بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

Factors Contributing to Post Suction Hypoxemia in Critical Ill Patients

Thesis

Submitted for Partial Fulfillment of the Requirements of
Master Degree in Nursing Science (Critical Care Nursing)

By

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B.Sc. Nursing, Faculty of Nursing
Alexandria University

Faculty of Nursing
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Mahmmoud Abd Elfatah Elessawy

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List of Abbreviations

ABG_S	Arterial Blood Gases
ACV	Assist Controlled Ventilation
ARDS	Acute Respiratory Distress Syndrome
BIPAP	Bi-level Positive Airway
BP	Blood Pressure
CaO_2	Oxygen Content
CAPG	Coronary Artery Bypass Graft
CKD	Chronic Kidney Disease
CL	Lung Compliance
CMV	Controlled Mechanical Ventilation
CO_2	Carbon Dioxide
COPD	Chronic Obstructive Pulmonary Disease
CPAP	Continuous Positive Airway Pressure
CSS	Closed Suction System
CVP	Central Venous Pressure
CVS	Central Nervous System
DKA	Diabetic Ketoacidosis
DLC	Disturbed Level of Consciousness
ES	Endotracheal Suction
FiO2	Fraction of Inspired Oxygen
H_2O	Hydrogen Dioxide
HR	Heart Rate
I/E	Inspiratory / Expiratory Ratio
IHD	Ischemic Heart Disease

List of Abbreviations (Cont.)

MAP	Main Arterial Pressure
MRB	Mask Resuscitation Bag
MV	Mechanical Ventilation
NANDA	American Nursing Diagnosis Association
NGT	Nasogastric Tube
OSS	Open suction System
$PaCO_2$	Partial Arterial Pressure of Carbon Dioxide
PaO2	Partial Arterial Pressure of Oxygen
PaO_2/FiO_2	Ratio Hypoxemic Oxygen Index
PEEP	Positive End Expiratory Pressure
PETCO2	Partial Pressure of End Tidal Carbon Dioxide
PSV	Pressure Support Ventilation
RBC_S	Red Blood Cells
RTA	Route Traffic Accident
SaO_2	Oxygen Saturation
SIMV	Synchronized Intermittent Mandatory Ventilation
SPO_2	Capillary Oxygen Saturation
STEMI	ST Segment Elevation Myocardial Infarction
V/Q	Ventilation / Perfusion Inequalities
V_T	Tidal Volume

Factors Contributing to Post Suction Hypoxemia in Critical Ill Patients

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Abstract

Tracheal suctioning is a rather frequent and essential procedure in patients under mechanical ventilation. During this procedure the tracheal secretion is removed to assure adequate oxygen supply and to avoid obstruction of the tube lumen, resulting in increased respiratory work, atelectasis and pulmonary infections. This procedure is associated with consequences and risks as hemorrhage, lesions of the tracheal mucosa, infections, atelectasis, cardiovascular disorder, hypoxemia and increase intracranial pressure. **Aim**: this study aimed to assess factors contributing to post suction hypoxemia in critically ill patients. **Study design**: a descriptive exploratory design was utilized in this study. **Setting**: this study was carried out in the Intensive Care Units of Alexandria Main Abo Quir- Hospital. **Subjects:** A purposive sample of 66 patients of both genders was involved in the study and convenient sample of all nurses working in intensive care unit at Alexandria Abo Quir hospital. **Data collection tools**: **(I): Patient related factors:** which includes 5 parts. **(II): Nurses related factors:** which includes 2 parts used to assess aim of this study**. Results**: the present study revealed that more than half of studied patients were male and had high education, more than two thirds of them were married and more than three quarters of them were employed. Additionally, there was a statistically insignificance relation between nurses' total level of practice and total level of knowledge. **Conclusion:** the majority of the studied nurses had unsatisfactory level of knowledge regarding suctioning procedure, while less than one fourth of them had satisfactory level of knowledge regarding suctioning procedure. In addition to only about half of the studied nurses had satisfactory level of suctioning performance, Additionally, more than half of the patients were smokers and had hypertension as contributing factors to post suction hypoxemia in critically ill patients. **Recommendations:** Educational program for intensive care unit nurses to improve knowledge and practices about endotracheal tube suctioning and avoid complications through performing suctioning procedure.

Key words: *Tracheal suctioning, Mechanical ventilation, Hypoxemia*

Introduction

Health care is undergoing dramatic change at a speed that makes it almost impossible to remain current and be protective. The chaos and multiple challenges facing nurses are evident in critical care, where new technology and therapeutic modalities interface with a continued strive for quality and positive outcome **(Jansson et al., 2020).**

Many patients in the critical care environment have altered mucociliary clearance because of pre-existing lung disease, which may have increased mucous production as part of the disease, lung damage from handling or trauma, muscle weakness and lack of ability to generate an effective cough, pain which may inhibit an effective cough or prevent expansion of the lung tissue and therefore decrease mucociliary clearance. Some of those patients may need mechanical ventilation (MV) to decrease the work of the respiratory muscles, administer a guaranteed fraction of inspired oxygen and increase alveolar ventilation and oxygenation **(Majeed, 2019).**

Generally, patient are connected to MV by endotracheal tube may have some complications appear as ineffective airway clearance, depressed cough reflex, impaired mucociliary clearance system, some tracheal

mucosal damage and infection. Care of mechanically ventilated patients is fundamental to intensive care nursing and constitutes a large part of the workload. Patients are highly dependent on skilled nursing throughout all aspects of their care. One such aspect is the ability to maintain a clear airway which necessitates endotracheal suctioning (ES) **(American Association for Respiratory Care (AARC), 2020).**

Endotracheal suctioning is one of the first skills learned by nurses. It involves the mechanical aspiration of secretions from the nasopharynx, oropharynx and trachea. Suctioning is necessary in mechanically ventilated patients to prevent airway obstruction, and to a lesser extent to decrease the work of breathing resulting from retained secretions. Preforming ES on a critically ill patient is not always a pleasant procedure **(Ansari et al., 2018).**

There are two types of ES systems: open suction system (OSS), which need to be disconnected from the respiratory circuit and empty suctioning catheter; and closed suction system (CSS), which do not need to be disconnected from the respiratory circuit and employ multi-use suctioning catheter. OSS was the standard method of practice until CSS was introduced **(Bülbül Maraş et al., 2017).**

Although ES is used to prevent occurrence of certain complications, also it is associated with a number of complications in critically ill patients including hypoxemia and tissue hypoxia, significant changes in heart rate and blood pressure, presence of cardiac dysrhythmias attributed to mechanical stimulation of vagus nerve, atelectasis, and infection. Many practitioners simply do not apply critical thinking and preform this procedure in a rote manner. This manner of thinking does injustice to our patients. Suction is serious business. Hypoxemia may result from the removal of alveolar gas or the interruption of mechanical ventilation and oxygen supply during tracheal suctioning, especially in patients who already have respiratory compromises **(Haghighat & Yazdannik, 2018).**

The recommendations prior to suctioning include comprehensive patient assessment and patient preparation. while The recommendations during suctioning include appropriate catheter selection, depth of insertion, suction pressure, duration of procedure and number of suction passes. Prevention of infection and maintenance of asepsis, i.e. hand – washing, wearing gloves, aprons and goggles are also essential **(Mwakanyanga et al., 2018).**