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ICU NURSES' PERCEIVED KNOWLEDGE, ATTITUDE, AND PRACTICE ON ENDOTRACHEAL SUCTIONING: A PRELIMINARY STUDY AT AHOSPITAL IN PAHANG, MALAYSIA

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ABSTRACT

Background: Endotracheal suctioning isa common procedure for intubated patients typically seen in the Intensive Care Unit (ICU). Although several studies regarding the knowledge and practice of endotracheal suctioning among nurses were conducted internationally, the status of the procedurein Malaysia is unknown. Objectives: To assess the level of knowledge, attitude, and practice on endotracheal suctioning and the relationship between each variable. Materials and methods: A cross-sectional study was conducted via convenient sampling at two ICUs using a set of questionnaire that consisted of fourparts pertaining to sociodemographic data, knowledge items, attitude items, and practice items following ethical approvals. The data obtained were analysed for descriptive and inferential assessments using SPSS. **Results:** A total of 77 nurses responded to the questionnaire (response rate 100%). A moderate positive relationship between knowledge and attitude were identified (r=0.514, p=0.000), whilea weak positive relationship was observed between knowledge and practice (r=0.408, p=0.000). A negligible correlation was also observed between attitude and practice (r=0.269, p=0.018). **Discussion:** From the study, the level of knowledge, attitude, and practice were found to be related to each other. The results have shown that age does not representthe score gain in knowledge, attitude, and practice questions. Similarly, the score gain was not affected whether the nurses had a post-basicbackground or not. **Conclusion:** There is a relationship between knowledge, attitude, and practice on endotracheal suctioning among ICU nurses. There is no relationship between socio-demographic data (age, working experience and post-basic) with knowledge, attitude and practice on endotracheal suctioning. A good practice score were seen in this study compared to the knowledge and attitude score among ICU nurses in HTAA Kuantan. Most of the ICU nurses in the HTAA Kuantan exhibited an excellent practice on endotracheal suctioning.

Keywords: Endotracheal Suctioning, Intensive Care Unit, Knowledge, Practice, Attitude

INTRODUCTION

One of the vital practicesof Intensive Care UT (ICU)nurses towards in tubated patient is endotracheal suctioning (Shrestha, & Shrestha, 2018).Moreover, patients who are on the endotracheal tube have difficulties in removing secretions due to abnormal function of ciliary cells and reduced coughing reflex effects, whereby the patients need suctioning 3 to 24 times per day (Ansari *et al.*, 2012). Clearance of respiratory tract secretions, which helps to improve oxygenation and prevent lung collapse is the significant benefit of endotracheal suctioning (Jansson *et al.*, 2013). As a nurse, endotracheal suctioning should be performed appropriately, with expertise and knowledge. Nurses acknowledge that endotracheal suctioning is an invasive procedure thatcan cause harm if not done properly. An ICU nurse must have the knowledge and skills based on proven, evidence-based studies to prevent harm to the patients (Mwakanyanga, Masika, & Tarimo, 2018).

Although several studies worldwide have reported the lack of scientific knowledge regarding the practice of endotracheal suctioning among nurses, similar studies are still lacking in Malaysia, especially those concerning endotracheal suctioning's knowledge, attitude, and practice. Thus, this study seeks to identify the knowledge, attitude, and practice on endotracheal suctioning among general ICU nurses at a tertiary hospital in Pahang.

RESEARCH METHODOLOGY

This cross-sectional study was conducted at an ICU in a tertiary hospital in Pahang within two months through the distribution of questionnaires to ICU nurses who met the inclusion criteria: staff nurses U29 and staff nurses who had at least one-month experience in the ICU. Those who were on extended leave (maternity, study, and unpaid leave) and staff nurses U32 were excluded. The questionnaire consisted of four parts: Part A comprises of the socio demographic data (age, gender, level of education, and working experience in ICU and post-basic in ICU), Part B consists of 15 knowledge items, Part C consists of 10 attitude items, and Part D consists of 15 practice items. The questionnaire was pre-tested on 23 subjects. The reliability and validity of all items were found to be good (Cronbach's alpha 0.691–0.759). A five-point Likert scale was used for all items, with 1 indicating 'strongly disagree', 2 'disagree', 3 'uncertain', 4 'agree', and 5 'strongly agree'. All scores were summed-up as the total score.

Approval for the study was obtained from the university and the National Medical Research and Ethics Committee of Malaysia (NMRR-19-135-46413). Respondents were provided with information on the intent ofthe study, research procedures, confidentiality guarantee, and their right to withdraw at any time. The return of the completed questionnaire was viewedas informed consent for participation.

Data were analysed for descriptive and inferential analysis using the Statistical Package of Social Science software (SPSS), version 20.

RESULTS

Socio demographic characteristics

A total of 77 general ICU nurses from ICU 1 and ICU 2 ofthe hospital (100% response rate) participated in this study comprising of 1male nurse (1.3%) and 76 female nurses (98.7%). The participants were between 25 to 49 years of age, with the means age of 33.99 years old and standard deviation of 4.99. The highest level of nursing education for all the nurses wasdiploma (100%).The nurses' working experience in the ICU were between 2 to 20 years (mean=6.84, SD=4.04). Only 28 nurses out of 77 nurses had post-basicknowledge of ICU (36.4%;Table 1and Table2).

Table 1: Participants' Gender, Post-basic Attended, and Level of Education

N=77	Variables	Frequency (n)	%
Gender	Male	1	1.3
	Female	76	98.7
Post-basic (ICU)	Yes	28	36.4
	No	49	63.6
Level of Nursing Education	Diploma	77	100

Table 2: Descriptive analysis to analyse nurses' age and working experience in ICU

N=77	Min	Max	Mean	Standard Deviation
Age	25	49	33.99	4.99
Working Experience in ICU	2	20	6.84	4.04

There is no statistically significant between the level of knowledge, attitude, and practice with post-basic background that the nurses had, *p*-value > 0.05 (Table 3).

Table 3: Independent t-test Association Between Post-basic with Nurses' Level of Knowledge, Attitude, and Practice

N=77	Post-basic	Mean	Std. Deviation	*p*-value
Knowledge	Yes (N=28)	58.68	6.18	0.695
	No (N=49)	60.57	7.43	
Attitude	Yes (N=28)	37.57	2.86	0.006
	No (N=49)	37.08	5.43	
Practice	Yes (N=28)	67.36	6.28	0.534
	No (N=49)	68.47	5.68	

A negligible correlation exists between age and knowledge (r=-0.038), attitude (r=0.149), and practice (r=-0.064), while no association wasseen between age andknowledge, attitude, and practice. Working experience in ICU also sporteda negligible correlation between knowledge (r=-0.029), attitude (r=0.084), and practice (r=0.087). The p-value is more than 0.05, indicating that working experience in the ICU was not statistically significant with knowledge, attitude, and practice (Table 4).

Table 4: Pearson-correlation to Analyse the Association Between Age and Working Experience in ICU and With Nurses' Level of Knowledge, Attitude, and Practice

Variables	Domain	*r*-value	*p*-value
Age	Knowledge	-0.038	0.745
	Attitude	0.149	0.195
	Practice	-0.064	0.583
Working experience in ICU	Knowledge	-0.0.29	0.806
	Attitude	0.084	0.466
	Practice	0.087	0.451

Relationship between level of knowledge, attitude, and practice on endotracheal suctioning

Relationship between the level of knowledge, attitude, and practice on endotracheal suctioning among ICU nurses in the hospital revealed significant and positive correlations. While a moderate positive relationship is observed between knowledge and attitude (r=0.514), there is also a weak positive relationship detected between knowledge and practice (r=0.408). Meanwhile, there is a negligible correlation between attitude and practice (r=0.269). Therefore, statistically significant correlations are observed between the level of knowledge and level of attitude, level of knowledge and level of practice, and level of attitude and level of practice (Table 5).

Table 5: Descriptive Analysis to Analyse Mean Score for Knowledge, Attitude and Practice

N=77	Minimum	Maximum	Mean	Standard Deviation
Knowledge	38.00	75.00	59.90	7.02
Attitude	23.00	48.00	37.30	4.65
Practice	54.00	75.00	68.06	6.06

Table 6: Relationship Between Level of Knowledge, Attitude, and Practice Among Nurses

		Knowledge	Attitude	Practice
Knowledge	Pearson correlation	1	0.514**	0.408**
	Sig. (2 tailed)		0.000	0.000
	N	77	77	77
Attitude	Pearson correlation	0.514**	1	0.269*
	Sig. (2 tailed)	0.000		0.018
	N	77	77	77
Practice	Pearson correlation	0.408**	0.269*	1
	Sig. (2 tailed)	0.000	0.018	
	N	77	77	77

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

DISCUSSION

Based on the findings, thepost-basicbackground of the nurses isnot statistically significant withthe knowledge, attitude, and practice concerning endotracheal suctioning. This study is in line with another study that showed the scores of the participants in the questionnaire does not reflect the training that they had (Mwakanyanga, Masika&Tarimo, 2018). It is also supported by another study in which thepost-basic or work training course does not affect ICU nurses in increasing their knowledge and practice (Majeed, 2017).

Next, this study also indicate that the age of the nurses did not reflect the score gained for each question. However, this result could notbe compared with other studies due to thelack of evidence. Besides age, working experience in the ICU was also incorporated to determine the level of knowledge, attitude, and practice among ICU nurses. This study shows that working experience in the ICU is not significant with the level of knowledge, attitude, and practice on endotracheal suctioning, which concurs with the study by Ansari *et al*. (2012)who stated that no relationship was seen between working experience with the level of knowledge of ICU nurses.

Participants perceived highlyon their suctioning practice despite not scoring high on knowledge and attitude. However, this finding is contradictory to the study by Bülbül Maraş *et al.* (2017), who stated that the right level of knowledge and a reasonable level of practice were seen among respondents as a result of prevailing service training or otherwise. The present study is consistent with another study in which the scores of knowledge concerning endotracheal suctioning recommendations did not reflect their practice of endotracheal suctioning (Mwakanyanga, Masika & Tarimo, 2018). A total of 11 (14.2%) nurses answered uncertain regarding the question about the stimulation of vagus nerve during suctioning. A study by Majeed (2017) also reported similar outcomes in which poor knowledge score was seen for the same question. Moreover, 19 (24.7%) nurses responded as uncertain towards the question regarding whether paroxysmal cough will be the possible complication of suctioning due to the irritation of carina. This result contradicts withthe study where the answers of the respondents showed that they had fair knowledge level regarding the matter (Majeed, 2017), indicating the respondents in the current study still lack knowledge regarding the complications of suctioning. Similarly, 14 (18.2%) nurses responded as uncertain to the question of whether normal saline should not be instilled through the endotracheal tube because it will damage lung tissue. On the contrary, 34 (44.2%) and 21 (27.3%) nurses responded as agree and disagree with the statement. The result is somehow contradictory to the previous study in which only 14.3% of nurses disagree that normal saline instillation cannot be used in endotracheal suctioning (Majeed, 2017). It is proven in another study that normal saline usage is in appropriate before suctioning (BülbülMaraş *et al.*, 2017). The study by Pederson *et al.*

(2009) seconded the notion, where the instillation of normal saline is not encouraged due to the unreliable effects on the patient.

For the attitude question, i.e., if closed suction can only be used for isolated patients,43 (55.8%) and 8 (10.4%) participants answered disagree and strongly disagree. The findings showed their understanding of the application of closed suction in all patients, whether isolated or not, as the benefit of closed suction can prevent the nurses from being exposed to the patient's secretion (Haghighat & Yazdannik, 2015). Based on previous studies, although both open and closed systems are recommended to be used for patient whether the patient is isolated or not, further research is needed to establish the safety of the use of the closed suction system over a long-term period (Pederson et al., 2009).

The result also indicated that the nurses were aware that they need to clean the suction catheter with sterile water after the completion of the procedure. A total of 23 (29.9%) nurses responded strongly disagree towards the question of 'no need to clean the suction catheter with sterile water after the suctioning process'. However, this result cannot be compared to any previous studies due to the lack of research in the area.

The nurses were aware and understood the correct practice on endotracheal suctioning, as observed by their response to hyper-oxygenate the patient before suctioning in the practice question. All nurses (100%) answered, agree and strongly agree to the need to hyper-oxygenate the patient before suctioning. This study is similar to the previous study where the percentage of the nurses answered the question on the need to hyper-oxygenate the patient was high which is 86.1% (Bulbul Maras *et al.*, 2017).According to another study, 64.60% of the respondents agreed the need forhyper-oxygenatingthe patient before suctioning (Zeb *et al.*, 2017). Meanwhile, AARC (2010) stated that it is significant topre-oxygenate patient before performing the suctioning procedure. Thus, it can be stated that based on our result, although all the nurses acknowledged the practice of hyper-oxygenation to the patient, there were still a few nurses who did not perform it. It may be that the nurses have forgotten to do it.

The response towards the question about maintaining aseptic techniques (to wash hands before suctioning, the use of gloves, apron, maintain sterility, the use of disposable catheter and gloves to prevents contamination from secretion, and to wash hands after suctioning), were agree and disagree. It indicates that most of the nurses were aware of the importance of preventing contamination from the intubated patient when performing the suctioning procedure. This present study is in line with another study where 46% of nurses understood the aseptic technique in preventing nosocomial infection from the patient (Majeed, 2017). It was also supported by another study in which infection prevention measures were understood by the nurses to be practised before the suctioning process was conducted (Bulbul Maras *et al.*, 2017).

In this study, a significant correlation between the level of knowledge and level of attitude (r=0.514); the level of knowledge and level of practice (r=0.408); and the level of attitude and level of practice were observed. The present study is similar to aprevious study that showed a correlation between the level of knowledge and practice on endotracheal suctioning (Mwakanyanga, Masika & Tarimo, 2018). Meanwhile, the study by Majeed (2017) reported the absence of a significant difference between years of experience, knowledge, and practice.

Study Limitation

This study has been successfully conducted despite time limitation. However, the results could not be generalised to the whole ICU nurses' population in Malaysia due to the small sample size (one hospital only). More significant coverage of population should be done in future research.

CONCLUSION

In conclusion, this article represents the knowledge, attitude, and practice among general ICU nurses on endotracheal suctioning in HTAA, Kuantan. Based on the results, it can be concluded that age and working experience were not statistically significant with knowledge, attitude, and practice. Besides, no significant relationship between post-basic with knowledge, attitude, and practice was recorded. However, the relationship between knowledge, attitude, and practice on endotracheal suctioning were documented in this study. According to the practice score, it can be stated that most of the ICU nurses in the HTAA Kuantan exhibited an excellent practice on

endotracheal suctioning. It shows that all nurses are aware that endotracheal suctioning is a vital procedure that can lead to other complications if not performed correctly. Besides the good practice score compared to the knowledge and attitude score, it is also essential for the nurses to gain more knowledge so that they will have more comprehension of the importance of having proper knowledge, attitude, and practice. Furthermore, age, working experience, and post-basic background do not give any impact on the knowledge, attitude, and practice of the nurses. A set of questionnaires was used to perceive the knowledge, attitude, and practice on endotracheal suctioning among ICU nurses. For future study, it is recommended for the researchers to use other methods such as observation checklist, interviews, and others. Moreover, since thisstudy is not adequate to generalise the knowledge, attitude, and practice of ICU nurses towards endotracheal suctioning, further study regarding endotracheal suctioning among ICU nurses in Malaysia is proposed.

Based on the findings of this study, the following recommendations are suggested for future study. First, the population size should be more extensive and not specific to one hospital or region only, as further study needs to be conducted in other hospitals from other regions to gain cumulative dataon the comparison of ICU nurses' knowledge, attitude, and practice. Next, the number of sample size for a cross-sectional study should be increased to prevent bias. Besides, the Ministry of Health should conduct more observation study on endotracheal suctioning and provide workshops regarding the procedure to all nurses to improve their knowledge, attitude, and practice. Moreover, the Ministry of Health and the Ministry of Education need to discuss regarding the incorporation of more curriculum regarding endotracheal suctioning practices. Endotracheal suctioning is an invasive procedure; thus, nurses need to be more competent, not only in theory but also in practice.

Conflicts of Interest Statement

The authors declare that they have no conflict of interest.

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