



Knowledge and Practice of Intensive Care Unit Nurses toward Prevention of Ventilator- Associated Pneumonia at Public Hospitals in Sana'a City-Yemen

*Thesis Submitted to the Applied Medical Sciences Department, College
of Medical Sciences, AL-Razi University as Partial Fulfillment for MSc.
in Critical Care Nursing*

Researcher

Abdul Fattah Saleh Mohammed Al-jaradi
BSc. Nursing

Supervisor

Professor Dr. Nabil Ahmed Al-Rabeei
Professor of Public Health

Co-Supervisor

Dr. Sadek Al-Wesaby
Assistant Professor of Medical-Surgical Nursing

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الدراسات العليا
كلية العلوم الطبية
قسم العلوم الطبية التطبيقية

معارف وممارسات ممرضي العناية المركزة تجاه الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي في المستشفيات العامة بمدينة صنعاء- اليمن

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الباحث

عبدالفتاح صالح محمد الجرادي
بكالوريوس تمريض

المشرف الرئيس

أ.د. نبيل أحمد الربيعي
استاذ الصحة العامة

المشرف المشارك

د. صادق عبده الوصابي

استاذ التمريض الباطني الجراحي المساعد

نوفمبر ٢٠١٨م

CERTIFICATE

This is to certify that the thesis entitled *Knowledge and Practice of ICU Nurses' toward Prevention of Ventilator-Associated Pneumonia at Public Hospitals in Sana'a City-Yemen*; which submitted to the Department of Applied medical sciences, College of Medical Sciences, Al-Razi University for the award MSc. degree in *Critical Care Nursing*. It is a recorded of the original and bona fide thesis work carried out by *Abdul Fattah Saleh Mohammed Al-Jaradi* under our guidance. Such material as has been obtained from other sources has been duly acknowledged in the research. This thesis embodies the work of the candidate herself and no part thereof has been submitted for any other degree.

Supervisor:

Professor Dr. Nabil Ahmed Al-Rabeei

Professor of Public Health

Dedication

This thesis is dedicated to

*My great parents, who never stop giving of themselves in
countless ways,*

*My dearest wife, who leads me through the valley of
darkness with the light of hope and support,*

My beloved brothers and sister,

*My beloved kids: Doa'a, Rehab & Fatima whom I cannot
force myself to stop loving. To all my family, the symbol of
love and giving,*

*My friends who encourage and support me,
All the people in my life who touch my heart.*

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TABLE OF CONTENTS

TITLE OF THE STUDY	I
CERTIFICATE	III
DEDICATION	IV
ACKNOWLEDGMENT	V
TABLE OF CONTENTS	VI
LIST OF TABLES	VIII
LIST OF FIGURES	IX
LIST OF ABBREVIATIONS	X
ABSTRACT	XII
CHAPTER 1: INTRODUCTION	1
1.1 Background of the study.....	1
1.2 Problem Statement.....	2
1.3 Significance of the study.....	4
CHAPTER 2: LITERATURE REVIEW	6
2.1 Introduction to literature review.....	6
2.2 Anatomy and physiology of respiratory system.....	6
2.2.1 Anatomy of respiratory system.....	6
2.2.2 physiology of respiratory system.....	9
2.3 Mechanical ventilation.....	10
2.3.1 Concept of mechanical ventilation:.....	10
2.3.2 Classification of ventilator:.....	12
2.3.2.1 Negative – pressure ventilation:.....	12
2.3.2.2 Positive – pressure ventilation:.....	13
2.3.3 Goals of mechanical ventilation:.....	15
2.3.4 Components of mechanical ventilation:.....	15
2.3.5 Indication for mechanical ventilation:.....	15
2.3.6 Ventilator setting:.....	16
2.3.7 Modes of ventilator support:.....	17
2.3.8 Complication of mechanical ventilation:.....	20
2.3.9 Weaning from mechanical ventilation:.....	20
2.4 Pneumonia.....	22
2.5 Ventilator associated pneumonia.....	24
2.5.1 Definition of VAP.....	24
2.5.2 Pathogenesis of VAP.....	25
2.5.3 Incidence of VAP.....	27
2.5.4 Etiology agents of VAP.....	29
2.5.5 Risk factors of VAP.....	30
2.5.6 Pathophysiology of VAP.....	32
2.5.7 Clinical manifestation of VAP.....	34
2.5.8 Diagnosis of VAP.....	34
2.5.9 Management of VAP.....	37
2.5.9.1 Pharmacologic interventions.....	37
2.5.9.2 Non- pharmacologic interventions.....	41
CHAPTER 3: OBJECTIVES OF THE STUDY	50
3.1 General objective.....	50
3.2 Specific objectives.....	50

CHAPTER 4: RESEARCH METHODOLOGY	52
4.1. Study setting	52
4.2. Study design	52
4.3. Study population	53
4.4. Sample size determination	53
4.5. Sampling technique	54
4.6. Inclusion and exclusion criteria	54
4.7. Data collection methods and tools	55
4.7.1 Data collection methods	55
4.7.2 Data collection tools	55
4.8 Validity and reliability	57
4.9 Pilot study	58
4.10 Data processing and statistical analysis	58
4.11 Study variables / operational definition	59
4.12. Ethical Considerations	60
CHAPTER 5: RESULTS	62
5.1 Demographic characteristics	62
5.1.1 Demographic characteristics of ICU nurses	62
5.1.2 Distribution of ICU nurses according to course training	64
5.2 Knowledge of ICU nurses toward prevention of VAP	65
5.2.1 Knowledge of ICU nurses about general information of VAP	65
5.2.2 Knowledge of ICU nurses about ETT tube strategies	67
5.2.3 Knowledge of ICU nurses about position strategies	69
5.2.4 Knowledge of ICU nurses about suction strategies	71
5.2.5 Knowledge of ICU nurses about common prevention strategies	73
5.2.6 Knowledge about other strategies toward prevention of VAP	75
5.3 Overall knowledge of ICU nurses on prevention of VAP	77
5.4 Lvel of overall knowledge of ICU nurses on prevention of VAP	78
5.5 Practice of ICU nurses toward prevention of VAP	79
5.5.1 Practice of ICU nurses about common nursing care	79
5.5.2 Practice of ICU nurses about suction strategies	81
5.5.3 Practice about position and ventilator equipments care	83
5.5.4 Practice about other nursing practice to prevention of VAP	85
5.6 Overall practice of ICU nurses toward prevention of VAP	87
5.7 Overall level of practice of ICU nurses toward prevention of VAP	88
5.8. Association between level of knowledge and demographic characteristics	89
5.9. Association between level of practice and demographic characteristics	90
CHAPTER 6: DISCUSSION	91
6.1 Introduction	91
6.2 Demographic characteristics of ICU nurses	91
6.3 Nurses knowledge toward prevention of VAP	92
6.4 Nurses practice toward prevention of VAP	97
6.5 Association between level of knowledge and demographic data	102
6.6 Limitations of the study	103
CHAPTER 7: CONCLUSION AND RECOMMENDATIONS	104
7.1 Conclusion	104
7.2 Recommendations	105
REFERENCES	108

LIST OF TABLES

Table 1: Guidelines for weaning from short-term ventilation	22
Table 2: Risk factors for VAP	31
Table 3: Clinical criteria used in the diagnosis of VAP.....	36
Table 4: sample size from each stratum.....	54
Table 5: Demographic characteristics of ICU nurses	62
Table 6: Distribution of ICU nurses according to course training.....	64
Table 7: Knowledge of ICU nurses about general information on the prevention of VAP	65
Table 8: Knowledge of ICU nurses about ETT tube strategies	67
Table 9: Knowledge of ICU nurses about position strategies	69
Table 10: Knowledge of ICU nurses about suction strategies.....	71
Table 11: Knowledge of ICU nurses about common prevention strategies	73
Table 12: Knowledge about other strategies toward prevention of VAP	75
Table 13: Practice of ICU nurses about common nursing care toward prevention of VAP	79
Table 14: Practice of ICU nurses about suction strategies	81
Table 15: Practice about position and ventilator equipments	83
Table 16: Practice of ICU nurses about other nursing care	85
Table 17: Association between the level of knowledge and demographic characteristics of nurses.....	89
Table 18: Association between the level of practice and demographic characteristics of nurses	90

LIST OF FIGURES

Figure 1: Distribution of nurses according to ICU specialities.....	63
Figure 2: Total knowledge of ICU nurses about general information	66
Figure 3: Total knowledge of ICU nurses about ETT tube strategies	68
Figure 4: Total knowledge of ICU nurses about position strategies.....	70
Figure 5: Total knowledge of ICU nurses about suction strategies	72
Figure 6: Total knowledge of ICU nurses about common strategies.....	74
Figure7: Total knowledge of ICU nurses about other strategies	76
Figure 8: Overall knowledge of ICU nurses toward prevention of VAP	77
Figure 9: Level of overall knowledge of ICU nurses toward prevention of VAP	78
Figure 10: Total practice of ICU nurses about common nursing care	80
Figure 11: Total practice of ICU nurses about suction strategies	82
Figure 12: Total practice of ICU nurses about position and ventilator equipments....	84
Figure 13: Total practice of ICU nurses about other nursing care.....	86
Figure 14: Overall practice of ICU nurses toward prevention of VAP	87
Figure 15: Overall of level practice of ICU nurses toward prevention of VAP	88

LIST OF ABBREVIATION

AACCN	American Association of Critical Care Nurse
ABG	Arterial blood gazes
ARDS	Acute respiratory distress syndrome
BAL	Broncho-alveolar lavage
Bi- vent	Bi-level positive ventilation
BSCs	Bachelor of science
CACM	Combination (assist & control mode)
CCN	Critical care nursing
CDC	Center of communicable diseases control
C-ICU	Cardiac – intensive care unit
CM	Controlled mode
cmH₂O	Pressure measured in cm of water
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CO₂	Carbon dioxide
CPIS	Clinical pulmonary infection score
C°	Centigrade
DRG	Dorsal respiratory group
E-ICU	Emergency – intensive care unit
ETT	Endotracheal tube
ETS	Endotracheal suction
F	Frequency
FIO₂	Fractional concentration of inspired oxygen
G-ICU	General – intensive care unit
H	Hour
HAP	Hospital-acquired infection
HCWs	Health care workers
HCAP	Health care-associated pneumonia
HOB	Head of bed
H+	Hydrogen ions
H₂	Histamine
ICU	Intensive care unit
I:E	inspiration to expiration
IPPV	Intermittent positive pressure ventilation
IVAC	Infection-related ventilation associated complications
Kg	Kilogram
MDR	Multi –drug resistant
M-ICU	Medical – intensive care unit
ML	Milliliters
MRSA	Methicillin-resistant Staphylococcus. aureus
MV	Mechanical ventilation
N	Numbers
NAVA	Neutrally adjusted ventilator assists
NIPPV	NON- invasive positive pressure breathing
NIV	NON- invasive ventilation

O₂	Oxygen
PaO₂	Partial pressure of arterial oxygen
PaCO₂	Partial pressure of carbon dioxide in arterial blood
PC	Pressure control
PEEP	Positive end expiratory pressure
P-ICU	Pediatric – intensive care unit
Blood PH	The acidity or alkalinity of the blood
PPI	Proton- pump inhibitors
PRVC	Pressure regulated volume control
PS	Pressure support
PTC	Protected telescoping catheter
PUD	Peptic ulcer disease
Q	Questions
RR	Respiratory rate
SaO₂	Saturation of hemoglobin
SD	Standard division
S-ICU	Surgical – intensive care unit
SIMV	Synchronized intermittent mandatory ventilation
SP	Spontaneous mode
SPSS	Statistical package for the social science
SSD	Suction system drainage
US	United State
USD	United State dollars
VAC	Ventilator – associated condition
VAP	Ventilator associated pneumonia
VAT	Ventilator- associated trachea bronchitis
VBS	Ventilator bundles strategies
VC	Volume control
VRG	Ventral respiratory group
VS	Volume support
VTE	Ventilator event
WBC	White blood cell
WOB	Work of breathing
ZEEP	Zero end expiratory pressure
μL	Microliters

ABSTRACT

Background of the study

Ventilator-associated pneumonia (VAP) is defined as a type of pneumonia in a patient receiving mechanical ventilation that was not present at the time of admission to hospital or that occurs 48 hours after intubation and mechanical ventilation. The VAP is still an important cause of mortality and morbidity in mechanically ventilated patients. This can be primarily prevented by increasing knowledge and practice of ICU nurses to improve nursing care that plays an important role in outcomes.

Methods

A descriptive cross-sectional study was conducted among ICU nurses at public hospitals in Sana'a City-Yemen, to assess knowledge and practice of ICU nurses on prevention of Ventilator-Associated Pneumonia. The sample of the study consisted of 87 Yemeni nurses from different public hospitals who participated in this study. The sample size was determined using EpiCalc 2000. A stratified simple random sampling was applied to select the sample size from 4 major public hospitals. After official approvals were obtained from the previously selected settings, the researcher obtained lists of nurses' currently working in the study settings via random sampling methods. Data was collected using a close-ended questionnaire, 87 nurses were tested for knowledge and 50 nurses were tested for practice by using an observational checklist. Information letters, consent form, and questionnaires were handed to ICU nurses by the researcher. Data coded and entered into SPSS version 21.0 for descriptive and inferential statistics.

Results

The ICU nurses, (54%) were male, (52%) were unmarried with age mean \pm SD, 28.40 ± 3.9 years. About (55.2 %) had working experience from 1-3 years. Two third (65.5 %) the nurses had a diploma degree, (51.7%) had courses training in ICU and (81.6%) had no training program on the prevention of VAP. Knowledge scores and their levels were as follows: (5.7%) scored 76%-100%, good, (36.8%) scored between 50%-75% and (57.5%) scored between 0% - 49%. poor knowledge. The overall level of practice, (52%) of nurses had a poor level, (42%) had a moderate level and (6%) that were had a good level of practice.

No association between knowledge and ICU training (P-value= 0.38), sex (P-value=0.41) and years of working experience (P-value= 0.37). A significant association between the knowledge toward prevention VAP and level of education (P-value=0.001). ICU nurses' practice on prevention of VAP was statistically associated with ICU training (P-value= 0.03) and years of work experience (p-value 0.64) but not associated between practice and educational level (P-value= 0.40).

On observation (28%) of nurses performed hands disinfect before oral care and before tracheal suction, before and after every patient care, most of the nurses (74%) were performed wear the gloves and gown before oral care and tracheal suction. (32%) of nurses were performed oral care with an antiseptic solution. Of ICU nurses (100%) of nurses not use the closed endotracheal suction system, (32%) performed sterilization

of suctioning equipment, (42%) used the sterile technique during tracheal suction and (54%) disposed of suction catheter immediately after one single use. Most nurses (78%) kept the patient in semi-sitting position, (88%) used the kinetic bed for the ventilated patient and (62%) of nurses were done respiratory chest physiotherapy. (54%) checked the nasogastric and (36%) used of protocol for weaning from mechanical ventilation.

Conclusion

ICU nurses' knowledge of VAP prevention was inadequate and their practice was found to be poor. No association between knowledge and ICU training, sex and years of work experience but significant association between the knowledge and level of education was found. ICU nurses' practice on prevention of VAP was statistically associated with ICU training and years of work experience but not associated with educational level.

Recommendations

We recommended increasing knowledge and practice of intensive care unit nursing staff through the courses training, workshop, and curriculums. In addition to similar studies with large sample size in other hospitals that provide critical care in Yemen are recommended.

ملخص الدراسة

• خلفية الدراسة:

يحدث الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي بعد ٤٨ ساعة من وضع المريض على انبوب جهاز التنفس الاصطناعي، حيث يعرف بأنه من معظم العدوى المكتسبة في العناية المركزة، ويعتبر من الاسباب الرئيسية التي تؤدي الى زيادة معدل الوفيات والمرض في العناية، وتبقى المسؤولية الاولية الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي هي مسؤولية الممرضين اعتمادا على المعارف والممارسات التي تلعب دورا مهما في التأثير على مخرجات المرضى .

• المنهجية:

دراسة مقطعية عرضية وصفية اجريت على ممرضى العناية المركزة في المستشفيات العامة بمدينة صنعاء- اليمن لتقييم معارف وممارسات ممرضى العناية المركزة تجاه الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي. شملت عينة الدراسة على ٨٧ ممرض وممرضة من جميع المستشفيات المشاركين في الدراسة. تم تحديد حجم العينة باستخدام برنامج (Epical 2000) وتم اختيار حجم العينة من الاربعة المستشفيات العامة بواسطة طريقة العينة العشوائية الطبقية بعد الموافقة من مكان الدراسة. الباحث اخذ قائمة الممرضين العاملين في أماكن الدراسة بالطريقة العشوائية البسيطة، كذلك جمعت البيانات باستخدام الاستبيانات المكتوبة لعدد ٨٧ ممرض وممرضة لتقييم المعارف ولعدد ٥٠ ممرض وممرضة لتقييم الممارسات باستخدام قائمة الملاحظة. المعلومات العامة وشكل الموافقة والاستبيان سلمت للممرضين بواسطة الباحث نفسة. تم ترميز وادخال البيانات الى برنامج الحزم الاحصائية للعلوم الاجتماعية النسخة ٢١ من اجل تحليل ومعالجة البيانات.

• النتائج:

اظهرت الدراسة ان نسبة ٤٥% من ممرضى العناية المركزة هم من الذكور ومنهم حوالي ٥٢% غير متزوجون ويتراوح متوسط اعمارهم والانحراف المعياري $3,9 \pm 28,40$ سنة بينما نسبة ٥٢% عندهم سنوات خبرة من ١-٣ سنوات و حوالي ٢١,٧% حاصلين على كرس تدريبي في العناية المركزة وكذلك نسبة ٨١,٦% لم يحصلوا على برنامج تدريبي على الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي. ايضا اظهرت الدراسة ان نسبة ٥,٧% يملكون معارف جيدة وحوالي نسبة ٣٦,٨% يملكون معارف متوسطة وايضا معظم ممرضى العناية المركزة بنسبة ٥٧,٥% يملكون معارف ضعيفة حول الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي. وكذلك مستوى الممارسات اكثر من نصف الكادر التمريضي ممارساتهم ضعيفة بنسبة ٥٢% وحوالي ٤٢% متوسط واخيرا فقط حوالي ٦% يؤدون ممارسات جيدة تجاه الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي. واطهرت الدراسة انه لا توجد دلالة احصائية بين مستوى المعارف والدورات التدريبية في العناية المركزة (p- value= 0.38) وكذلك الجنس (p- value= 0.41) وسنوات الخبرة (p- value= 0.37). بينما توجد دلالة احصائية بين المعارف والمستوى التعليمي (p- value= 0.001). ايضا توجد دلالة احصائية بين مستوى الممارسات والدورات التدريبية في العناية المركزة وسنوات الخبرة (p- value= 0.03). بينما لا توجد دلالة احصائية بين مستوى الممارسات والمستوى التعليمي (p- value= 0.40). اظهرت النتائج حول الممارسات أن حوالي ٢٨% يؤدون غسل اليدين قبل وبعد العناية بالفم والشفط من القصبه الهوائية وقبل وبعد العناية لكل مريض. ايضا معظم الممرضين بنسبة ٧٤%

يرتدون القفازات والجاونات قبل العناية بالفم والشفط من القصبة الهوائية وحوالي ٣٢% يؤديون العناية بالفم باستخدام محلول مضاد الاخماج (الكلورهيكسيديل). لآكن نسبة ١٠٠% لا يعملون بنظام الشفط المغلق من القصبة الهوائية وايضا حوالي ٣٢% يلتزمون بتعقيم ادوات الشفط ونسبة ٤٢% يستخدمون تقنية التعقيم خلال الشفط من القصبة الهوائية، وكذلك نسبة ٥٤% يتلفون قسطرة الشفط من القصبة الهوائية بعد استخدامها لمرة واحدة فقط، ايضا معظم الكادر التمريضي يضعون المريض في وضعية شبه جالس وحوالي نسبة ٨٨% يستخدمون الأسرة المتحركة للمرضى، واكثر من نصف الممرضين ٦٢% يأدون العلاج الطبيعي على الصدر للمرضى، ايضا ٥٤% يشيكون على الارتجاج من الانبوب المعوي واخيرا حوالي ٣٦% يستخدمون برتوكول لعملية فطام المريض من جهاز التنفس الاصطناعي.

• الاستنتاجات:

استنتجت الدراسة ان معارف ممرضي العناية المركزة حول الوقاية من الالتهاب الرئوي المصاحب لجهاز التنفس الاصطناعي غير كافية وكذلك مستوى ممارستهم ضعيفة. ايضا لا توجد دلالة احصائية بين المعارف والدورات التدريبية في العناية المركزة والجنس وسنوات الخبرة، لآكن توجد دلالة احصائية بين المعارف والمستوى التعليمي وتوجد دلالة احصائية بين الممارسات والدورات التدريبية في العناية المركزة وسنوات الخبرة وبينما لا توجد دلالة احصائية بين الممارسات والمستوى التعليمي للكادر التمريضي.

• التوصيات

نوصي برفع مستوى المعارف والممارسات للكادر التمريضي من خلال الدورات التدريبية وورش العمل والمناهج وكذلك نوصي بعمل دراسات مشابهة بحجم عينة اكبر في مستشفيات اخرى تعطي رعاية حرجة في اليمن.