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Assessing nurses' performance in endotracheal tube suctioning in Neonatal Intensive Care Units

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ABSTRACT

Aims: One of the most important nursing interventions for the patients using endotracheal tube is on time and accurate discharge of respiratory tract secretions. Improving nurses' performance in taking care of the newborns with endotracheal tube is an important factor in reducing side effects of frequent suctioning and acceleration in patients' improvement. This study has been done in order to "assess nurses' performance in endotracheal tube suctioning".
Methods: It is a descriptive-cross sectional study. 48 nurses working in NICU of the training hospitals affiliated to Ahvaz Medical Sciences University were chosen through census method in 2014. A questionnaire was prepared to assess nurses' performance before, during and after endotracheal tube suctioning and to compare their performance according to suctioning standard procedure; the questionnaire was consisted of demographic information and a standard checklist regarding endotracheal tube suctioning. Data analysis was done through using descriptive statistical test and SPSS 19 software.
Results: 83.4 percent of the workers were women and 16.6 percent were men and they were 26-35 years old. 54.1 percent had attended intensive care in service-training. 52.1 percent of the nurses had 5 years or less working experiences in ICUs. 64.6 percent had good performance and 35.4 percent had medium to poor performance.
Conclusions: According to the results of the present study, most of the nurses working in ICUs had good performance regarding endotracheal tube suctioning. So it is necessary to consider in-service training regarding correct and appropriate endotracheal tube suctioning for those who did not have good performance too, since lack of appropriate performance of endotracheal tube suctioning by a small number of nurses might be dangerous for the patients hospitalized in ICUs.

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1. Introduction

The primary purpose of taking care of at risk newborns is establishing and maintaining their breathing. Many of these newborns need oxygen and mechanical ventilation; usually an artificial airway such as tracheal intubation is used for this purpose. Due to possibility of

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tracheal intubation obstruction, endotracheal tube suctioning is a method that is typically needed for airway clearance in these patients. The purpose of tracheal suctioning is pulmonary drainage in patients who are unable to cough and clean secretions effectively. Tracheal intubation suctioning is an essential procedure for keeping it open but this procedure is not safe and should never be done as a routine work [1].

Severe side effects such as hypoxia, bradycardia, atelectasis, pneumothorax and pneumonia can occur due to tracheal intubation suctioning; nosocomial pneumonia and entry of Microorganisms into injured blood stream mucosal is highly prevalent. Studies indicate that, lack of performing required cares through airy artificial ways in patient under mechanical ventilation will burst pneumonia due to ventilator in patients hospitalized in ICUs. Prevalence of pneumonia in mechanically ventilated patients is equal to 12.2 percent with a mortality rate of 29.3 percent [4-2].

Observing correct principles of tracheal intubation suctioning is one of the most important factors in taking care of newborns. Standard suctioning instruction is various in different centers and usually they aren't according to physiological principles or results of the recent researches. Considering suctioning side effects, it's better to do suctioning for intubated newborns only in required times and by professional personnel and to avoid routine suctioning of newborns. Clinical symptoms of needing suctioning are: changing in rhythm and quantity of breathing, secretions of tracheal intubation, reduction of breathing voices, and reduction of arterial oxygen saturation, increasing carbon dioxide in blood, reduction of arterial oxygen pressure, bradycardia, change in drawn pattern in ventilator and newborn restless [7-5].

Due to risks of tracheal intubation suctioning, it is necessary for the nurses to be familiar with new scientific-research advices on its various aspects and to assess their educational needs [8].

There are different methods of tracheal intubation suctioning in different units and even every one of the nurses uses his/her own method and does not use standard method. A method that is safe, has less pain, discomfort and anxiety is the ideal method of tracheal intubation suctioning; so that it creates less effects such as decreased lung volume, drop of arterial oxygen saturation, cardiovascular changes, changes in central nervous system, tissue damage to respiratory system and respiratory infections and is effective; it also removes respiratory secretions completely and keeps airways clean and without obstruction [9].

Hospital respiratory infections mortality varies between 30-50 percent; these numbers rises considerably by manipulating respiratory tract; it has been said that it is because of non-normative practices and lack of equipment and facilities for discharging respiratory secretions. So, intensive care unit with new technology is required to take care of these patients to be able to save these patients' life from certain death risk and keep them in a good condition [10].

In a study about assessing needs to suctioning in NICU of a university hospital in Tabriz, it was found out that neonatal tracheal intubation suctioning is performed routinely and without researching [11]. Also, findings of another research in this regard showed that nurses have a medium knowledge about tracheal intubation suctioning (obtaining 50 to 75 percent of the total mark) and their performance is weak (obtaining less than 50 percent of total score) [12]. Since nurses have an effective role in taking care of these patients and great care is usually done by them, in order to reduce complications due to cares such as suctioning, nurses working in ICU should have enough skills and knowledge in taking care of these patients and working with suctioning device and its correct performing way [13]. According to the research findings, it is essential for nurses to learn correct principles of tracheal intubation suctioning in NICU. Education improves knowledge level and nurses'

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performance. But over time, level of knowledge and practice, particularly level of knowledge will be decreased. Hence, continuous education is known as a means for responding to rapid changes in care method and raising professional standards of nursing [14].

Nurses as main drivers of hospitals have an important role in taking care of patients thus enhancing quality of their work in taking care of patients is the most important factor that can speed up recovery [13]. So this study is done with the aim of "assessing nurses' performance in tracheal intubation suctioning in NICU".

2. Methods

It is a descriptive cross-sectional study, which was done with the aim of assessing performance of nurses in tracheal intubation suctioning in NICUs of educational hospitals affiliated to Jundishapour Medical Sciences University of Ahvaz in 2014 for 3 months.

Researched population included nurses working in NICUs in three Educational hospitals affiliated to Jundishapour Medical Sciences University of Ahvaz. Sample size included all the nurses working in NICU (48 people) that were selected through census method.

A checklist was used to collect data, some questions in relation to some of demographic characteristics including; gender, age, marital status, level of education, work experience in ICU and experience of passing intensive care course were considered. Standard checklist was related to tracheal intubation suctioning (including 19 questions). Data (questionnaires and checklist) was gathered after obtaining permission from relevant agencies with the presence of researcher and filling written consent form by the participants of three educational hospitals.

Questions of checklist were scored by using three-part Likert scale (yes 3 points, sometimes 2 points and no1 point). In general, score more than sixty percent, Thirty to sixty percent and less than thirty percent were respectively considered good, average and weak.

Absolute and percentage frequency distribution tables were used for analyzing data. Data analysis was done by descriptive statistical tests, (frequency, mean) and inferential statistical tests (chi-square) and by using $SPSS_{19}$ software.

3. Results

Results achieved from nurses' demographic characteristics showed that most of the samples of the study were female (83.4 percent) and majority of the samples (72.9 percent) were 26 years old and older. Most of the samples (54.1

Table 1: Absolute and percentage frequency distribution of participants based on demographic characteristics in ICU

		Number	Percent
Gender	Man	8	16.6
	Woman	40	83.4
	Sum	48	100
Age	25years old	13	27.1
	26 years old	35	72.9
	Sum	48	100
passing the course of intensive care	yes	26	54.1
	no	22	45.9
	sum	48	100
Experience in the intensive care unit	0-5years	25	52.1
	6-10	18	37.5
	11and more	5	10.4
	sum	48	100

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percent) had attended ICU course. Most of samples (52.1 percent) had 5 years of work experience and less (Table 1).

Results of this study about performance of the samples of the study showed that 64.6 percent had good performance and 35.4 percent had medium to poor performance. (Table2)

4. Discussion

Results of the above study showed that in 64.6 percent of the cases, nursing personnel performance has been good regarding tracheal intubation suction and they had moderate to poor performance in 35.4 percent of the cases. Also, findings of Zandieh et al. showed that in 53.3 percent of the cases, personnel's performance in taking care of patients under mechanical ventilation was satisfactory [15]. The results also suggest that staff's performance regarding taking care of a tracheal intubation has been good with the mean of 89.2; these findings are in consistent with the present study [16]. But results of another study showed that although nurses have an acceptable knowledge, their performance regarding tracheal intubation suctioning is undesirable [17] Perhaps one of the reasons for contradictory findings of the studies is difference in their research environment.

In this study it was revealed that most of the samples of the study washed their hands before tracheal intubation suctioning. Results of the study of Mazaheri et al. is in consistent with the results of the present study [16]. While results of other studies showed that hands aren't washed before and after suctioning in 100 percent of the cases [18]. Results of a study showed that 82 percent of nurses were using necessary instructions for washing hands [19]. Perhaps one of the reasons of difference in findings of the studies is different environments. In this regard, results of the study of Sherma et al. regarding effectiveness of tracheal intubation suctioning protocol showed that this protocol increases knowledge and improves performance of nursing staff [20]. Statistical results showed that 80 percent of nurses always import normal saline into tracheal intubation before suctioning. considering that exact suctioning of tracheal intubation and oral discharge is one of the standard actions for reducing pneumonia caused by ventilator device in patients under mechanical ventilation [6], monitoring is required here to personnel suction solution thoroughly after entering it into tracheal intubation, then this action doesn't increases the risk of pneumonia due to ventilator device in mechanically ventilated patients [13].

This research showed that, often 45 percent of staff enter catheter into tracheal intubation up to bifurcation of trachea during suctioning; it can be effective in reducing risk of respiratory infection in deep suctioning. Studies conducted in 2008 by Lobby et al. showed that 51-57 percent of personnel stated that deep suctioning can reduce pneumonic breakout in mechanically ventilated patients [21].

in this research it was cleared that most of samples of the study (54.1) had attended intensive care course successfully and 47.9 percent of them had 6 years or more work

Table 2: Absolute and relative frequency distribution of the samples of the study based on obtained points in relation to nurse's performance of NICU

Absolute and relative frequency distribution of nurse's performance	Good >60 percent		Mean 30-60 percent		Weak <30 percent		Sum	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Suction tracheal tube Secretions	26	54.2	16	33.3	6	12.5	48	100
Regulating & use of suction device	6	12.5	22	45.8	20	41.7	48	100
Total performance	31	64.6	16	33.3	1	2.1	48	100

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experience; but assessing its relation with performance showed that there is no significant difference statistically; it is while study of Kason et al. showed that experience of working in ICUs can be effective in appropriate performance of nurses [19]. A survey conducted by Howe et al. in 2007 also reflects the fact that having necessary knowledge and awareness of the way of taking care of mechanically ventilated patients hospitalized in ICU significantly influences staff's performance [22]. Further results show that in-service training of tracheal intubation suctioning is a great help in nurses' empowerment in terms of assessing and recognizing patients; also it helps diagnosing patients' need to tracheal intubation suctioning [23]. In addition, other findings suggest that theoretical and practical training of tracheal intubation suctioning will improve nurses' performance in this regard [24]. In this regard, Amirzadeh et al. consider it necessary to have continuous training for improving nurses' poor performance in relation to tracheal intubation suctioning [25]. Consistency of the results of other studies with the present study regarding nurse's in-service education represents the importance of proper and appropriate performance of this care (tracheal intubation suctioning) in ICUs to accelerate healing of disease. According to the results of this study, further studies with larger sample size are required to be done.

The limitations of this study include the small size of the samples which reduces generalizability power of findings to target population. It is recommended to conduct a study in this regard with a larger sample size at provincial level to assess performance of nurses in tracheal intubation suctioning in NICUs and compare results with the present findings.

5. Conclusions

According to the results of present study, most of the nurses working in ICUs were doing tracheal intubation suctioning according to the standard procedures. Therefore, it is essential to provide in-service education courses (tracheal intubation suctioning, hyper oxygenation of patient during suction, regulating pressure of suctioning, infection control during suctioning, observing right time, presenting proper position to patient) for minimum number of them who were not doing tracheal intubation suctioning according to the standard procedures, since lack of proper implementation of this action by even a few number of nurses of ICUs is dangerous for improvement of patients' condition. Finally researcher states that considering results of numerous studies based on necessity of continuous training in order to reform nurses' performance regarding proper and standard way of tracheal intubation suctioning, it is necessary for the related managers to consider continuous education program for improvement of care qualities in ICUs.

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