Barriers Facing Nurses' Implementation of Suction Techniques at Intensive Care Units

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Abstract

Background: The suction technique is a fundamental procedure in any intensive care unit (ICU). Use of the suction technique can be vital in an emergency, but there are many barriers that hidden suction technique to be successful. **Aim:** was to assess the barriers facing nurses' implementation of suction techniques at Intensive Care Units. **Subjects and Method: Design**: A descriptive study design was utilized**. Setting:** This study was conducted at the Surgical and Anesthesia Intensive Care Unit at International Educational Hospital, Emergency Hospital, Internal Hospital and Neurological Intensive Care Unit of Internal Hospital affiliated to Tanta University. **Tools of the study**: Two tools were used in this study. The tool I: Nurses' Structured Questionnaire, Tool II: Nurses' questionnaire related to barriers of suction techniques. **Results:** About two third (68.1%) of the total nurses had high barriers to suction techniques, there was a statistically significant relationship between the nurses, socio-demographic characteristic and nurses, level of education in which p=0.001. **Conclusion**: Two-third of the total nurses were had high barriers related to suction techniques and the majority of the nurses have had a negative attitude toward suction techniques. **Recommendation:** Periodic in-service training program should be provided to nursing staff in order to keep them updated on recommended guidelines regarding suction techniques.

Key words: Suction techniques, Barriers and Intensive Care Unit.

Introduction

Critically ill patients often have an increase in the amount of mucous production and an impaired ability to clear secretions due to some sort of respiratory insufficiency such as disorder in normal function of celery cells, defect in coughing reflex. Also, most patients who are admitted in the intensive care units suffer from an increase in secretions in the airway and difficulty in clearing these secretions. As a result, these patients need suctioning, which is the most common, fundamental and clinically significant practice. Frequent invasive procedure performed in patients having an artificial airway to remove accumulated secretions and patients who are mechanically ventilated [1]. Endotracheal suction is a life-saving procedure to enhance clearance of respiratory tract secretion, improve oxygenation and prevent atelectasis [4]. Despite of ETS being a necessary procedure to both children and adult patients, if the procedure is not performed with correct techniques, it can lead to serious complications, such as bleeding, infection, hypoxia, cardiac arrest and sudden death. Since the procedure can cause harm to the patient if it is done incorrectly, it is important therefore that Intensive Care Unit (ICU) nurses have the necessary

knowledge and skills based on valid scientific evidence in performing ETS and aspects related to it [2].

The practice of critical care nursing requires specialized knowledge and clinical skills to manage actual or potential health problems that affect individuals. Nurses play an integral role in the healthcare field, providing care to patients, filling leadership roles at hospitals, health systems, and other organizations. However, being a nurse is associated with big challenges and barriers [3].

There are many barriers and challenges facing nurses in Intensive Care Unit that may affect the quality of care. High nursing workload, poor patient safety, poor nursing quality of working life (QWL), barriers related to nurses, patients and barriers related to intensive care units are major issues in intensive care units (ICUs). Characteristics of the ICU and performance obstacles may contribute to these issues [4].

There are many obstacles in hospitals that waste the time and energy of the nurses. Hectic and disorganized workplace, poor-conditioned equipment related to suction techniques, and ineffective morning rounds are some of these obstacles. Ineffective nurse physician communication, unclear medication orders related to suction techniques, and insufficient nurse-to-patient ratio can also act as barriers in ICU and affect quality of care related to suction. [5,6].

Significance of the study

Endotracheal suctioning is an essential part of nurses' duties to manage airways for mechanically ill patients in intensive care units. The efficiency and problems with the endotracheal suctioning procedure are associated with the technique of accomplishment and barriers facing nurses during application of suction techniques [7]. Therefore, assessment of barriers facing nurses' implementation of suction techniques is very important and contributes to the development of the patient outcome.

The aim of study

The aim of this study was to: assess the barriers facing nurses' implementation of suction techniques at Intensive Care Units.

Research Question:

What are barriers facing nurses' implementation of suction techniques at intensive care units?

Subjects and method
Study design:

A descriptive study design was utilized for conduction of this study.

Study setting:

The study was conducted at the Surgical and Anesthesia Intensive Care Unit at International Educational Hospital, Emergency Hospital, Internal Hospital and Neurological Intensive Care Unit of Internal Hospital which are affiliated to Tanta University Hospitals.

Study subjects:

All nurses (166) were selected. They are divided into: (50) nurses from Anesthesia Intensive Care Unit at Emergency Hospital, (37) nurses from Anesthesia Intensive Care Unit at International Educational Hospital, (26) nurses from Anesthesia Intensive Care Unit at Internal Hospital and (53) nurses from Neurological Intensive Care Unit of Internal Hospital.

Date collection tools:

Two tools were used to collect data after reviewing of the relevant literatures [8] which included the following:
Tools I: Nurses' Structured Questionnaire
It consisted of two parts as follows:
Part one: Socio-demographic data of the nurses, which included nurses' code, age, sex, marital status, level of education, place of occupation, years of experience and previous training about suction technique.
 Part Two: Nurses' knowledge related to suction techniques which included: Questions related to definition, purpose types, complication and time of suctioning, oxygenation and questions related to nursing management of suction.
The total scoring system of nurses' Knowledge was calculated and classified as the following: >75% of the total score considered high level,60% to 75% of the total score considered moderate level and <60% of the total score considered low level
Tools (II) : Nurses' questionnaire related to barriers of suction techniques, it was classified into four parts as follows :
Part one: Barriers related to the nursing staff which include: Physical,

Psychological and communication barriers.
Part two: Barriers related to the patient as the patient who bites tube of suction, patient who had sever bleeding disorder.
Part three: Barriers related to delivered Intensive Care Setting which included barriers related to Intensive Care Unit resources, barriers related to administration strategy.
 The total scoring system of nurses' barriers was calculated and clarified as follows: High barriers: > 75% of the total barriers score, moderate barriers: 60% to 75% of the total barriers score, low barriers: < 60%of the total barriers score.
Part four: Barriers related to nurses' attitude regarding suction techniques. It was composed of 20 items divided into four subscale concerning nurses' attitudes towards suction techniques namely uses, contamination, time and complications (5 items in each).
Scoring system: All items was scored on a 3-point Likert Scales ranging from agree (1) to disagree (3). Scores were summed up and then converted to percentages and nurses were classified as having a positive, natural and negative attitude as follows: Negative: less than 50%, Natural: between 50-65%, Positive: above 65%.
Method
The study was accomplished through the following steps:
1- Administrative process:
   The researcher got official permission to carry the study from the relevant authorities of selective setting and also the nurses' consent was obtained to participate in the study. Formal permission obtained from the

authorities for the collection of data. The investigator first introduced himself and explained the need and purpose of the study.

2-Ethical considerations:
-Written consent to participate in the study was obtained and she/he has the right to withdraw from the study at any time they need.
- Confidentiality and privacy were taken into consideration for each nurse during data collection.
-Approval of ethical committed obtained.

3- Tool development:
1- Structured questionnaire tools were developed to assess the barriers facing nurses' implementation of suction techniques at Intensive Care Units. Several literatures help to develop the tools and experts in the field of Critical care nursing department approved it. It was developed by the researchers.
2- All questions covered several aspects about knowledge about suction techniques, the barriers which faced the nurses during application suction techniques and attitude of nurses toward suction techniques.
3- The two tools were developed and content validity and reliability was done.
4- Structured questions contain (9) questions for obtaining Socio-demographic data of the nurses. Structured questions contained (17) questions for assessing knowledge related to suction techniques, while (43) questions for assessing the barriers facing nurses' implementation of suction techniques at Intensive Care Units.

4-Reliability statistics:
1- Reliability factor of Tool I and Tool II were 0.817 and 0.836 respectively

5-The pilot study:

1- A pilot study was carried out before starting the data collection and it was done on a sample of (10%) nurses to test the feasibility and applicability of the tools and necessary modifications was done and they involved to the subjects.

Data collection procedure:
1-The data were collected over a period of 6 months starting from the beginning of April 2021 to the end of September 2021.
2- An interview was done to each nurse, and it was in the morning and afternoon shift.
3- The sheets were distributed to the nurse to fill it and after that it were collected.
4-The results obtained were tabulated, analyzed and relationship established.

7- Statistical analysis of data:
The study data were computerized and verified using the SPSS (Statistical Package for Social Science) version 22 to perform tabulation and statistical analysis. Quantitative data were summarized by the arithmetic mean and standard deviation. All statistical analysis was done using Alpha Cronbach test of 0.05 p value less than or equal to 0.05 was considered to be statistical significant. Frequency tables and cross tabulations with percentages was used to illustrate the result of categorical data and tested by chi square (X^2). Correlation analysis: Pearson correlation was used to test nature and strength of relation between two, three quantitative/ordinal variables.

Result

Table (1): revealed the percentage distribution of the studied nurses regarding their socio–demographic.
characteristics. In relation to age, more than three quarter (78.9%) of

the nurses were within the age < 30 years with Mean ± SD 27.52 ± 2.89 . Regarding to sex more than two third quarter (69.9%) were female. Regarding to marital status, the majority (91.6%) of the nurses were married. Regarding level of education, more than half of the nurses (51.8%) were bachelor's Degree. Regarding to place of work, about one third (30.1%) of the nurse worked at anesthesia ICU. The range of the nurses' experience was (1-10) years.

Table (2): revealed the percentage distribution of the studied nurses according to their total level of knowledge related to suction techniques. It was observed that more than three quarter (76.5%)of the total nurses have low level of knowledge related to suction techniques, and the highest level of knowledge the nurses have is(7.2%) with Mean ± SD 6.66 ± 3.44 .

Table (3): revealed the percentage distribution of the studied nurses according to their level of total score of barriers. It was noticed that more than two third (68.1%) of the total nurses have high barriers related to Intensive care Unit and less than one third (31.9%) of the total

nurses have moderate barriers related to Intensive care Unit. Mean and standard deviation is 42.02 ± 3.70.

Table (4): revealed the percentage distribution of the studied nurses according to their level of attitude related to suction techniques. It was showed that the majority (91.6%) of the nurses have negative attitude toward suction techniques, while (8.4%) of the total nurses have positive attitude. Mean and standard deviation is 32.90 ± 3.45.

Table (5): revealed the percentage comparison between barrier of the studied nurses and their level of attitude. There was a statistical significant relationship between total barrier level of the nurses and the total attitude level at P-value=0.007* using Fisher' exact test.

Table (7): revealed the correlation between total barrier score and total attitude score of the studied nurses. It was reported that there was significant negative correlation (-0.154) between total knowledge score and total barrier score and total Attitude score at p=0.048.

Table (1): Percentage distribution of the studied nurses regarding their socio–demographic characteristics

Characteristics	The studied nurses (n=166)	
	No	%
Age (in years)		
< 30	131	78.9
(30 –<40)	35	21.1
Range **Mean ± SD**	**(22 – 33)** **27.52 ± 2.89**	
Sex		
Male	50	30.1
Female	116	69.9
Marital status		
Single	13	7.8
Married	152	91.6
Divorce	1	0.6
Education		
Diploma	12	7.2
Technical Institute	66	39.8
Bachelor degree	86	51.8
Post graduate	2	1.2
Place of work		
Anesthesia ICU	50	30.1
Neurological ICU	53	31.9
Surgical and anesthesia ICU	37	22.3
Emergency Hospital	26	15.7
Training		
No	10	6.0
< 1 w.	11	6.6
1 – 2 w.	19	11.4
> 2 w.	126	75.9
Experience at other departments (in years)		
Range **Mean ± SD**	(1 – 10) 4.73± 2.20	

Table (2): Percentage distribution of the studied nurses according to their total level of knowledge related to suction techniques (n=166)

Total knowledge level	The studied nurses	
	No	%
High	12	7.2
Moderate	27	16.3
Low	127	76.5
Range	**(1–15)**	
Mean ± SD	**6.66 ± 3.44**	

Table (3): Percentage distribution of the studied nurses according to their level of total score of barriers related to suction techniques (n=166)

Level of barriers	The studied nurses	
	No	%
High	113	68.1
Moderate	53	31.9
Low	0	0
Range **Mean ± SD**	**(35 – 54)** **42.02 ± 3.70**	

Table (4): Percentage distribution of the studied nurses according to their level of attitude related to suction techniques (n=166)

Attitude	The studied nurses	
	No	%
Positive	14	8.4
Negative	152	91.6
	(20 – 51) **32.90 ± 3.45**	

Table (5): Percentage comparison between total level of attitude of the studied nurses and total level of barriers.

Total attitude level	The studied nurses (n=166)				X^2 P-value
	Total Barrier level				
	Moderate		High		
	No	%	No	%	
Negative	44	26.5	108	65.1	FE
Positive	9	5.4	5	3.0	0.007*

FE: Fisher' exact test, (*)Significant at level P < 0.05.

Table (6): Correlation between and total attitude score and total barrier score of the studied nurses

	Total barrier score	
	R	P
Total attitude score	- 0.154	0.048*

r: Pearson' correlation coefficient, (*)Significant at level P < 0.05.

Discussion

The air way suctioning is an essential component in airway management in patients on mechanical ventilation, being one of the most frequently performed invasive procedures in the Intensive Care Unit (ICU). Our finding indicate that some aspects of barriers regarding suction techniques [9]. High-quality care is necessary to assure the patient's well-being and is the vision of nursing care services. Providing high-quality nursing care is the vision of healthcare systems. Several factors contribute to providing high-quality care, which many of them need further investigation. In this line, research that helps researchers to access the thoughts and feelings of participants can play an important role in identifying care challenges and barriers [10]. Therefore, this study aims to assess barriers facing nurses in intensive care units about application of suction techniques.

Concernings ociodemographic characteristics of the studied nurses, the result of the present study delineated that the majority of the studied nurses were in the age group less than thirty years old. In this regard, this finding was matched with **Grigson (2020)** [11] who conducted a study under the title the effectiveness of planned teaching program on knowledge regarding technique of endotracheal suctioning among the Staff nurses in Selected hospital at Jabalpur City and declared that the

majority of the studied nurses were less than thirty years old **Regarding sex,** the result of the present study showed that more than two third of the studied nurses were females. This is justified by the female are dominant for this occupation and a little number of men occupying this job in Egypt. This finding was in agreement with **Parveen and Afzal (2021)** [12] who stated in a study with title of analysis of knowledge and practice for endotracheal suctioning among ICU nurses that the most of the respondents were women. On the other hand, this finding contradicted with **Majeed (2017)** [13] in a study with title assessment of knowledge and Practices of intensive care Unit nurses about endotracheal Suctioning for adult Patients in Baghdad teaching hospitals, Iraq".   Who stated that the most of the study samples were males while the remaining were females. **As regards marital status** in this study, it was noticed that the majority of the studied nurses were married. This finding was in the line with **Heidari and Shahbazi (**2017) [14] in a study with title nurses' awareness about principles of airway suctioning, found that the majority of nurses were married.

Concerning the total level of knowledge, the current study showed that more than three quarter of the total nurses were had low level of knowledge related to suction techniques. This might be related to the fact that most nurses abandon reading related to suction techniques, lack of availability of manual booklets or evidence-based practice related to suction techniques, nurses, work overload and most of the nurses did not attend of training programs related to suction techniques. This result was supported by **Afenigus et al. (2021)** [15]

who stated that the majority of the nurses had poor level of knowledge**.** Additionally Elbokhary **et al. (2015**) [16] who concluded that the majority of the studied nurses had a poor level of knowledge regarding suctioning**.** On the other hand, **Ali et al. (2017)** [17] who disagreed with the present results and mentioned in a study conducted in Peshawar, Pakistan regarding Knowledge and practice of ICU nurses regarding endotracheal suctioning in tertiary care hospitals that the majority of the ICU nurses had average knowledge and practice.

Regarding the total level of barriers that facing the nurses during application of suction techniques. It was observed that about two third of the total nurses have high barriers related to Intensive care Unit which include barriers related to nurses, patients and ICU barriers. The current study was in agreement with **Atashi et al. (2018)** [18] who conducted a qualitative descriptive study with title the barriers to the prevention of ventilator-associated pneumonia from the perspective of critical care nurses, they found most of the nurses facing diverse interrelated personal, environmental, and organizational barriers.

Regarding attitude of the nurses toward suction techniques. The current study mentioned that the majority of the studied nurses were had negative attitude toward suction techniques. This finding was in the line with **Afeniguset et al. (2021)** [15] they noticed that more than half of the nurses were had unfavorable attitude toward suction techniques. On the other hand **Alja'afreh and Mosleh (2018)** [19] in a study under the title with nurses' perception and attitudes

towards oral care practices for mechanically ventilated patients. They disagreed with the result of current study as they found that the attitude of the studied nurses was favorable.

Concerning relationship between the barrier level and the attitude of the nurses related to suction techniques. The current study showed that the nurses who had high level of barriers, had negative attitude toward suction techniques. From the researcher point of view this was due to the barriers that the nurses faced as shortage of the nurses and overwork, resulted in physical fatigue to the nurses and affect the nurses health and resulted in negative attitude toward suction techniques. This finding was in line with **Aloush   et al . (2016)** [20] who reported that poor knowledge that consider a barrier can also lead to the negative attitudes of healthcare workers toward suction techniques.

Regarding correlation between total barrier score and total attitude score of the studied nurses. The current study showed that that there was significant negative correlation between total barrier score and total attitude score. This was due to the availability of the guidelines does not reflect current practices, and a gap still exists between the current and ideal practice. Barriers to implementing the guidelines and the factors that influence nurses' compliance with the guidelines vary from country to country and from institution to institution. This was in the same line with **Jahansefat et al. (2016)** [21] they reported in a study with title

exploration of knowledge of, adherence to, attitude and barriers toward evidence-based guidelines for prevention of ventilator-associated pneumonia (VAP) that nurses' attitudes were strongly influenced by thinking and reasoning, lack of time (barriers) and poor knowledge can also lead to the negative attitudes of healthcare workers towards suction techniques.

References

1- Chatwin M, Toussaint M, Gonçalves R, SheersN. Airway clearance techniques in neuromuscular disorders. Respiratory Medicine Journal. 2018; 1(36): 98-110.

2-Pinto H, Sanil T. Knowledge and practices of endotracheal suctioning amongst nursing professionals: A systematic Review. Indian Journal of Critical Care Medicine. 2020; 24(1): 23-5.

J3-Mahran G, Taher A, Saleh N. Challenges and work crisis facing critical care nurses. Egyptian Nursing Journal. 2017;14(3): 235.

4-Qohal A, Kaddaf F. Obstacles associated with considering family as client (Family Centered Care). Open Journal of Nursing. 2019; 9(8):795-96.

5-Driscoll A, Grant M, Carroll D, Dalton S, Deaton C, Jones I, et al. The effect of nurse-to-patient ratios on nurse-sensitive patient outcomes in acute specialist units: A systematic review and meta-analysis. Eur J Cardiovasc Nurs. 2018; 17(1): 6–22.

6-Rajaeian Z, Alavi N. Barriers to nursing performance from the perspective of nurses working in Intensive Care Units. Kashan/Iran. Journal of Critical Care Nursing. 2018; 11(1):1-6.

7-Aboalizm S , Abd Elhy A. Effect of Educational Intervention on nurses' knowledge and practices regarding endotracheal tube suctioning. *International Journal of Nursing and Health Science.* 2019; 5(3): 1-8.

8-Alsai' O. Barriers Influence the quality of oral care in Intensive Care Units at Tanta University Hospital. The new Egyptian Journal of Medicine. 2010 ; 42(1): 5.

9-Pathmanathan N, Beaumont N, Gratrix A. Respiratory physiotherapy in the critical care unit. Continuing Education in Anaesthesia, Critical Care & Pain. 2015; 15(1): 20-25.

10-Zamanzadeh V, Valizadeh L, Tabrizi F, Behshid M, Lotfi M. Challenges associated with the implementation of the nursing process: A systematic review. *Iran J Nurs Midwifery Res*. 2015; 20(4): 411-19.

11- Grigson S. A Study to assess the effectiveness of planned teaching program on knowledge regarding technique of endotracheal suctioning among the staff nurses in selected hospital at Jabalpur City (Madhya Pradesh). International Journal of Emergency and Trauma Nursing, 2020; 6(1): 1-5.

12-Parveen K, Afzal M. Analysis of knowledge and practice for Endotracheal suctioning among ICU Nurses.: A multicenter student. Biological and Clinical Sciences Research Journal. 2021; (1): 19-20.

13-Majeed H. Assessment of knowledge and practices of intensive care unit nurses about endotracheal suctioning for adult patients in Baghdad teaching hospitals, Iraq. International Journal of Research in Medical Sciences. 2017; 5(4): 1396-404..

14-Heidari M, Shahbazi S. Nurses' awareness about principles of airway suctioning. Journal of Clinical Diagnostic Research. 2017; 11(8):17-27.

15-Afenigus A, Mulugeta H, Bewuket B. Skill of suctioning adult patients with an artificial airway and associated factors among nurses working in intensive care units of Amhara region, public hospitals, Ethiopia International Journal of Africa Nursing Sciences. 2021; 14 : 100-29.

16-Elbokhary R, Osama A, Al-Khader M. Knowledge and practice of ICU nurses regarding endotracheal suctioning for mechanically ventilated patients in Khartoum Teaching Hospital. American Journal of Clinical Neurology and Neurosurgery. 2015; 1(2): 92-8.

17-Ali N, Hussain S, Faisal S. Knowledge and practice of ICU nurses regarding endotracheal suctioning in tertiary care hospitals, Peshawar. Nurse Health Care Journal. 2017; 2(4): 555-95.

18-Atashi V, Yousefi H, Mahjobipoor H, Yazdannik A. The barriers to the prevention of ventilator-associated pneumonia from the perspective of critical care nurses: A qualitative descriptive study. Journal of Clinical Nursing. 2018; 27(6): 1161-70.

19-Alja'afreh A, Mosleh S. Nurses' perception and attitudes towards oral care practices for mechanically ventilated patients. Saudi Medical Journal. 2018; 39 (4): 379-85.

20- Aloush M, Abdelkader A, Al-Sayaghi M, Tawalbeh L, Suliman M. **Compliance of nurses and hospitals with ventilator-associated pneumonia prevention guidelines: A middle eastern survey**. J Nurs Care Qual. 2018; 33 (3): 8-14.

21-Jahansefat L, Vardanjani M. Bigdelian H, Massoumi G, Khalili A. Exploration of knowledge of, adherence to, attitude and barriers toward evidence-based guidelines (EBGs) for prevention of ventilator-associated pneumonia (VAP). A Quali-Quantitative survey. International Journal of Medical Research & Health Sciences. 2016; 5(9): 67-73.