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Examining the quality of care provided for the intubated patients with ventilator and without ventilator in a teaching hospital in 1998

Mohammad Reza Ghaffary ,*
Associate Professor of Tuberculosis and Lung Disease Research Center, Tabriz University of
Medical Sciences, Tabriz, Iran

Shamsi Ghaffari
Shamsi Ghaffari, Associate Professor of Pediatric Cardiology, Medical Faculty, Tabriz University, Tabriz, Iran
**Corresponding author.*

ABSTRACT

Background and Aim: The present study aimed to examine the quality of care provided for the intubated patients with ventilator and without ventilator in Imam Khomeini Hospital in Tabriz.
Methods: In this study, an observational form that included 21 questions was used at intervals of 45 days (Fall 1998) to examine 144 intubated patients with ventilator and without ventilator in 6 units (4 intensive care units and non-intensive care units). The data were analyzed using descriptive and inferential statistics.
Results: The results showed that in 55.6% of the cases, the size of the endotracheal tube guided into trachea was appropriate, but in 25% of the cases, the endotracheal tube guided into trachea more than the standard. In 97.2% of cases, nurses did not pay attention to the remaining volume of cardiac gavage when performing gavage. In 50% of cases, non-use of oral airway tube was not observed in conscious intubated patients. In 95.8% of cases, the size of the catheter used for suctioning of airways of intubated patients was incorrect. In 71.5% of cases, nurses did not recognize the symptoms of airway obstruction. In 99.3% of cases, hand washing technique was not observed in the care of different patients. In 100% of cases, the method of disinfection of respiratory circuits and ventilators was non-standard. In 86.1% of cases, Ambu bag or other respiratory device such as masks was not disinfected. Also, the results of inferential statistics revealed no statistically significant difference between the type of shift and observing standard principles. However, there was a significant difference between type of unit and observing some cases.

Conclusion: According to the observations of this study, some cases were observed that non-observing of them can endanger the patient's life, and since most of these cases were not observed in patients' bedside, high mortality in intubated patients with or without ventilator can be related to non-observing of the basic points of nursing.
Keywords: Intubated patients, ventilator, nursing care.

Introduction

Without doubt, breathing is a vital part of life, and there are many internal diseases and surgeries that disrupt this part of life and endanger human life. In such cases, if breathing is allowed for a person for a while using mechanical device, the underlying problem may be solved and thus recovery will be achieved. Nurses play a unique role in this regard, since they are responsible for making treatment measures and they have more contact with patients than other members of the health team. Thus, they have a critical role in treating patients. Mortality rate in intensive care units is more than non-intensive care units. However, high mortality rate in intensive care units and the patients who need intensive care in general units can be related to the performance of nurses. Patients with endotracheal tubes are at greater risk than those without endotracheal tubes. For example, in these patients, the return of gastric contents is more likely in these patients. Anxiety, stress and fear can delay the emptying of the stomach, so it is recommended to measure the remaining contents of the previous gavage before performing the gavage, and if remaining volume is more than 50 ml, do not perform the next gavage (1). Several studies have shown that in patients admitted to intensive care units, the rate of deviation of the endotracheal tube to one of the bronchi is higher. One study reported that in 9.6% of cases, the endotracheal tube was located in the right main bronchus it was one of the reasons for the increase in mortality among patients admitted to the intensive care unit (2). Endotracheal tube deviation usually to one of the brunches, usually the right one, is more common in females than males, and it is due to the shortness of women (2).

Regarding the pressure size of the airway cuff, Rippe reports that although the use of low pressure cuffs has significantly reduced the complications of tracheal wall ischemia, paying attention to the cuff pressure it is very important. The cuff should be filled with air so that only the sound of air leakage is not be heard when the ventilator is inhaled. In most cases, if the cuff pressure is maintained between 17-23 mm Hg, both the ventilator inhalation air will not leak from the side of the cuff and the blood supply to the trachea wall will not be disrupted. Also, severe abdominal bloating in patients with endotracheal tube increases the possibility of tracheal fistula to the esophagus because this condition makes the cuff more prominent towards the esophagus and increases the pressure on the tracheal wall (4). If the patient experiences bloating during resuscitation, it should be ensured that patient has a tube before inserting a gastric tube. Aspiration increases the risk of ARDS complications (5).

Also, in patients with artificial air tubes, due to suctioning, coughing, changing position and chest physiotherapy, dry discharges might be separated from the lower extremities and obstruct the inside of the endotracheal tube. Sometimes, this condition causes severe and sudden disturbances in gas exchange. One of the symptoms of tracheal obstruction is that the suction catheter cannot be easily guided inside the endotracheal tube (6). There are many cases in which the patient is abandoned after intubation and after a while the person in charge of the aspirator is recalled to the patient's bedside that the patient is in crisis and needs to be connected to a ventilator. In most cases, the problem is the dryness of discharges and airway obstruction. Dryness of discharges or blood in the trachea, even if it does not completely obstruct the airway, can increase the patient's respiration rate by creating stenosis (7) and cause fatigue and unnecessary connection of the patient to the ventilator, and consequently impose numerous ventilator risks on the patient.

It is always recommended not to connect the patient to ventilator as much as possible and use mechanical ventilation for the patient when there is no other way to treat the patient and to separate the patient from the ventilator as soon as possible (8). However, owing to the importance of nursing measures, the present study was conducted to detect possible deficiencies and take appropriate measures to eliminate them.

Methodology

The present study is a descriptive-analytical research. The statistical population of the study included all patients who had an endotracheal tube or tracheostomy tube for any reason and were hospitalized in Imam Khomeini Hospital in Tabriz and were treated with a ventilator or without a ventilator. Sampling was done by non-probabilistic method, so that all patients qualified as the study population during the study period were examined. Also, sampling was purposeful and among the hospitalized patients, some of them who have artificial air tubes for any reason were considered as research samples. The number of research samples in this study was 144 patients.

In the present study, an observational form consisting of 21 questions was developed to evaluate the quality of care provided to intubated patients. In developing the questions, an attempt was made to consider the cases that had greater importance using the textbooks. The researcher attended the intubation patients' bedside and reviewed and recorded the items inserted in the observation. Content validation method was used to determine the scientific validity of data collection tools. Thus, after developing the observational form, a number of specialists and nurses who are experts in the care of patients who needed for intensive care were asked to study the cases and express their opinions. After applying the corrective comments of these experts, the observational form was developed and used. Data analysis was performed using Spss software.

Results

Considering the relationship between the quality of measures, type of shift, and the type of unit, the results of the analysis are shown with the parameters of chi-square, degree of freedom (df) and p-value.

Table 1: Frequency of percentage related to the quality of care for intubated patients with the criteria of yes and no and not necessary

Cases related to caring intubated patients	Percentage of yes	Percentage of no	Percentage of not necessary
Is the size of the endotracheal tube inside the trachea appropriate?	55.6	25	19.4
Is the cuff pressure of the endotracheal tube appropriate?	58.3	40.3	1.4
Is attention paid to remaining volume of previous gavage?	2.8	97.3	-
Is the patient position appropriate?	65.3	34	0.7
Is Bite Block used instead of airway?	-	34.7	65.3
Is the size of the suction catheter appropriate?	4.2	95.8	-
Does the nurse detect the signs of airway obstruction?	18.1	71.5	10.3
Does the nurse detect ventilation of one side of the lungs?	59	27.1	13.9
Does the nurse observe the hands washing technique and?	0.7	99.3	-
Are respiratory circuits of ventilators disinfected in good condition?	-	100	-
Is the Ambu bag in the patient bedside in the unit clean?	65.3	33.3	1.4
Is there a specific embargo for each intubated patient?	13.2	86.1	0.7
Are respiratory device such as masks and catheters cleaned and disinfected before using by another patient?	3.5	96.5	-

As seen in the table, in most cases, cares are not provided properly.

Table 2: Examining the relationship between the quality of care of intubated patients and the type of work shift (morning, evening and night)

cases related to caring intubated patients	P	df	X^2
Is the size of the endotracheal tube inside the endotracheal appropriate?	0.09	4	7.92
Is the cuff pressure of the endotracheal tube appropriate?	0.19	4	6.10
Is attention paid to remaining volume of previous gavage?	0.16	2	3.60
Is the patient position appropriate?	0.38	4	4.18
Is Bite Block used instead of airway?	0.8	2	0.42
Is the size of the suction catheter appropriate?	0.59	2	1.04
Does the nurse detect the signs of airway obstruction?	0.51	4	3.26
Does the nurse detect ventilation of one side of the lungs?	0.08	4	13.62

Does the nurse observe the hands washing technique and?	0.36	2	2.01
Are respiratory circuits of ventilators disinfected in good condition?	0.08	2	4.15
Is the Ambu bag in the patient bedside in the unit clean?	0.06	4	8.80
Is there a specific embargo for each intubated patient?	0.48	4	3.48
Are respiratory device such as masks and catheters cleaned and disinfected before using by another patient?	0.81	2	0.41

As seen in the table, in all cases, there is no statistically significant difference among morning, evening and night shifts in terms of the quality of care.

Table 3: Examining the relationship between qualities of the cares provided for intubated patients and type of unit

cases related to caring intubated patients	p	df	X^2
Is the size of the endotracheal tube inside the trachea appropriate?	0.00	10	38.33
Is the cuff pressure of the endotracheal tube appropriate?	0.00	10	29.93
Is attention paid to remaining volume of previous gavage?	0.14	5	8.22
Is the patient position appropriate?	0.00	10	59.12
Is Bite Block used instead of airway?	Non-calculable	-	-
Is the size of the suction catheter appropriate?	0.13	5	8.34
Does the nurse detect the signs of airway obstruction?	0.00	10	41.96
Does the nurse detect ventilation of one side of the lungs?	0.00	10	36.96
Does the nurse observe the hands washing technique and?	0.41	5	5.93
Are respiratory circuits of ventilators disinfected in good condition?	Non-calculable	-	-
Is the Ambu bag in the patient bedside in the unit clean?	0.00	10	53.19
Is there a specific embargo for each intubated patient?	0.00	10	114.29
Are respiratory device such as masks and catheters cleaned and disinfected before using by another patient?	0.0001	5	25.89

As seen in the table, in most cases, there was a statistically significant difference between the type of unit and the quality of nursing care.

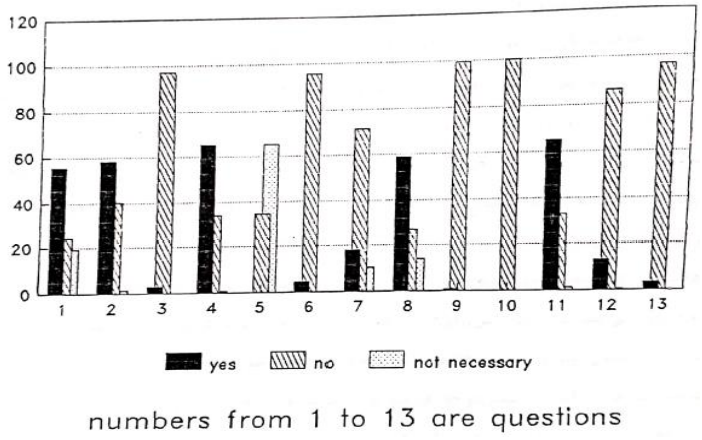

Figure 1: Quality of cares provided for intubated patients connected to a ventilator or without a ventilator based on yes and no

Discussion

The present study aimed to evaluate the quality of care for intubated patients connected to a ventilator or without a ventilator. The results revealed that in most cases (55.6%), the size of the endotracheal tube was in good condition, and in 25% of cases, the size of the endotracheal tube was guided to inside the trachea more than the standard. Goodman suggests that endotracheal tube should be placed in the trachea

so that its end to have 5 cm (+/-2) distance from the carina. He reports that bending the head by 2 cm and turning the head sideways by 1 cm guides the end of the endotracheal tube to the carina. Thus, if the end of the endotracheal tube is placed at a distance of one third of the lower middle of the endotracheal tube, it will be at 3-4 cm distance from the carina (9).

It is practically suggested by experts in the medical center that if the endotracheal tube is guided approximately at 20 cm distance from the mouth to the endotracheal tube, it will be far enough away from the carina and the probability of accidental exit of the endotracheal tube will be low. Miller (10) reports that the appropriate length of the endotracheal tube inside the trachea can be determined in children using this formula (Half age + 12). In 58.3% of cases, the cuff pressure was such that the probability of aspiration and damage to the trachea wall was low. The cuff pressure of artificial air tubes should be maintained between 18 and 22 mm Hg and the cuff should not be routine, because the probability of aspiration increases (11).

In 97.2% of cases, nurses did not pay attention to the remaining volume of the previous gavage before the suction. In a patient who is being treated with a ventilator or suffers severe disease, there are reasons that gastric emptying is slower than normal. These reasons delay gastric emptying include pain, stress, anxiety, and severity of disease. For these reasons, the nurse should aspirate and measure the contents of the previous gavage before performing the gavage, and if there is more than 50 ml of fluid in the stomach, gavage should not be performed (12). Since almost all patients admitted to intensive care units suffer discomforts that delays gastric emptying, it is important to pay attention to the remaining volume of previous gavage.

In 65.3% of cases, the patient's position was appropriate, and in 34% the position, it was inappropriate. The supine position is a risk factor for aspiration in a ventilator-treated patient. Torres et al. conducted a research in which two groups of patients were selected. One group received radioactive material as gavage in a supine position and the other group received it in a semi-sitting position. Finally, it was found that in the 68% of those received in the supine position, radioactive material was discovered in their throat and trachea. However, it was reduced by 32% in the semi-sitting group.

They concluded that a semi-sitting position is a convenient and effective way to reduce the risk of aspiration of gastric contents into the lower airways (7). In 34.7% of cases, an airway was used instead of a bite block for the conscious patient who had a healthy reflex. In the remaining 65.3%, the patient's condition was such that there was no problem to use of a bite block. It should be noted that the oral airway causes vomiting by stimulating the posterior wall of the throat. Therefore, this device is used only in patients who do not have gag reflex (5). In 95.8% of cases, the diameter of catheters used for airway suction diameter was not compatible with the caliber of the endotracheal tube.

A general rule on the size of a suction catheter is that the diameter of the catheter should be less than half of diameter of the endotracheal tube (2). In 71.5% of the cases, nurses could not detect the symptoms of airway obstruction. Dryness of discharges dryness of blood in the trachea can cause complete obstruction or narrowing of the airway. Partial obstruction can also reduce airflow and increase respiratory rate (7), which results in respiratory muscle fatigue. Although the result of the blood gas test may indicate the patient's need for a ventilator, patient’s connection to the ventilator can make his condition even worse. In 59% of cases, nurses had knowledge about the symptoms and non-ventilation of one side of the lungs and hand washing technique was not observed in 99.3% of cases.

Although it is difficult to prevent nosocomial pneumonia in patients who are severely ill and are being treated with a ventilator, even in ideal conditions, in countries with limited facilities, lack of doing it may increase the incidence of some cases. One of the cases seen in the bedside of these patients is that after suctioning a patient's trachea, nurses suck another patient without washing their hands, and thus transfer germs from one patient to another patient (8). The method of disinfecting respiratory circuit of ventilators was incorrect in 100% of cases. In 65.3% of cases, the T-shaped part of the Ambu bag was clean and in

33.3%, it was dirty. In 86.1% of cases, Ambu bag was used commonly for several patients. In 96.5% of cases, oxygen masks and catheters were not disinfected and packaged after use for one patient and before use for another patient. Hand-held respiratory device, including Ambu bag, should be sterilized before using by another patient or at least be disinfected with a high-grade disinfectant (8).

Conclusion

The results showed that the quality of nursing procedures was relatively good in some cases, and needs more attention in most cases. The results of this study showed that there is a statistically significant difference between the quality of nurses' performance and the type of unit, so that in the intensive care units, especially in our studied unit, some cases were better observed than other units. For example, the cleanliness of the Ambu bag, the use of a special Ambu bag for each patient and the disinfection of the Ambu bag and respiratory device before using by another patient were observed more in the respiratory intensive unit than other intensive care units and general units. There was no statistically significant relationship between the quality of nursing performance and the type of shift.

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