

## **Intensive Care Units Nurse's Knowledge and Practice Regarding the Endotracheal Tube Suctioning**

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### **Abstract**

Endotracheal tube suction (ETS) is an invasive procedure which done by intensive care unit (ICU) nurses to keep airway clear from lung secretion, many complications may occur if these procedures done without sufficient knowledge and good practice according to evidence-based practice among ICU nurses. This review aimed to evaluate the level of the knowledge and practice regarding endotracheal tube suction among ICU nurses and explore the factors that affect the knowledge and practice. In most studies, ICU nurses have a good level of knowledge and fair level of practice regarding ETS and practices not in line with current recommendations of ETS the professional training that they received, the level of experience, type of ICU, support, and the level of education are factors affecting the knowledge and practice level regarding the ETS. Further studies are recommended with larger sample size, in different setting, and include developing countries.

**Keywords:** Endotracheal Tube Suctioning; Nursing Knowledge; Nursing Practice

### **Introduction**

Mechanical ventilation is a lifesaving therapy, used for patients with respiratory disorders and life threatening illnesses; it delivered oxygen with pressure to patients via endotracheal tube, which inserted to trachea [1]. The main purposes of mechanical ventilation are to reduce respiration functions of critically ill patients (spontaneous breathing), remove respiratory distress, fatigued respiratory muscles rest, and improve ventilation, chest wall stabilization, and acid-base balance restoration. However, the most common causes for using mechanical ventilation are hypoxemia with failure in respiratory system (acute respiratory distress syndrome, heart failure with pulmonary edema, pneumonia, sepsis, surgery and trauma complications), which reported as most common ventilated causes (65%), respiratory failure result from hypercapnia such as coma (15%), complications of chronic obstructive pulmonary disease (13%) and neuromuscular diseases (5%) [2,3].

Unsuitable and incorrect strategy of ventilation support can lead to increase in mortality and pulmonary complications such as, barotrauma, oxygen toxicity, stenosis of trachea, and loss of tones for respiratory muscles. The secretions accumulated in the airway, which result from the deterioration of ciliary movement and the cough reflex can lead to increase resistance of airway and respiration workload and hypoxemia, hypercapnia, atelectasis and infections [4,5].

Ventilator associated pneumonia (VAP) is a complication of mechanical ventilation which used for airway support. The VAP may increase of secretions production, gas exchange worsening, and may affect other body organs functions such as the heart [6].

Endotracheal Tube Suction (ETS) is a procedure which should be done by Intensive Care Unit (ICU) nurses for patients who have Endotracheal Tube (ETT) to keep the airway clear from lung secretions, give appropriate oxygenation to patients, and decrease level of nosocomial infections. However, this procedure has some risks: infections, lesions of the tracheal mucosa, cardiovascular disorders, hemorrhage, increase intracranial pressure, and hypoxemia [7].

The roles of nurses in ICU are to observe patients closely and interfere to preserve ventilation and oxygenation and make sure that the needs of patients are met [1,8], so they should be familiar with suctioning procedure. There are two suction methods; closed suction method which is evacuate the secretion from tube while the ventilator attached to the tube, and open suction method which is done when the ventilator disconnecting from the patient [9]. In 2010, guidelines for practice of ETS was published by the American Association for respiratory care, the goal of these guidelines was to optimizing the procedure, and reduce the risks [7].

There is a deficiency in nurse's knowledge regarding practice of ETS that may lead nurses to disadvantageous practices, which may cause complications, like decrease level of oxygen in blood, infections, hemodynamic instability [10,11].

There is a significant gap between the knowledge and practice among ICU nurses [12,13]. Their knowledge was evaluated as good, while, their practice level was fair. The majority of ICU nurses identified the ETS indications and was oriented to the action that should be taken in case of abrupt change in the ECG monitor. However, the majority of those have demonstration unsafe practices regarding the ETS [14]. Unsafe ETS demonstration will result in many serious complications such as venous and arterial desaturation, cardiac arrest, atelectasis, anxiety, dyspnea and infection in the lower respiratory airway [6] among many patients [14,23].

### Aim of the Study

The purpose of the present paper is to assess the level of the knowledge and practice regarding ETS among ICU nurses, also to explore factors that affect the knowledge and practices.

### Methods

#### Search methods

The electronic searching was conducted in a different database: CINAHL, Google Scholar, EBSCO and PubMed. Key search terms used: Endotracheal Tube Suctioning, nursing knowledge, Nursing practice and ICU nurses.

The studies that focused on the topic of open system of endotracheal tube suctioning, and conducted in adult ICU, were published in English between 2013 and 2020 were included in the review. While, studies published before 2013 were excluded.

#### Search outcome

Exploring of literature yield about 40 studies for review, after reading the studies about 30 studies were excluded and 10 studies met the inclusion criteria.

### Results and Discussion

The level of knowledge regarding the ETS procedure was ranged between fair to good [2,4,10,24-27]. For example, In Brazil, identified that the knowledge of the ICU professionals including nurses could be classified as fair [10]. In Italy, a cross-sectional study was conducted

to evaluate the level of knowledge regarding the ETS in comparison to the association of respiratory care guidelines among ICU nurses. They found that none of the nurses in the sample completed the questionnaire without any mistakes, just 6 nurses took a 9/10 mark, and the total correct answers were 58% from all questionnaires. When these percentages were correlated to the demographic variables they found that the more correct answered were among the more experienced nurses [26].

Regarding practice, the practice level regarding ETS procedure ranged from under the acceptable level to good level [2,4,24,25,28,29]. A cross-sectional study was conducted in Finland to evaluate the level of practice of ICU nurses regarding the ETS in comparison to the global guidelines. The data revealed that the level of the practice was under the acceptable level of performance. The study recommended increasing the education interventions, clinical guidelines, and adequate support the nurses in ICU to improve the level of practice [30]. A cross-sectional study in Brazil aimed to explore the level of practice of professionals working in ICU. The results revealed that (61.5%) of them used all the personal protective equipment's (PPEs) (gloves, mask, cap and goggles) and (100%) washing their hands before and after the procedure [18]. A cross-sectional study was conducted in Iraq to evaluate the level of knowledge and practice regarding ETS among ICU nurses. The study found that the practical level was better than the knowledge level, and there was no any association between the demographic characteristics and the level of knowledge and practice, only the educational program had the positive effect on the level of knowledge and practice [25].

The factors affecting the knowledge [26-30] and practice level regarding the ETS were: the professional training that they received, the level of experience, type of ICU, support, and the level of education [24,31,33,36-39].

Many studies indicated that the knowledge level was better than the practice level regarding the ETS procedure [2,4,23,24]. A study identified that (69.9%) ICU nurses knew the indications for the procedure ETS, (77.7%) of them knew the accurate action that should be taken in a case of abrupt changes on cardiac monitor, while (80.6%) didn't follow the recommendations in their practices supported that there was a wide gap between knowledge and practice [24]. Another study was conducted in Pakistan to evaluate the level of knowledge and practice regarding ETS and to assess the gap between them among nurses. the data revealed that the knowledge level was good, while the practice level was fair [23]. Another study was conducted in India to weigh the differences in the level between knowledge and practice regarding ETS among ICU nurses. The study found that the nurses showed an acceptable level of knowledge (70%), but the practice level in the ETS phases was inadequate (54%) [2]. In Turkey, a cross-sectional observational study indicated that ICU nurse's knowledge level was very good in (59.7%) of the sample, good in (34.7%), while the practice level was fair in (79.2%) and good in (18.1%) [4].

Finally, the training programs were the major intervention that was identified by most of past studies to improve the knowledge and practice regarding ETS [39-44] and evaluating the nurses' knowledge and practice to patients in different settings is significant [45-66].

### Conclusion

The ETS is an important part of airway management. In most studies, ICU nurses have a good level of knowledge and fair level of practice regarding ETS and practices not in line with current recommendations of ETS. Gap between knowledge and practice lead nurses to failed in ETS practice, which lead to unwanted effects on the quality of nursing care and patient's quality of life. The professional training that they received, the level of experience, type of ICU, support and the level of education are factors affecting the knowledge and practice level regarding the ETS. The past studies revealed that there is a significant increase in the level of knowledge and practice among ICU nurses after teaching program. Teaching programs should be implemented and updated yearly in hospitals for all nurses. Further studies are recommended with larger sample size, in different setting and include developing countries.

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