

Effect of Self Learning Package on Nurses' Performance Caring for Patients on Ventilators

Thesis

*Submitted for partial fulfillment of the requirement of
Doctorate Degree in Nursing Sciences
(Medical-Surgical Nursing- Critical Care Nursing)*

*In
Nursing sciences
(Medical-Surgical Nursing)*

**By
Samsoma Askander Tadros Awad**

(M.Sc. Nursing 2012)

Faculty of Nursing

Ain Shams University

*Faculty of Nursing
Ain Shams University
2017*

Effect of Self Learning Package on Nurses' Performance Caring for Patients on Ventilators

Thesis

*Submitted for partial fulfillment of the requirement of
Doctorate Degree in Nursing Sciences
(Medical-Surgical Nursing- Critical Care Nursing)*

Under Supervision of

Prof. Dr/ Mahasen Abd EL Sattar

Professor of Medical-Surgical Nursing

Faculty of Nursing

Ain-Shams University

Prof. Dr/ Hanan Shehata

Professor of Medical-Surgical Nursing

Faculty of Nursing

Ain-Shams University

Dr/ Mona Nadr

Lecturer in Medical-Surgical Nursing

Faculty of Nursing

Ain- Shams University

Faculty of Nursing

Ain- Shams University

2017



Acknowledgement

*First and foremost, I feel always indebted to **God**, the most kind and most merciful for all his blessing and for giving me the will and strength for the completion of this work.*

*I wish to express my deep appreciation and gratitude to **Prof. Dr/ Mahasen Abd EL Sattar** Professor of Medical-Surgical Nursing, Faculty of Nursing Ain Shams University, words cannot describe how grateful I am for her meticulous supervision, fruitful guidance, valuable support, constructive criticism, and continuous, unlimited help to complete this study.*

*I am deeply grateful to Words can never express my deep thanks to **Prof. Dr/ Hanan Shehata**, Professor of Medical-Surgical Nursing, Faculty of Nursing, Ain Shams University, for her close supervision, faithful guidance, and sisterly support, also for the effort and time she had devoted for the completion of this study. I would not have been able to start and reach the perfection of this work without her.*

*I am deeply grateful to **Dr/ Mona Nadr** Lecturer in Medical-Surgical Nursing Faculty of Nursing Ain- Shams University, for her meticulous supervision, trial efforts, fruitful guidance, valuable support and instructions throughout this work, all are deeply and heartily appreciated.*

I am sincerely grateful to all nurses who participated in this study for their patience and cooperation. And I would like to express my deep thanks to all those who contributed by giving their time, effort, and encouragement to the fulfillment of this work.

Samsoma Askander Tadros



I would like to dedicate this thesis to the spirit of my Dear Father and also to my dear Mother; my Brothers, Sisters and Sister's sons, for them I will never find adequate words to express my gratitude.

And also I would like to dedicate this thesis to the spirit of His, Holiness Pope Shenouda III



LIST OF CONTENTS

Title	Page No.
List of Contents.	I
List of Tables	III
List of Figures	V
List of Abbreviations	VI
List of Appendics	VII
Abstract	VIII
Introduction	1
Aim of the Study	6
Review of literature:	
• Anatomy and physiology of The Respiratory System....	7
• Mechanical ventilation	11
• Nursing management of patients on ventilators	34
• Self-learning package for nurses' caring for patients on ventilators.	47
Subjects & Methods	51
Results	64
Discussion	91
Conclusion	107
Recommendations	108
Summary	109

LIST OF CONTENTS (Cont...)

Title	Page No.
References	115
Appendices	131
Arabic Summary	—

LIST OF TABLES

Table	Title	Page No.
<i>Tables in the Results</i>		
1	Number and percentage distribution of demographic characteristics among nurses under study.	65
2	Percentage distribution of nurses' level of knowledge regarding caring for patients on MV pre, post and follow up implementation of SLP.	67
3	Percentage distribution of nurses' level of knowledge regarding MV complications and its effect on all body systems pre, post and follow up implementation of SLP.	69
4	Percentage distribution of nurses' level of practices regarding caring for patients on MV pre, post and follow up implementation of SLP.	71
5	Percentage distribution of nurses' level of practices regarding prevention of complications associated with ETT & tracheostomy tubes pre, post and follow up implementation of SLP.	73
6	Percentage distribution of nurses' level of practices regarding prevention of ventilator-associated pneumonia according to the recent bundle of nursing care pre, post and follow up implementation of SLP.	75
7	Percentage distribution of nurses' level of practices regarding documentation pre, post and follow up implementation of SLP.	78
8	Neglected items of MV practices pre, post and follow up implementation of SLP.	79
9	Correlation between total level of nurses' knowledge and the total level of nurses' practice pre/post and follow up phases.	81
10	Relation between the total satisfactory level of nurses' knowledge and their demographic characteristics.	83

LIST OF TABLES (Cont...)

Table	Title	Page No.
11	Relation between the total satisfactory level of nurses' practices and their demographic characteristics.	86
12	Nurses' opinions regarding self-learning package.	89
13	Percentage distribution of problems facing the nurses during management of patient on MV as stated by them.	90
<i>Tables in the results of testing validity and reliability of the tools:</i>		
1	Expertise's judgment regarding general evaluation of content validity of the self-administered questionnaire for nurse's knowledge regarding nursing intervention for management of patients on ventilators	162
2	Expertise's judgment regarding general evaluation of content validity of observational checklist for nurse's practice regarding nursing intervention for management of patients on ventilators.	163
3	Expertise's judgment regarding general evaluation of content validity of opinionnaire sheet regarding self-learning package on nurses' performance caring for patients on ventilators.	164
4	Face validity of developed data collection tools based on agreement.	165
5	Cronbach's Alpha reliability analysis.	165

LIST OF FIGURES

Figure	Title	Page No.
<i>Figures in the review of literature:</i>		
1	Anatomy of the respiratory system.	9
<i>Figures in the results:</i>		
1	Percentage distribution of nurses according to Work area.	66
2	comper between total satisfactory nurses' level of knowledge and practice throughout the implementation of self-learning package phases.	82
<i>Tables in the results of testing validity and reliability of the tools:</i>		
1	Job characteristics of expertise group member	161

LIST OF ABBREVIATIONS

Abbreviation	Mean of abbreviation
AACN	American Association of Critical Care Nurses
ABGs	Arterial blood gases.
AC	Assist-control ventilation.
ANCC	American Nurses Credentialing Center's Commission on Accreditation.
APRV	Airway pressure release ventilation
ARDS	Acute respiratory distress syndrome.
ASV	Adaptive support ventilation.
CMV	Continuous mandatory ventilation.
CO₂	Carbon dioxide.
COPD	Chronic Obstructive Pulmonary Disease
CPAP	Continuous positive pressure ventilation
CTICU	Cardiothoracic Intensive Care Unit.
ETT	Endotracheal tube.
HFPPV	High-frequency positive-pressure ventilation.
ICU	Intensive Care Unit.
ILV	Independent lung ventilation
MV	Mechanical ventilation.
O₂	Oxygen.
P	Probability that observed data is consistent with null hypothesis.
PaCO₂	Partial pressure of arterial carbon dioxide.
PaO₂	Partial pressure of arterial oxygen.
PC	Pressure-controlled.
PEEP	positive end-expiratory pressure.
R	Multiple correlation coefficients.
RICU	Respiratory Intensive Care Unit.
SD	Sample standard deviation.
SIMV	Synchronous intermittent mandatory ventilation.
SLP	Self-Learning package.
So₂	Oxygen saturation.
Spo₂	Arterial oxygen saturation.
VAP	Ventilator-Associated Pneumonia.
VC	Volume-controlled.
X²	Greek chi-squared test, to test the difference in proportions in two or more independent group.

LIST OF APPENDICES

Appendix	Title	Page No.
I	Self-administered nurses' questionnaire.	131
II	Nurses' observational checklists	143
III	Nurses' opinions regarding self-learning package	159
IV	The results of testing validity and reliability of the tools	161

ABSTRACT

Mechanical ventilation (MV) is a common procedure and life-saving used to treat patients with respiratory failure. **Aim:** This study aims to evaluate the effect of self-learning package on nurses' performance caring for patients on ventilators. **Methods:** A quasi-experimental study was conducted in critical care units: Intensive Care Unit; Respiratory Intensive Care Unit and Cardiothoracic Intensive Care Unit at Ain-Shams University Hospitals. **Subjects:** A convenient subjects of all available nurses caring for patients on a mechanical ventilator were recruited for the conduction of this study from the above-mentioned setting. **Tools:** (1) **Self-administered questionnaire: Part one** is concerning with demographic data that include (age, gender, marital status, educational levels, work area, years of experience, ect...). **and Part two** is concerning with nurses' knowledge regarding caring for patients on MV, (2) **Nurses' performance observational checklists:** It used to assess nurses' practices during caring for patients on MV and (3) **Nurses' opinions questionnaire regarding SLP and problems facing nurses during management of the patient on MV:** It was used to assess nurses' opinions regarding using SLP and problems & barriers facing nurses. **Results:** of this study reveal that the mean age for nurses under study was 31.38 ± 6.88 . More than two-thirds of nurses (72.5%) were females and more than half of them (52.5%) were Diploma nursing graduates. Also, there was statistically significant improvement immediately after self-learning package implementation and throughout the follow-up phases regarding nurses' performance related to care of patients on ventilators. **Conclusion:** Concluded that there was statistically significant positive effect for self-learning package on nurses' level of knowledge and practice. **Recommendations:** this study recommended conducting the self-learning package in a wider field including all hospitals to raise the efficiency of nursing care provided.

Keywords: Mechanical ventilation, self-learning package, and nurse' performance.

INTRODUCTION

The number of patients who require MV increased during the last decade, which generated a large population of chronically ill patients. Every year worldwide, Admission to the ICUs for millions of people during some point of their lifetime and the possibility of being placed on Mechanical ventilation (MV) while in the ICU is high. An estimated 69% of all ICU patients have placed on MV annually (*Haitsma, 2014*).

Mechanical ventilation (MV) is employed in the Intensive Care Units (ICUs) to aid patients in the case of compromised respiration due to severe illness or trauma until the patient is able to breathe independently of the machine, and some patients receive ventilator support during surgery. Furthermore, MV has become an important therapy for treating patients who have impaired pulmonary function and particularly patients suffering from acute respiratory distress syndrome. Actually, the key supportive treatment for patients who have impaired pulmonary function is mechanical ventilation (*Phillips, 2011*).

Mechanical ventilation is the main intervention performed in the treatment of critically ill patients in ICUs. It is a widely used intervention in ICUs, life-saving technological intervention. It is used in the treatment of critically ill patients whose respiratory function is compromised due to an acute or chronic disease. It is a supportive therapy used to assist patients who are unable to maintain adequate oxygenation and/or carbon

dioxide elimination. It is a support, non-curative method, with specific indications, and potential complications (*Melo; & Eline, 2014*).

Mechanical ventilation is indicated to support patients with acute respiratory failure in situations where the patient has a partial or total airway obstruction, for example following a drug overdose, slow recovery from anesthetic drugs or neuromuscular disorders. Although MV is a life-saving process, it can cause physiological and psychological complications for the patient. An important priority for critical care clinicians is, therefore, to discontinue mechanical support as soon as possible (*Guilhermino; Inder; Sundin; & Kuzmiuk, 2013 and Khalafi; Elahi;& Ahmad, 2016*).

Care for the patient with MV has become an integral part of nursing care in critical care units. Nurses must understand each patient's specific pulmonary needs and work together with the physician and respiratory therapist to realistic goals for better outcomes of patient condition. Critical care nurses play an important role in the identification of risk factors and prevention of ventilator-associated pneumonia (VAP) (*Smeltzer; Bare; & Hinkle, 2010*).

Intensive Care Units nurses require scientific knowledge to provide constant surveillance; make complex decisions to reduce patient discomfort, anxiety, and risk of complications; execute ventilator troubleshooting effectively and efficiently; and optimise the patient's ventilation parameters and outcome.

Critical care nursing as defined by American Association of Critical Care Nurses (AACCN) is the utilization of nursing process in the intervention and prevention of life-threatening situations. Thus critical care nurses need to establish a strong knowledge base to promote effective and appropriate management of patients requiring MV (*Grossbach; Chlan; & Tracy, 2013 and Maria; Kaur; & Jaspal, 2015*).

Care of the mechanically ventilated patient is at the core of a nurse's clinical practice in the ICUs. Nurses must be knowledgeable about the function and limitations of ventilator modes, causes of respiratory distress and appropriate management in order to provide high-quality patient care (*Mahmoud, 2015*).

Nursing management for the patient who is receiving MV requires extensive training and supervised practices. Nurses take responsibility for decisions concerning nursing care, which requires both experience and competence. This includes the assessment, planning, implementation, evaluation, and documentation of ventilator care and weaning. Patient will require protection from infection, monitoring of vital signs, measurement of intake and output, check the physician's order each shift, regular arterial blood gases (ABGs) analysis, suction, check respiratory status and check alarm (*Dewit, & Kumagai, 2013; Guilhermino, et al., 2013; and Khalafi, et al., 2016*).
