and irritation by Centre for Disease Control and Prevention. Despite being the most effective strategy for preventing illnesses linked to healthcare, hand hygiene compliance is still low. Although hand hygiene is considered the most effective strategy to reduce healthcare-associated infection rates, compliance rates remain inadequate (Luangasanatip et al., 2015).

Furthermore, in the Malaysian healthcare system, there is a group of untrained staff known as assistant health care; their task is to perform non-clinical duties to ensure smooth ward or clinic operation. They are one of those who interact with patients directly the most, after nurses, but this group is always given the lowest priority when we discuss hand hygiene. Good hand cleanliness is the best defence against infection transmission when providing medical care. Assistant healthcare's adherence to best practices varies between settings and nations but is typically poor and insufficient to guarantee patient safety as they never get proper training prior to job placement (MOH, Malaysia, 2019).

To provide information and recommendations for improving hand hygiene, the World Health Organisation (WHO) released draft guidelines in 2016. The WHO Guidelines on Hand Hygiene in Health Care offer healthcare personnel, hospital administrators, and health authorities a thorough analysis of the research on hand hygiene in healthcare, as well as specific recommendations to improve procedures and lessen the spread of pathogenic microorganisms to patients and healthcare workers. The current guidelines are meant to be used when healthcare is provided to a patient or a particular population. This idea applies to any environment where medical care is regularly or irregularly provided, such as in-home delivery care (WHO, 2019).

According to Emmanuel Olushola Shobowale (2016), all infection control initiatives have been said to begin and end with good hand hygiene, and a study by Sin, C. S., and Rochelle, T. L. (2022) shows that healthcare professionals pay attention to hand cleanliness primarily when there is a clear threat to their safety. The Theory of Planned Behavior (TPB), a well-known psychological theory used to understand human behavior and decision-making, is the foundation for the theoretical framework that Katherine M. White described in 2015. In this context, White is applying the TPB to examine healthcare assistants' judgements regarding hand cleanliness at five specific moments, which are referred to as the "five important times.". Therefore, Katherine M. White's theoretical framework uses the Theory of Planned Behaviour and its belief foundation to systematically investigate how assistants healthcare make decisions about hand cleanliness at specific critical moments. By doing so, the study seeks to contribute to the understanding of how beliefs influence healthcare assistants' behaviour in healthcare settings.

A dedication to enhancing healthcare workers hand hygiene practices throughout the five moments should centre on personal tactics to prevent procrastination, peer-based programmes to promote shared responsibility, and management-driven answers to staffing and resource problems, as suggested by Al Sawafi, K. M. (2021). The most frequently disregarded opportunity for compliance comes after touching a patient's surroundings. According to J.M. Al Salman (2014), people are becoming more concerned about hand hygiene, which is essential to preserving patient safety in a medical setting. . Numerous management initiatives have been implemented for hand hygiene, encompassing education, awareness campaigns, and regular observations."

According to Muna Yousif (2020), the knowledge, attitudes, and practices of healthcare personnel were extremely unsatisfactory, with significant inconsistencies in their knowledge of hand hygiene. In five moments of hand hygiene, most healthcare personnel were noncompliant before touching the patient and most compliance after removing gloves. Their study showed that a lack of educational programmes on hand hygiene is one reason compliance is low. Practicing hand hygiene is always related to knowledge. Knowledge of hand hygiene refers to a comprehensive understanding of the principles and practices related to maintaining clean and sanitised hands to prevent the spread of infections. This knowledge includes awareness of proper handwashing techniques, the importance of

hand hygiene in healthcare settings, and an understanding of when and how to use hand sanitizers effectively (CDC, 2015). Assistant healthcare workers are part of the healthcare team in Malaysia, but they are frequently overlooked when discussing hand hygiene. Though they always deal with patients' while performing non-clinical duties, they did not get proper training like nurses or doctors before becoming assistant healthcare. healthcare assistant This study is to assess the relationship between level of knowledge and five moments of hand hygiene practice among assistants healthcare in one of the teaching hospitals in Malaysia.

METHODS

A cross-sectional research methodology was used to obtain a snapshot of the knowledge and hand hygiene practices related to the five moments of hand hygiene within the studied population. The healthcare assistant employed by one of the teaching hospitals in Malaysia makes up this study's population. The study used a sample population of 154 assistants healthcare from a specified sample size of all departments and units where assistants healthcare were actively involved in patient care. Wards, clinics, the emergency room, and the sterility unit are just a few of these units. The study included assistants healthcare in HASA who were willing to participate and had attended special training related to hand hygiene, while assistants healthcare who were unwilling to participate or had incomplete questionnaire forms were excluded.

Sampling of this research using simple random sampling to enhance the selection of the sampling group for the study. A list of assistants healthcare from various hospital departments and units was compiled for random sampling. The sampling frame was this list. 154 assistants healthcare were chosen from this list using random number generators or a comparable randomization technique. Through simple random selection, this study ensured that the chosen sample accurately reflected the more significant population of healthcare assistants, enabling it to draw applicable and generalizable findings about compliance with hand hygiene among this group.

Sample size calculation using a readily available online sample size calculator by Raosoft's (2016) formula for determining sample size. The formula is: where z represents the z score, ε represents a margin of error,and P represents the population proportion. N represents the population size. The current population size is finite at 160, so the above formula is applicable. The confidence level opted for the study is 99%, with a margin of error set at 5%. A 99% confidence level builds more confidence in the estimated results' accuracy, and a margin of error of 5% indicates that the sample estimate falls within ±5% of the actual population parameter. The population proportion is set at 50% since it provides the most conservative and maximum sample size requirement for a given confidence level and margin of error. From the distribution tables, the Z score for a 99% confidence level is approximately 2.576. Therefore, the study intended to use a sample of 154 participants who were to actively answer the questionnaires for the study. Sample Size (n) = 160 / [1 + (2.576^2 * 0.5 * (1 - 0.5)) / (0.05^2 * 160)] = 154

The knowledge, attitude, and practice of hand hygiene questionnaire used was adopted and adapted from WHO and a study by Das et al. (2022). Demographic data looking at the group ages, gender, and previous hand hygiene training received (Table 1). The knowledge assessment questionnaire consists of 23 items with dichotomous answers of “yes” and "no." whereby the attitudes part consists of 13 items on the Likert scale (strongly agree, agree, disagree, or strongly disagree) adopted from Das et al. (2022), knowledge, attitude, and practice of hand hygiene questionnaire.

The data collected for this study underwent rigorous analysis employing the Statistical Package for the Social Sciences (SPSS) software, version 27.0, to derive meaningful findings. Prior to analysis, a comprehensive data screening procedure was executed to identify and address any instances of missing values. The self-administered questionnaire, designed to elicit responses from participants, was distributed through an electronic platform in the form of a Google Form. Notably, participants were

allotted a dedicated timeframe of 15-20 minutes to conscientiously complete the questionnaire, ensuring the quality and completeness of the responses.

Ethical clearance: The Ethical Committee (RMPU) of Open University Malaysia obtained the ethical review (EA1071). To gain access to the study population, the director of the hospital was to seek approval for study settings. Written informed consent was obtained from each participant after they had explained the nature and role of the study, as well as the importance of their participation in it. No invasive procedure was performed on the participant as this was a survey questionnaire study. The participants were informed of their right to voluntary participation, to decide whether to take part in this study or reject it without any influence, coercion, or persuasion, and to discontinue the study at any time without incurring a penalty. Permission from the director of the hospital and the ward manager was granted after an official letter of request to conduct the research. The findings using the internal consistency measure of the scale reliability by Cronbach's alpha 0.8, shows that the instrument is reliable.

RESULTS

Table 1: Demographic characteristics of the participant's data

Variables	N (%)
Age	
19-22	20(13)
23-26	33(21.4)
27-30	73(47.4)
31 and above	28(18.3)
Gender	
Male	53 (34.4)
Female	101(65.6)
Working experience	
< than 1 year	17(11.3)
1-5 years	91(60.7)
6-10 years	26 (17.3)
above 10 year	16 (10.7)
Previous training in hand hygiene	
Yes	150 (97.4)
No	4(2.6)

The demographic characteristic of the participants show the majority of participants fall into the age range of 27-30 years old (47.4%), followed by 23-26 years old (21.4%). There is also a considerable representation from participants aged 31 and above (18.3%). However, the youngest age group (19-22 years old) comprises the smallest proportion (13%) of participants. Female participants constitute the majority, representing 65.6% of the total, while male participants represent 34.4%. The largest group of participants (60.7%) has a working experience of 1-5 years, followed by those with 6-10 years of experience (17.3%). Participants with less than 1 year of experience and those with over 10 years of experience are relatively smaller in number, accounting for 11.3% and 10.7% respectively. A significant majority of participants (97.4%) have received previous training in hand hygiene, indicating a high level of awareness or compliance with hand hygiene protocols among the surveyed population.

Table 2: Multiple Correlation Coefficient

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.748[a]	.822	.816	.28634

a. Predictors: (Constant), Level of Knowledge

b. Dependent Variable: Level of Practice

The multiple correlation coefficient (R) is 0.748. It represents the strength and direction of the linear relationship between the predictor variable "Level of Knowledge" and the dependent variable "Level of Practice." A high R value suggests a strong linear relationship between the variables. In summary, the model with "Level of Knowledge" as the predictor variable explains a large proportion of the variance in "Level of Practice" (82.2% based on R Square). The high multiple correlation coefficient (R) indicates a strong linear relationship between the variables. This suggests that "Level of Knowledge" is a significant predictor of "Level of Practice." The high multiple correlation coefficient (R = 0.748) indicates a strong linear relationship between the predictor variable "Level of Knowledge" and the dependent variable "Level of Practice."

This indicates that "Level of Knowledge" is a significant predictor of "Level of Practice." These findings indicate that individuals' knowledge levels significantly influence their practice levels. Therefore, efforts to improve "Level of Knowledge" may lead to corresponding improvements in "Level of Practice."

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.808	1	.808	3.416	.006[b]
	Residual	35.952	152	.237		
	Total	36.760	153			

a. Dependent Variable: Level of Practice

b. Predictors: (Constant), Level of Knowledge

The regression analysis tests the significance of the relationship between the predictor variable "Level of Knowledge" and the dependent variable "Level of Practice." The sum of squares for regression is 0.808. It represents the variability in the dependent variable "Level of Practice" that is explained by the predictor variable "Level of Knowledge." The p-value associated with the F-statistic is 0.006. This p-value is less than the conventional significance level of $\alpha = 0.05$. A significant p-value indicates that the regression model is statistically significant at the conventional level. In conclusion, based on the ANOVA results, there is evidence to suggest that the regression model is statistically significant in predicting "Level of Practice" from "Level of Knowledge." The significant p-value suggests that the relationship between these variables is statistically significant at the conventional level of significance. Therefore, "Level of Knowledge" appears to be a significant predictor of "Level of Practice."

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.149	.194		16.273	.000
	Level of Knowledge	57.725	.068	.148	1.848	.006

a. Dependent Variable: Level of Practice

The associated p-value is < 0.0001, indicating that the intercept is significantly different from zero. The intercept represents the estimated value of the dependent variable "Level of Practice" when the predictor variable "Level of Knowledge" is zero. The associated p-value is 0.006, indicating that the coefficient for "Level of Knowledge" is statistically significant at the conventional significance level of $\alpha = 0.05$. The coefficient represents the change in the dependent variable "Level of Practice" for each unit increase in the predictor variable "Level of Knowledge," holding all other variables constant. In summary, the regression analysis suggests that both the intercept and the coefficient for "Level of Knowledge" are statistically significant in predicting "Level of Practice." The intercept provides the estimated baseline value of "Level of Practice," while the coefficient for "Level of Knowledge" indicates the magnitude and direction of its impact on "Level of Practice."

In this study, ANOVA was conducted to assess the relationship between the predictor variable, Level of Knowledge, and the outcome variable, Level of Practice. The analysis revealed a significant effect of Level of Knowledge on Level of Practice ($F(1, 152) = 3.416$, $p = 0.006$). Specifically, for each unit increase in Level of Knowledge, Level of Practice increased by 57.725 units ($\beta = 57.725$, $p = 0.006$). These findings suggest that Level of Knowledge is a significant predictor of Level of Practice among the participants.

DISCUSSION

There is a significant correlation between the level of knowledge and the adherence to the 'five moments of hand hygiene' protocol among assistant healthcare workers in the teaching hospital. These findings underscore the pivotal role that knowledge plays in influencing the hand hygiene practices of assistant healthcare workers within the study's specific setting.

Higher-educated healthcare professionals are more likely to put their understanding of the five moments of hand hygiene into practice (Al Sawafi, K.M., 2021). This link emphasises the significance of ongoing training, education, and awareness programmes to increase healthcare professionals' understanding because it directly improves adherence to recommended hand hygiene practices. Barakat & Kasemy (2020), These results agree with Al Salman (2014), who demonstrated that increasing healthcare staff members' understanding of hand hygiene guidelines and infection control practices increases the likelihood that they will follow them. The effectiveness of educational interventions, such as ongoing training and feedback, has been demonstrated to boost compliance and knowledge. People are becoming more concerned about hand hygiene, which is essential to preserving patient safety in a medical setting. Many management initiatives have been in this area, including education, awareness, and observations (Al Sawafi, K.M., 2021). The study's findings have a broad impact on healthcare organisations, governments, educators, and practitioners. To increase hand hygiene compliance and patient safety, it is essential to comprehend the relationships between knowledge, attitudes, practices, and sociodemographic characteristics among assistant healthcare personnel.

The study findings emphasise the value of modifying training curricula to suit the unique requirements of healthcare workers. When creating training sessions, institutions should consider their staff's different educational backgrounds and degrees of expertise (Allegranzi, B., et al., 2013). Using a customised method ensures that healthcare assistants receive training appropriate for their level of knowledge and fills in any knowledge gaps. Another important aspect is professional growth and continuing education, which are crucial in the healthcare industry. Healthcare professionals must keep in mind the most recent recommendations and ideal methods for hand hygiene and infection prevention. Institutions should invest in ongoing training opportunities, workshops, and seminars to guarantee that healthcare assistants maintain and improve their expertise over time.

Based on the research by Shobowale E.O. (2016), it is recommended that compliance and training policies for hand washing be reviewed and improved. Institutions and regulatory agencies should place a higher priority on practical training and take sociodemographic aspects into account when assessing knowledge levels. To reinforce healthcare staff's grasp of hand hygiene, policies should also highlight the significance of ongoing training updates (Al Sawaf,K.M., 2021). The promotion of a positive attitude towards hand washing is essential for compliance. Healthcare organisations should take steps to encourage and preserve a good attitude among their workforce. This can involve promoting hand hygiene among healthcare personnel through awareness campaigns, reward programmes, and a positive work atmosphere. The study emphasises the requirement for additional investigation in this field. Therefore, future research might examine the long-term effects of specialised training programmes on patient outcomes and hand hygiene compliance.

Significant limitations within this study warrant careful consideration. The reliance on participant self-reporting for the majority of the data introduces a potential vulnerability to the insidious influence of social desirability bias. This bias may lead participants to furnish responses they perceive as socially acceptable rather than candidly representing their true beliefs and actions. Consequently, there exists a substantial concern that reported hand hygiene habits and attitudes may not accurately mirror real-world behaviour, potentially leading to an overestimation of compliance rates (Sin & Rochelle, 2022).

Furthermore, the study's utilisation of a cross-sectional design, coupled with data collection at a specific, singular point in time, offers a transient glimpse into participants' knowledge, attitudes, and practices. This temporal limitation underscores the necessity for a more comprehensive understanding of the multifaceted factors influencing compliance rates and how they fluctuate over time. To address this gap in knowledge, it is imperative to contemplate the implementation of longitudinal studies that meticulously track the evolution of hand hygiene behaviours across time, providing a deeper and more nuanced perspective on this crucial healthcare aspect (Wright & Fancourt, 2022).

CONCLUSION

These results show that assistant healthcare in HASA with a specific amount of hand hygiene proficiency are also more likely to have a good attitude towards using hand hygiene in the context of the five moments of hand hygiene. Therefore, maintaining stringent hand hygiene standards in healthcare environments is essential to protecting patients and staff and averting illnesses linked to the industry. Everyone in the healthcare industry, including assistant healthcare personnel, must adhere to five-minute hand hygiene practices. It's essential to examine how working culture affects how often people wash their hands. Future research should prioritise and delve into the profound impact of administrative policies, dynamic leadership styles, effective teamwork, communication patterns, and meticulous hand cleanliness in shaping and influencing healthcare personnel's attitudes and behaviours. Understanding these critical factors is essential for enhancing the overall quality of healthcare delivery and ensuring the well-being of both healthcare professionals and patients. Maintaining patient safety and the standard of care in general depends heavily on these five hand hygiene moments.

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