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Review Article

**NARRATIVE REVIEW OF NURSING ROLES IN CHEST
PHYSIOTHERAPY WITH PROPER SUCTIONING IN ICU**

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Article Received: October 2022**Accepted:** November 2022**Published:** December 2022**Abstract:**

Suctioning is a crucial element of airway treatment in severely ill patients. However, there are numerous hazards and issues involved. Trauma, hypoxemia, cardiac dysrhythmias, and, in the most extreme circumstances, cardiac arrest and death are examples. This document describes the current research guidelines for safer nursing suctioning procedures. The literature is reviewed through electronic databases; PubMed and Embase, for all related articles that were published in 2022. Showed, prior to suctioning, the following suggestions are made: patient assessment, patient preparation, and hyperoxygenation. Suctioning recommendations include catheter selection, insertion depth, negative pressure, duration of treatment, and number of suction passes. The usage of hyperinflation before and after suctioning was uncommon despite growing evidence that this method improves lung compliance.

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INTRODUCTION:

The outcomes and survival rates of intensive care unit (ICU) patients have improved due to advances in their care. Nonetheless, as patients recover from acute illness, long-term effects become increasingly apparent [1]. Utilizing physical therapy approaches in critically ill patients is a potential method for reducing complications [1].

Physiotherapists in intensive care units have concentrated on treating functional impairment, particularly in patients receiving mechanical ventilation. The physiotherapeutic therapy begins with a comprehensive evaluation and treatment planning [2]. This care includes techniques such as endotracheal suction of bronchial secretions, patient movement, and patient positioning. The goal of the physiotherapy treatment is to prevent and limit probable pulmonary problems such as hypoventilation, hypoxemia, and infection in order to rapidly restore muscular and pulmonary function [2].

Endotracheal suctioning (ETS) is a component of bronchial hygiene therapy and mechanical ventilation that involves the mechanical aspiration of pulmonary secretions from an artificial airway-equipped patient [2]. This method aims to preserve the patient's airway, maximize breathing and oxygenation, and minimize respiratory tract infection due to secretion accumulation [3]. ETS is one of the most often performed invasive procedures for mechanically ventilated patients in the intensive care unit (ICU) [4]. As a vital process, if ETS is not conducted correctly, it can result in a number of deleterious outcomes, including tracheobronchial oedema, ulceration, and epithelial detachment [5]. These areas of mucosal injury increase the risk of infection and bleeding, and ETS is a stressful and painful experience for intensive care unit patients [6]. The results of a study indicated that ETS performance by well-educated health care professionals, based on the best available evidence, can reduce its adverse consequences [7]. Therefore, it is necessary for health care providers to have up-to-date knowledge of the evidence-based practices of ETS so that they can perform the treatments scientifically and decrease the problems and potential hazards for patients [8].

Clinical practice recommendations are "systematically generated statements to aid clinicians and patients in determining the most appropriate health care for specific clinical settings" [8]. Guidelines, as a form of high-level evidence in the evidence hierarchy, offer clinicians with reliable advice that may be utilized to

eliminate inappropriate practice variations and improve the delivery of high-quality treatment [8]. In recent years, numerous ETS guidelines have been produced by respected bodies. For instance, the American Association for Respiratory Care (AARC) published the AARC Clinical Practice Guidelines on ETS for mechanically ventilated patients with artificial airways [1] in 2010. Despite the great work put into producing these guidelines, there are still significant gaps between the data and actual ETS practice.

DISCUSSION:

In China, ICU ETS is the responsibility of intensive care nurses. According to the "Guidelines for the Construction and Management of Critical Care Medicine in China," the ratio of intensive care nurses to critical care unit beds should be at least 2.5:1 [9]. However, ICU nurse-to-bed ratios declined from 1.8:1 in 2002 to 1.5:1 in 2018, showing an unresolved severe ICU nursing shortage in China [10]. In addition to increasing the number of nurses, it is essential to comprehend nursing practice in Chinese ICUs and equip nurses with the most recent knowledge and abilities for performing intensive care practices to ensure patient safety and favorable patient outcomes. As one of the most frequently performed procedures in the ICU, few studies have studied the nurses' understanding and practice of ETS in China. Few intensive care nurses were aware of the suction pressure, indications, and harmful effects of suction, as determined by Gu et al. [11] and Qin et al. [12]. Gu [11] also found that the majority of nurses' ETS knowledge derived from work experience rather than scientific journal study, showing a deficiency in nurses' awareness of current suctioning recommendations. Zhang et al. [13] observed nurses' compliance with the aseptic procedure during ETS and discovered that nurses frequently neglected to wash their hands before and after performing ETS. These studies were hampered by the short number of survey items and included only a handful of ETS practices, including catheter size, insertion depth, humidification, aseptic approach suction pressure, and side effects [11,13]. Other crucial parts were omitted, such as a comprehensive assessment of the patient's needs before to suctioning and monitoring indicators such as breath sounds, oxygen saturation, and respiratory rate and pattern during the suctioning procedure [14]. In addition, each of the aforementioned research was completed at least a decade ago, and ETS practice has evolved during the past decade. In order to develop a solid evidence base for policymaking and intensive care nurse training in

China, it is required to conduct a comprehensive, up-to-date investigation of intensive care nurses' understanding of ETS and the procedures they perform.

Hu et al. [14] updated the ETS guideline for adult patients with artificial airways in 2018. Using the ADAPTE framework as a reference, the guideline was created through a literature review, expert panel consultation (n = 9 nurses, physicians, and patients), and external reviewer meeting (n = 20) [15]. The final guideline has 26 suggestions spanning three phases of the surgery and seventeen areas of care. This study seeks to investigate (1) the awareness and adherence of intensive care nurses to ETS standards and (2) the factors that influence nurses' awareness and practice adherence.

As ETS affects the safety of mechanically ventilated patients, studies on the knowledge and use of ETS among nurses have been done in a number of countries [9,15]. However, Chinese ICUs have revealed nothing in recent years. Due to the use of diverse tools, a direct comparison between our results and those of others is not possible. We consider our findings to be consistent with those of Negro et al's investigations. [4], Varghese and Moly [15], and Heidari and Shahbazi [12], who found that more than one-third of nurses were uninformed of tracheal suctioning process requirements. This level of awareness of evidence-based ETS recommendations may be attributable, in part, to the inaccessibility of guidelines to clinical nurses [16]. Even though there are various English ETS recommendations, there was none in Chinese prior to Hu et al [14] 's adaptation. Due to linguistic limitations, many Chinese intensive care nurses lacked access to these English guidelines [14]. Inadequate training experiences may also account for this low to moderate level of awareness and compliance [15]. According to the results of our study, nurses who got training exhibited much greater awareness and compliance than those who did not. However, one-third of our study's participants did not receive ETS-specific training. This is comparable to a study by Xu et al. [15] which indicated that approximately 25 percent of intensive care nurses did not get ICU nursing skills training over the course of six months, including instruction on ETS. This may be due to the province of Hunan's huge number of intensive care nurses and lack of organized training [17]. At 2018, there were 1847 intensive care nurses working in Hunan's tertiary hospitals [16]. The Specialized ICU Skills Training Center was established in 2009, but only 23 systematic trainings for roughly 1300 nurses were given by the end of 2020 [17]. In addition, many

hospitals give one-on-one coaching or a few days of prework training for new nurses joining ICUs; however, these trainings are typically not based on the most recent recommendations for ETS practice and are hardly considered systematic [18].

A significant proportion of nurses lacked awareness of specific components of the standards, according to the results of our study. Almost two-thirds of intensive care nurses were ignorant of the minor changes in clinical outcomes between open and closed suctioning (i.e., oxygen saturation, cardiovascular instability, secretion removal, environmental contamination, and cost). This conclusion was not unexpected, given there have been inconsistent findings over the previous two decades comparing these two suctioning techniques [19]. Some researches discovered that the two suctioning methods affected the heart rate differently, but other researchers observed no change. Nonetheless, the methodological problems of a few studies rendered their findings less persuasive and prevented them from generating strong recommendations [20]. Our study's recommendations were formulated using the greatest available evidence [21].

Stiller et al. shown that despite the fact that physiotherapy is viewed as a vital part of the multidisciplinary team in the majority of ICUs, there is minimal evidence about the efficacy of physiotherapy due to the variety of data presented in previous research [22].

On the other hand, Burtin et al. [23] demonstrated that physiotherapy care for intensive care unit (ICU) patients increases early recovery, hospital time reduction, and cost savings. However, both the quality and quantity of care delivered to ICU patients can influence the occurrence of problems.

In a study [24] conducted in 460 ICUs in 17 affluent European nations, Norremberg and Vincent discovered significant variance in the role of the physiotherapist in the ICU. The authors demonstrated that just 35 percent of services had physiotherapists available 24 hours a day in the ICU. Chaboyer et al. [25] examined 77 Australian public hospitals. They found that 90% of institutions retain physiotherapists in their ICUs Monday through Friday, but just 25% do so on weekends and 10% do so every day of the week. The lack of uniformity of approaches and the amount of treatment offered are likely the primary causes of the unfavorable outcome found in the majority of systematic reviews on this topic [25].

Several authors have demonstrated the efficacy of physiotherapy for patients undergoing mechanical ventilation in the ICU, particularly with regard to the improvement of pulmonary function and hemodynamic, hence lowering the incidence of pulmonary problems. However, randomized studies are still necessary to demonstrate the reduction of hospitalization and mechanical ventilation duration of stay [14,22,25].

However, in the critically or acutely ill patient, these functions may be severely compromised, resulting in an excessive production of secretions, which may prove difficult to expectorate. Endotracheal and tracheostomy tubes form artificial airways, which bypass the normal physiological processes and inhibit the cough reflex. This leaves the respiratory tract vulnerable to opportunistic infections, with an increased production of mucus and reduced secretion of pneumocytes and surfactant. An inability to expectorate this mucus, which is often thick and tenacious, is a common problem for the patient with a tracheostomy or endotracheal tube [26]. Periodic suctioning is required in order to clear these secretions and prevent atelectasis or alveolar collapse [26].

Suctioning may frequently lead to hypoxemia, which can cause cardiac dysrhythmias, hypotension and even cardiac arrest and death. Strategies used to minimize these effects include hyperoxygenation or hyperinflation. Hyperoxygenation involves the administration of oxygen at a greater percentage or fraction of inspired oxygen (FiO₂) than the patient has been currently receiving [27]. This may be performed before (pre-oxygenation), during (insufflation) and/or after the procedure (post-oxygenation). Several researchers have examined this issue [28].

CONCLUSION:

Although physiotherapy is a vital part of the multidisciplinary team in the majority of ICUs, there is minimal evidence demonstrating its benefit. Numerous factors that may enhance the risk of suctioning-related problems in critically or acutely unwell patients have been identified in the reviewed literature. This intervention is the nurse's responsibility, and any knowledge gaps may result in ineffective and perhaps deadly suctioning practices. To be accountable for this skill, nurses must be informed of current research recommendations and apply safer suctioning procedures in accordance with professional accountability, clinical governance, and quality assurance standards. Chest physiotherapy treatments are frequently delivered jointly by

physiotherapists and nurses; however, the exact therapies provided tend to vary by provider.

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