Nurse's Practices for Patients Undergoing Respiratory Ventilator in the Intensive Care Unit

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Abstract

Background: Mechanical ventilation can partially or fully replace spontaneous breathing. Its main purpose is to improved gas exchange and decreased work of breathing by delivering preset concentrations of oxygen at an adequate tidal volume. An artificial airway (endotracheal tube) or tracheostomy is needed to a patient requiring mechanical ventilation, the roles of the nurses in the respiratory care unit are vital in assessing and monitoring the response of these patients to ventilation, and intervene to maintain oxygenation and ventilation. Aim of this study: The study aims to assess the nurse's practices for patients undergoing respiratory ventilator in the intensive care unit, and to find out the relationship between the nurses' practices and socio - demographic characteristics which as the gender, level of education, years of experiences, and training course. Methodology: A descriptive study has been carried out to nurse's practices for patients undergoing respiratory ventilator in the intensive care unit at Al-Diwaniyah teaching hospital for the period from April 20th, 2021, to October 14th, 2021. Nonprobability (purposive) sample of (40) nurses who work in intensive care unit at Al-Diwaniyah teaching hospital. The sample has been collected by using assessment instrument which consists of two parts: part I: demographical characteristics of the nurse which consist of 7 items. Part II: observational checklist for the nurses in the intensive care unit which consists of 20 items. The researcher used the appropriate statistical methods in the data analysis, which included descriptive data analysis and inferential data analysis. The analyzed data have been conducted through application of descriptive statistics (Frequencies, Percentages, Mean of Scores and Standard deviation). Also, inferential statistics (Chi-Square test for testing the independency distribution of the observed frequencies); In addition, the comparison significant for this study the significant P-value ≤ 0.05. Results: Results of the study shows the nurses practices in the intensive care unit, the highest of nurses' practices items are (sometimes). While (never) was the main nurses' practices regarding use the appropriate size of the face mask, change the oxygen mask for each patient and use clean suction technique and shows that 51% of nurses' practices have sometimes, while 22% of them have never and 27% of them have Always concerning to overall assessment of nurses' practices. Also, there is a significant association between overall assessment of nurses' practices and some variables in demographic data of the study sample, at P. value <0.05. In regard to education level of the sample, it shows that there is a highly significant association at P-value (0.001); also, there are a significant association at P-value (0.03) regarding training courses about intensive care unit, and there are highly significant associations at P-value (0.001) regarding duration of training courses. Conclusions: The study concluded that the majority of nurses in intensive care unit wear sterile personal protective equipment and provide patient's privacy by covering the patient, while high percentage of nurses does not use the appropriate size of the face mask, change the oxygen mask for each patient and does not use clean suction technique. Also, there are a highly relationship between education level, and duration of training courses about intensive care unit of the nurses in the sample and their efficiency in nursing practice. Recommendations: The study recommended engaging intensive care nurses in special training course (inside and outside of Iraq) to improve knowledge and practice regarding mechanical ventilation, and nursing staff in the intensive care unit, must include those nurses who have bachelor's degree in nursing only. Also, health directorate should provide poster fixed on intensive care unit walls including responsibilities and duties of nurses in this unit and supply the hospitals with enough equipment and facilities used in intensive care unit.

Keywords: Assessment, Nurse's practices, Mechanical ventilation, Intensive care unit.

1. Introduction

Mechanical ventilation is an essential, life-saving therapy for patients with critical illness and respiratory failure. Endotracheal suction is a procedure which aims to keep airways patent by mechanically removing accumulated pulmonary secretions, in patients with artificial airways, all patients with an artificial airway require endotracheal suctioning to remove secretions and prevent airway obstruction (1). Although mechanical ventilation is essential to maintain ventilation and oxygenation, it can cause adverse effects. Patients on mechanical ventilation are prone to develop complications such as alveolar hypoventilation, alveolar

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hyperventilation, fluid and electrolyte imbalance Although mechanical ventilation is essential to maintain ventilation and oxygenation, it can cause adverse effects (2). Studies have shown that Ventilator Associated Pneumonia is one of the most common infectious complications among patients admitted in intensive care units and accounts for up to 47% of all infections among intensive care unit patients. It prolongs the length of stay in respiratory care unit and increase the risk of death in critically ill patients (3). Optimal pre oxygenation is vitally important with the aim of providing an increased apneic time to allow more time for airway management before the patient's oxygen saturations weakening. Appropriate positioning of the patient helps to improve the apneic time by decreasing dependent atelectasis. The Fowler's or semi-Fowler's position helps to improve both ventilation and laryngoscopy view by aligning the oral, pharyngeal and laryngeal axes (4). The role of the nurse in the intensive care unit is essential in assessing clinical condition of the patient in intensive care unit and the nurse monitors the patient's response to ventilation, intervenes to maintain oxygenation and ventilation and ensures that the patient's complex needs are met (5). Therefore, in order to provide a better comprehensive care to the mechanically ventilated patient and to reduce the cases of common complications of endotracheal suctioning, nurses' practices are essential when it is built on effective scientific evidence regarding variety of approaches of endotracheal suctioning procedure and other facts related to it (6). Close observation and protection to the patients is one of the most important procedures in nursing intervention. Therefore, adequate number of nurses needed to be assigned for more specific dimension that needs human resources, the ratio between the nursing professional's number and the total patients at intensive care unit must be considered (7).

2. Objectives of the study

1) To assess the nurse's practices for patients undergoing respiratory ventilator in the intensive care unit.
2) Find out the relationship between the nurses' practices and socio - demographic characteristics which as the gender, level of education, years of experiences, and training course.

3. Methodology

Study Design: A descriptive study has been carried out to assessment of nurse's practices for patients undergoing respiratory ventilator in the Intensive care Unit at Al-Diwaniyah Teaching Hospital. This study began from April 20th, 2021, to October 14th, 2021.
Study Setting: The study has been carried out in Al-Diwaniyah Health Directorate at Al-Diwaniyah teaching hospital in the intensive care unit.
Study Sample: Nonprobability sampling has been performed. A purposive sample of (40) nurses who work in the intensive care unit at Al-Diwaniyah teaching hospital.
Instrument Construction: After extensive review of relevant literature, the checklist has been constructed for the purpose of study. The checklist (observational tool) consists of (20) items which include two parts:
Part I: Demographical characteristics of the nurse: This part consists of (7) items which include: Age, Gender, Marital status, educational level, Years of working in nursing practice, Years of experience in intensive care unit, and Training courses about intensive care unit.
Part II: Observational checklist for the nurses in the intensive care unit: This part consists from 20 items about nurse's practices in the intensive care unit which include: The nurse wears sterile personal protective equipment, Position of the patient in semi-Fowler's or Fowler's position, Provide patient's privacy by covering the patient, Use sterile equipment for airway care, Check breathing tube, Control ventilator parameters, Check oxygen cylinder, Use the appropriate size of the face mask, Change the oxygen mask for each patient, The trolley containing laryngoscopes and available ambu-bag, Check the patient's respiratory status (respiratory rate, depth , and characteristics), Monitoring oxygen saturation value, Select appropriate sensor site, Check the pulse oximeter weather functioning or not, Use clean suction technique, Check suctioning equipment, Observe for obvious airway obstructions by (secretions, blood clots or food particles), Administer medications prescribed by specialist physician to treat respiratory complications, Monitor possible adverse effects of administered medications, and Documentation of administered medications.
Data Collection: The data have been collected from June 4th to August 24th, 2021. The researcher has gathered the objective's responses through an application of direct observation as mean of data collection. Nurses were observed while they are working in the intensive care unit. The researcher observed each nurse three observations and among each observation and the next observation (10) days' time period. Three correct nursing practices out of 3 episodes were rated as (always). 2-1 correct nursing practices out of 3 episodes were rated as (sometimes). No correct nursing practices out of 3 episodes was rated as (never).
Statistical Data Analysis: The following statistical data analysis approaches is used in order to analyze the data of the study under application of the statistical package of social science (SPSS) version (19), and the Microsoft excel (2010):
1. Descriptive Data Analysis: Tables (Frequencies and Percentages), Summary Statistics tables including: Mean, Mean of scores and Standard Deviation (SD; In addition, the assessment by cutoff point (o.66%) due to the three points likert scales with three levels of assessment, never (1-1.66), sometimes (1.67-2.33), and always (2.34-3).
2. Inferential Data Analysis: This approach used to accept or reject the statistical hypothesis, which includes: Chi-Square test for testing the independency distribution of the observed frequencies, and for measuring the association between the studies variables according to its type;

In addition, the comparison significant for this study the significant P-value ≤ 0.05.

4. Results

Table (1): Nurses' Demographic Data: (N=40)

Data	Rating and intervals	Frequency	Percent
Age / years	20-29 years	20	50
	30 – 39 years	11	27.5
	40-49years	5	12.5
	50 years and more	4	10
Gender	Male	30	75
	Female	10	25
Marital	Single	12	30
	Married	28	70
Education	Secondary nursing school	9	22.5
	Technical institute of nursing	14	35
	College of nursing	17	42.5
Years of Working in nursing practices	3 years or less	10	25
	4 years and more	30	75
Years of Experience in intensive care unit	3 years or less	12	30
	4 years and more	28	70
Training courses about intensive care unit	Yes	16	40
	No	24	60
Duration of training courses / days	7 days or less	22	55
	7 days and more	18	45
Setting of training courses	No	24	60
	Inside of Iraq	16	40

Table (2): Observational checklist for the nurses in the intensive care unit by three applying levels (Never, Sometimes, Always): (N=40)

Items	Levels	Frequency	Percent	M.S	Evaluation
The nurse wears sterile personal protective equipment	Never	1	2.5%	2.72	Always
	Sometimes	5	12.5%		
	Always	34	85%		
Position of the patient in semi-Fowler's or Fowler's position	Never	10	25%	2.18	Sometimes
	Sometimes	13	32.5%		
	Always	17	42.5%		
Provide patient's privacy by covering the patient	Never	2	5%	2.35	Always
	Sometimes	16	40%		
	Always	22	55%		
Use sterile equipment for airway care	Never	5	12.5%	2.12	Sometimes
	Sometimes	25	62.5%		
	Always	10	25%		
Check breathing tube	Never	9	22.5%	1.98	Sometimes
	Sometimes	23	57.5		
	Always	8	20%		
Control ventilator parameters	Never	6	15%	2.28	Sometimes
	Sometimes	17	42.5%		
	Always	17	42.5%		
Check oxygen cylinder	Never	3	7.5%	2.28	Sometimes
	Sometimes	23	57.5%		
	Always	14	35%		
Use the appropriate size of the face mask	Never	21	52.5%	1.55	Never
	Sometimes	16	40%		
	Always	3	7.5%		
Change the oxygen mask for each patient	Never	33	82.5%	1.20	Never
	Sometimes	6	15%		
	Always	1	2.5%		
The trolley containing laryngoscopes and available ambu-bag	Never	2	5%	2.38	Always
	Sometimes	21	52.5%		
	Always	17	42.5%		
Check the patient's respiratory status	Never	4	10%	2.15	Sometimes
	Sometimes	26	65%		
	Always	10	25%		
Monitoring oxygen saturation value	Never	4	10%	2.22	Sometimes
	Sometimes	23	57.5%		
	Always	13	32.5%		
Select appropriate sensor site	Never	11	27.5%	1.80	Sometimes
	Sometimes	26	65%		
	Always	3	7.5%		
Check the pulse oximeter weather functioning or not	Never	8	20%	1.90	Sometimes
	Sometimes	28	70%		
	Always	4	10%		
Use clean suction technique	Never	30	75%	1.28	Never
	Sometimes	9	22.5%		
	Always	1	2.5%		
Check suctioning equipment	Never	2	5%	2.25	Sometimes
	Sometimes	26	65%		
	Always	12	30%		
Observe for obvious airway obstructions	Never	8	20	2.02	Sometimes
	Sometimes	23	57.5		
	Always	9	22.5		
Administer medications prescribed by specialist physician	Never	3	7.5%	2.18	Sometimes
	Sometimes	27	67.5%		
	Always	10	25%		
Monitor possible adverse effects of administered medications	Never	8	20	1.88	Sometimes
	Sometimes	29	72.5		
	Always	3	7.5		
Documentation of administered medications	Never	10	25	1.92	Sometimes
	Sometimes	23	57.5		
	Always	7	17.5		

Table (1): Shows that 50% of the study sample within age group (20-29 years). Concerning gender 75% of the sample is males. About marital status 70% of the present study samples are married. In educational level variable 42.5% of the study samples were graduated from college of nursing. In regard to years of working in nursing practices there are 75% of the samples has 4 years or more. In addition, 70% of the sample has 4 years and more experience in intensive care unit, and 60% of nurses without history of training courses.

Mean (2), cut off point (0.66), Always (mean of scores more than 2.33), sometimes (mean of scores 1.67-2.33), never (mean of scores less than 1.67). M.S.: mean of scores, %: Percent

Table (2): Shows the nurses practices in the intensive care unit, the highest of nurses' practices items are (sometimes). While (never) was the main nurses' practices regarding use the appropriate size of the face mask, change the oxygen mask for each patient and use clean suction technique.

Table (3): Overall Assessment of Nurses' Practices					
Studied items	Levels	Frequency	Percent	M.S	Assessment
Overall assessment	Never	9	22%	2.03	Sometimes
	Sometimes	20	51%		
	Always	11	27%		
	Total	40			

Mean (2), cut off point (0.66), Always (mean of scores more than 2.33), sometimes (mean of scores 1.67-2.33), never (mean of scores less than 1.67). M.S.: mean of scores, %: Percent

Table (3): Shows that 51% of nurses' practices have sometimes, while 22% of them have never and 27% of them have Always concerning to overall assessment of nurses' practices.

Table (4): Association between the Overall Assessment of Nurses' Practices and their demographic and job-related data			
Demographical Data	Nurses' Practices		
	Chi-square value	D.F	p-value
Gender	5.7	1	0.56 NS
Education level	15.8	2	0.001 HS
Years of Working in nursing practices	2.4	1	0.28 NS
Years of Experience in intensive care unit	2.1	1	0.34 NS
Training courses about intensive care unit	7.7	1	0.03 S
Duration of training courses / days	11	1	0.001 HS
Setting of training courses	3.3	1	0.07 NS
D.F: degree of freedom; p-value: probability value.			

Table (3): Shows that there is a significant association between overall assessment of nurses' practices and some variables in demographic data of the study sample, at P. value <0.05. In regard to education level of the sample, it shows that there is a highly significant association at P-value (0.001); also, there are a significant association at P-value (0.03) regarding training courses about intensive care unit. There are highly significant associations at P-value (0.001) regarding duration of training courses.

5. Discussion

Part I: Discussion of Nurses' Demographic and Job-Related Data of the Study Sample

According to (table 1) in the results, shows that 50% of the study sample within age group (20-29 years), this result goes with the result of a previous study of Ahmed 2014 [8], she recognized in her study that the majority of the study subject's age were between (18-27) years old.

Concerning gender there are (75%) of the sample are males, this result match with the result of Faris and Hassan 2016 [9], who find 75% of the study are males.

About marital status (70%) of the present study samples are married, this result agrees with the result of Bedier, *et al.*, 2016 [10], who find (80%) of the study are married.

Concerning educational level, the majority of the study samples (42.5%) were graduated from college of nursing, this result match the result of Eskander, *et al.*, 2013 [11], who found (51%) of the study samples were graduated from college of nursing. The researcher opinion is that the better patient outcome result with highly educated nurses.

In regard to years of working in nursing there are (75%) of the samples has 4 years and more, this result match with the result of Faris and Hassan (2016), who find (70%) of the study samples has 5 years and more in regard to years of working in nursing.

Concerning years of experience about (70%) of the sample has 4 years and more experience in intensive care unit, this result goes with the result of Aysha, *et al.*, 2016 [12], who find that the highest percent of nurses were 5 years and more experience. As a matter of fact, to have some experience can be valuable because it makes the nurse more confident.

In regard to courses of training about (60%) of nurses without history of training courses about intensive care unit, this result is in agreement with the result of Eskander, *et al.*, 2013 who find (63.6 %) of nurses without training programs. Also Faris and Hassan (2016) who find (100%) of nurses have not training course. It is essential for the professional nurses to have nursing educational courses to develop their

practice in specific areas of action.

Part II: Discussion of Observational checklist for the nurses in the intensive care unit by three applying levels (Never, Sometimes, Always):

According to (table 2) in the results, Shows the nurses practices in the intensive care unit, the highest of nurses' practices items are (sometimes). While (never) was the main nurses' practices regarding use the appropriate size of the face mask, change the oxygen mask for each patient and use clean suction technique, this result match with the result of Faris and Hassan (2016) who find (95 %) of the study samples does not wear appropriate size of the face mask and changed mask every 30 minutes or sooner if it became damp.

According to (table 3) in the results, shows that 51% of nurses' practices have sometimes, while 22% of them have never and 27% of them have Always concerning to overall assessment of nurses' practices, this result match with the result of Faris and Hassan (2016) who find (60 %) of the study samples are sometimes.

Part III: Discussion of Association between the Overall Assessment of Nurses' Practices and their demographic data:

According to table (4) in the results, shows that there is a significant association between overall assessment of nurses' practices and some variables in demographic data of the study sample, at P. value <0.05. In regard to education level of the sample, it shows that there is a highly significant association at P-value (0.001); also, there are a significant association at P-value (0.03) regarding training courses about intensive care unit. There are highly significant associations at P-value (0.001) regarding duration of training courses.

This result agrees with the result of Faris and Hassan (2016) who find there are significant relationship between the nurses' practices and level of education at P. value <0.05. Also, this result agrees with the result of Ahmed 2014, who find there are highly significant associations at P. value (0.001) regarding to training courses, and duration of training courses. The researcher opinion is that training courses are very necessary to improve nurses' practices and develop the skill of the nursing staff in the intensive care unit.

6. Conclusions

According to the present study results, the researcher can mention the following conclusions

The majority of nurses in intensive care unit wear sterile personal protective equipment and provide patient's privacy by covering the patient.

High percentage of nurses does not use the appropriate size of the face mask, change the oxygen mask for each patient and does not use clean suction technique.

Many nurses did not follow the procedures and protocols in giving care to the patient during mechanical ventilation in respiratory care unit.

There are a highly relationship between education level, and duration of training courses about intensive care unit of the nurses in the sample and their efficiency in nursing practice.

7. Recommendations

Based on the study results discussion and conclusions, the study has Recommended the following

Engaging intensive care nurses in special training course (inside and outside of Iraq) to improve knowledge and practice regarding mechanical ventilation.

Health directorate should apply continuous education programs to improve nurses' knowledge and practice toward the newest issues related to mechanical ventilation in intensive care unit.

Nursing staff in the intensive care unit, must include those nurses who have bachelor's degree in nursing only.

Health directorate should provide poster fixed on intensive care unit walls including responsibilities and duties of nurses in this unit.

Health directorate should supply the hospitals with enough equipment and facilities used in intensive care unit.

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