

Knowledge and Practice of Intensive Care Nurses Toward Weaning Criteria From Mechanical Ventilation at Public Hospitals in Sana'a City-Yemen

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Introduction





Background of the study

Mechanical ventilation (MV) is applied to treat respiratory insufficiency caused by failure of oxygenation and respiratory muscles to improve gas exchange and reduce the work of breathing

Introduction

Background cont...

Prolonged MV for critically ill patients is associated with adverse clinical outcomes, including physiological and psychological experiences and prolonged MV is associated with significant morbidity and mortality.

Therefore, minimizing the duration of MV is an important consideration for clinicians who care for critically ill patients, and weaning from MV should be considered as soon as possible.

Background cont...

Discontinuation of mechanical ventilation can be defined as the process of gradual (weaning) or sudden ventilator support withdrawal in critically ill patients and represents one of the most important challenges in intensive care units.

Weaning from MV is a major issue in intensive care units (ICUs). The weaning process comprises at least 40% of the total duration of MV.

Introduction

Background cont...

Weaning practice requires that bedside nurses continually make decisions about the patients' ventilation management.

The ability to make clinical judgments involves a complex process using both domain-specific knowledge and decision-making methods.



Problem statement

Weaning the patient from mechanical ventilation can be very challenging problems in the intensive care unit, especially in patients with underlying pulmonary disease and after prolonged ventilation periods

Introduction

Problem statementcontinue

Prolonged mechanical ventilation (MV) leads to high resource utilization and poor outcomes. Patients that require prolonged weaning experience longer hospital stays as well as increased complications, mortality and healthcare costs.

Justification of the study

The Justification of this study was providing baseline information on weaning criteria from MV.

The nurse's team members playing very curial role in successful weaning process form MV and prevent re-intubation of patients.

Justificationcontinue

Due to limited of previous studies in this topic, also according to previous study was showed more than half of the nurses had inadequate knowledge regarding weaning criteria.

Therefore, this study was aims to assess the existing knowledge and practice among intensive care nurses toward weaning criteria from mechanical ventilation.

Introduction

Justificationcontinue

The findings of the study will be helping in planning a comprehensive teaching/training program to improve nursing care practices toward weaning criteria from mechanical ventilation and reduce complication and mortality rates that associated with weaning process.

Justificationcontinue

. So on another hand this will be improving the patient outcome. Improved outcomes will be shorting the patient's length of stay in hospitalization as well as benefit the patient financially with decreased hospital costs.

Objectives and Hypothesis of The Study

Objectives and hypothesis

□ Objectives

General Objective:

To assess the existing knowledge and practice among intensive care nurses toward weaning criteria from mechanical ventilation at public hospitals in Sana'a City-Yemen.

Objectives and hypothesis

Specific Objectives:

1. To identify the level of knowledge about screening of respiratory, hemodynamic and readiness toward weaning criteria from MV.
2. To examine other screening readiness toward weaning criteria from MV.
3. To verify the level of knowledge about modes of weaning intervention from MV.

Specific Objective cont..

4. To explore the level of knowledge regarding the parameters recommendations about weaning intervention from MV.
5. To describe the level of knowledge toward tolerance criteria and extubation for weaning from MV.
6. To determine the level of practice among nurses towards weaning criteria from MV.

□ Hypothesis

1. There is no statistically significant differences between demographic characteristics and nurses knowledge and practice toward weaning criteria from MV.
2. There is no statistically significant differences between the courses training and nurses knowledge and practice toward weaning criteria from MV.

Methodology

Study Setting

The study was done in intensive care units (ICU) in four public hospitals in Sana'a City, Yemen that include (Al-Thowrah, Al-Sabeen, Al-Kuwait and Al-Jomhury hospitals).

Study design

A descriptive, cross-sectional study was carried out.

Methodology

Population of the study

All nurses with various educational backgrounds and working in ICU at public hospitals in Sana'a City, during the data collection period were enrolled in the study.

Sample size determination

Sample size will be determined using EpiCalc 2000.
taking into consideration the following;

The population of the study were all nurses working in ICU at four public hospitals was 220 nurse, precision (3%) and 95% confidence level. The final sample size was 93 Yemeni nurses.

Sampling Methods

A stratified random sampling was applied to select the sample size from 4 major public hospitals.

The list was reviewed and nurses meeting the inclusion criteria were included in the study to select from the total population.

Sampling Methods Con.

The sample size was calculated from each stratum in the hospital was prepared by the following formula:

$$\frac{n}{N} \times K = \text{Sample size from each hospital}$$

- n = (sample size)
- N= (study population)
- k= (population of each hospital)

Sampling Methods Con.

A stratified random sampling to selected sample size from each stratum as follows:

Study setting	Total of Population	The sample size
Al-Thowrah	105	44
Al- Jomhury	45	19
Al-Kuwait	37	16
Al-Sabeen	33	14
Total	220	93

Inclusion and exclusion criteria

☐ The inclusion criteria were included:

- All Yemeni male and female nurses working in the ICU who had an educational certificate, that agree to participate in this study during the study period were enrolled.
- Nurses who had a duration of working one year and more.

☐ The exclusion criteria were included:

All nurses who are not fulfilling the above inclusion criteria.

Data Collection Methods and Tools

□ Data collection methods.

Data was collected from 1st June to 30th March 2019.

1- A self-administered questionnaire was used to collect data on demographic characteristics of ICU nurses, training courses or degree and knowledge toward the weaning criteria from MV. All nurses were received an Arabic version questionnaire.

The questionnaires were filled in the presence of the researcher and participants were free to ask for any questions or clarifications. All of the collected data has checked by the researcher daily for completeness and finally

❑ **Data collection methods con.**

2. ***The observational method*** was applied to assess the actual nurses' practice. During the three shifts, each nurse attended mechanically ventilated patients was observed by the researcher for about 1-4 hours, the time is selected randomly whereby the researcher stays around ICU.

Within these hours, the nurses were occupied with patients care practice.

Observed nurses' time was conveniently selected and were not aware that they were being observed

Data collection tools

1- Questionnaire: A structured questionnaire was consisted of thirty questions.

The questionnaire divided into the following sections:

- **Section one:** Demographic characteristics of nurses; this part contains the following: (ICU type, sex, marital status, age, level of education, duration of working).
- **Section two:** courses training in ICU, attending training on weaning from MV, protocol of weaning from MV, diploma in respiratory therapy.

Data collection tools

Section three: : knowledge of ICU nurses toward weaning criteria from mechanical ventilation, which included twenty questions. This part was comprised of the following sections:

- (screening of respiratory, and hemodynamic, readiness weaning criteria, modes of weaning intervention, recommendation parameters of weaning, tolerance criteria for weaning from MV and extubation)

Data collection tools

2- The observation checklist: : was applied to assess the actual nurses' practice.

- The observation checklist was included the twenty six observe.
- The observation checklist divided into the following section (Practice of ICU nurses about readiness for weaning criteria from MV, weaning intervention and extubation).

Validity and reliability

The questionnaire and an observation checklist were adopted from previously validated and reliable studies (*School, 2016; Haugdahl, 2016; Burns, 2012; Contro, 2019; J.M. Cairo, 2016*) and from weaning criteria from MV guidelines (*Robert & Kenneth, 2017; David, W. Chang, 2013; Cynosure Health, 2013*).

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Validity and reliability:

The validity of the Arabic version of the questionnaire and an observation checklist were sent to **5 experts** to assess the clarity and relevance of the questionnaire to the objectives of the study.

Experts **included two academic staff in critical** and medical-surgical nursing and three ICU nurse specialist, the ICU respiratory therapist, and a registered nurse who has worked in the ICU for 6 years and more.

Validity and reliability Con.

- **Reliability**

The, overcoming the distribution of the questionnaire to measure the reliability can be achieved by using Cronbach's Alpha through the SPSS software and the general reliability for all items equal (0.86).

This range is considered high, the result ensures the reliability of the questionnaire.

Pilot Study:

The piloted of the questionnaire and the observation checklist was performed. A pilot study was done in the study setting on 10% of nurses working in the ICU on items in a questionnaire and observation checklist.

Following the pilot study, minimal modifications of the instrument were made.

The piloted nurses were excluded from the final study sample.

Data processing and Analysis

A statistical package for the social science (SPSS 21.0) used for statistical analysis of this data.

Descriptive statistics including frequency and percentage for categorical variables and the **mean** and **standard deviation** (SD) for numerical variables.

Chi-square test (χ^2) for association was used for testing association between categorical variables.

t-test was used to examine the differences between two variables

One way-ANOVA was used to examine the differences between more than two variables

Furthermore the Cronbach's Alpha was used to determine reliability of data collection tools.

P-value <0.05 was considered significant.

Study Variables

- ***Independent variables:*** Demographic characteristics and ICU training (course training in ICU, weaning criteria from MV and diploma in respiratory therapy).
- ***Dependent variables:*** Knowledge and practice of ICU nurses toward the weaning criteria from MV.

Ethical Considerations

Approval of the study was obtained prior to carrying out this study from the college of medical sciences of Al-Razi University.

A cover letters were sent to principles of hospitals to obtain approval to conduct this study.

The consent was taken orally from all participating nurses in the study .

Results

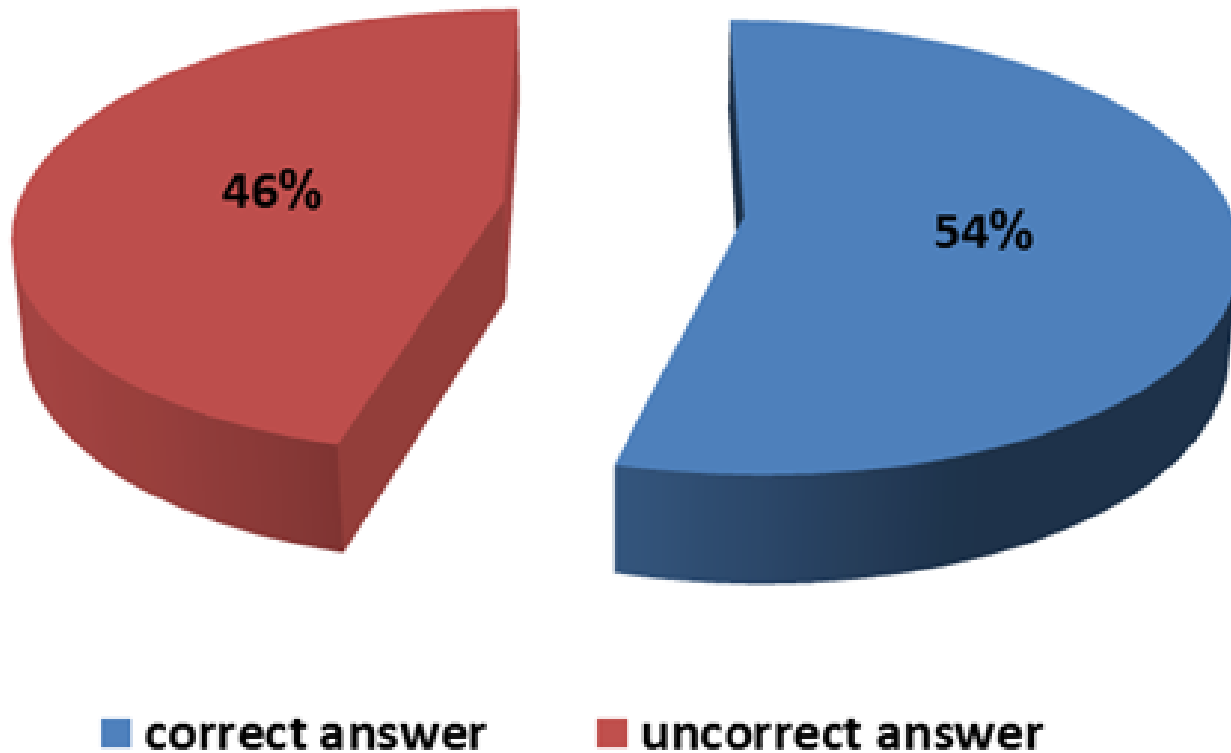
Demographic characteristics of ICU nurses.

Demographic characteristics	F	%
Sex		
• Male	48	51.6
• Female	45	48.4
Age group		
• 20-30	61	65.6
• 31-40	30	32.3
• >40	2	2.2
Marital status		
• Single	48	45.2
• Married	49	52.7
Level of education		
• Diploma degree	60	64.5
• Bachelor degree	29	31.2
• Master degree	4	4.3
Work experience (years)		
• 1 - 5 years	70	75.3
• 6 - 10 years	16	17.2
• >10 years	7	7.5

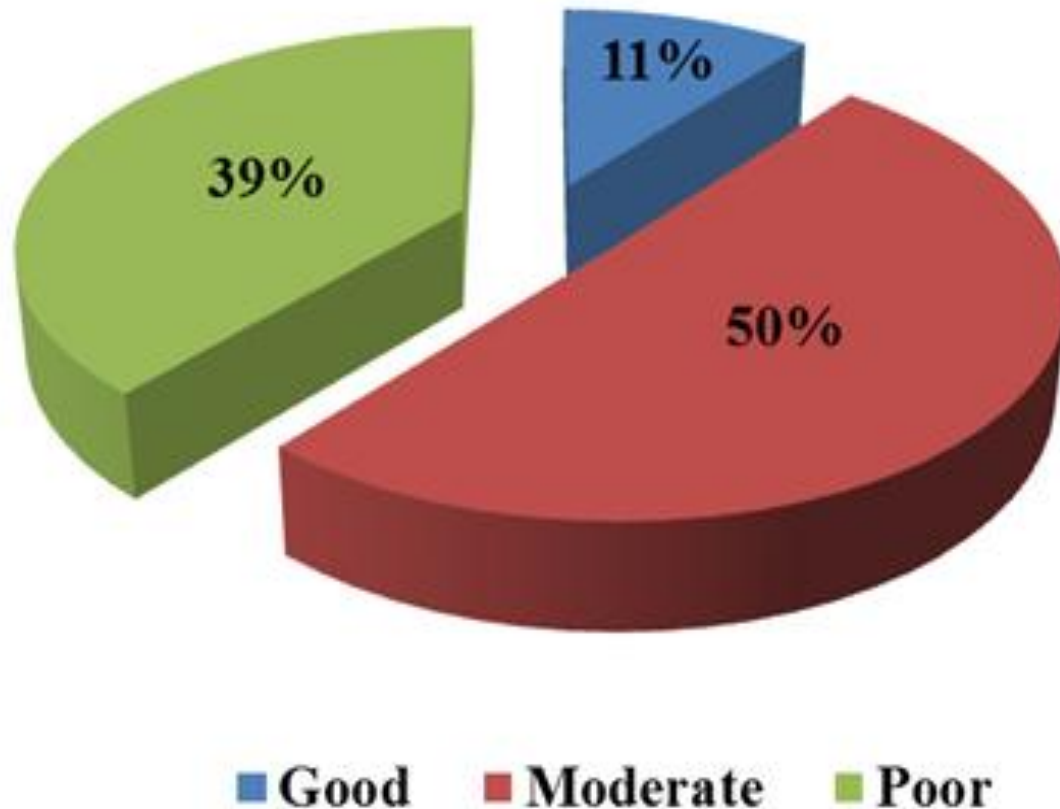
Statement	Responses			
	Yes		No	
	F	%	F	%
Course training in ICU	38	40.9	55	59.1
Writing weaning protocol in the hospital.	0	0	93	100
Courses training in weaning criteria from MV	15	16.1	78	83.9
Diploma in respiratory therapy	16	17.2	77	82.8

ICU Training among nurses

Overall knowledge toward weaning criteria from MV



Level of knowledge about weaning criteria from MV



Demographic characteristics	Total knowledge scores	p-value
	Mean \pm SD	
Age group		0.235*
• 20- 30	43.1 \pm 13.1	
• 31- 40	44.9 \pm 12.5	
• >40	29 \pm 1.4	
Sex		0.307*
• Male	42.1 \pm 12.3	
• Female	44.8 \pm 13.6	
Marital status		0.072*
• Single	40.7 \pm 13.1	
• Married	45.6 \pm 12.5	

Continue... Overall knowledge scores by demographic characteristics of nurses

Demographic characteristics	Total knowledge scores	p-value
	Mean \pm SD	
Educational level		0.682**
• Diploma degree	43.7 \pm 13.7	
• Bachelor degree	42.1 \pm 11.2	
• Master degree	47.7 \pm 14.3	
Work experiences		0.705**
• 1 to 5 years	43.98 \pm 13.3	
• 6 to 10 years	42.25 \pm 10.6	
• \geq 10 years	40.14 \pm 15.6	

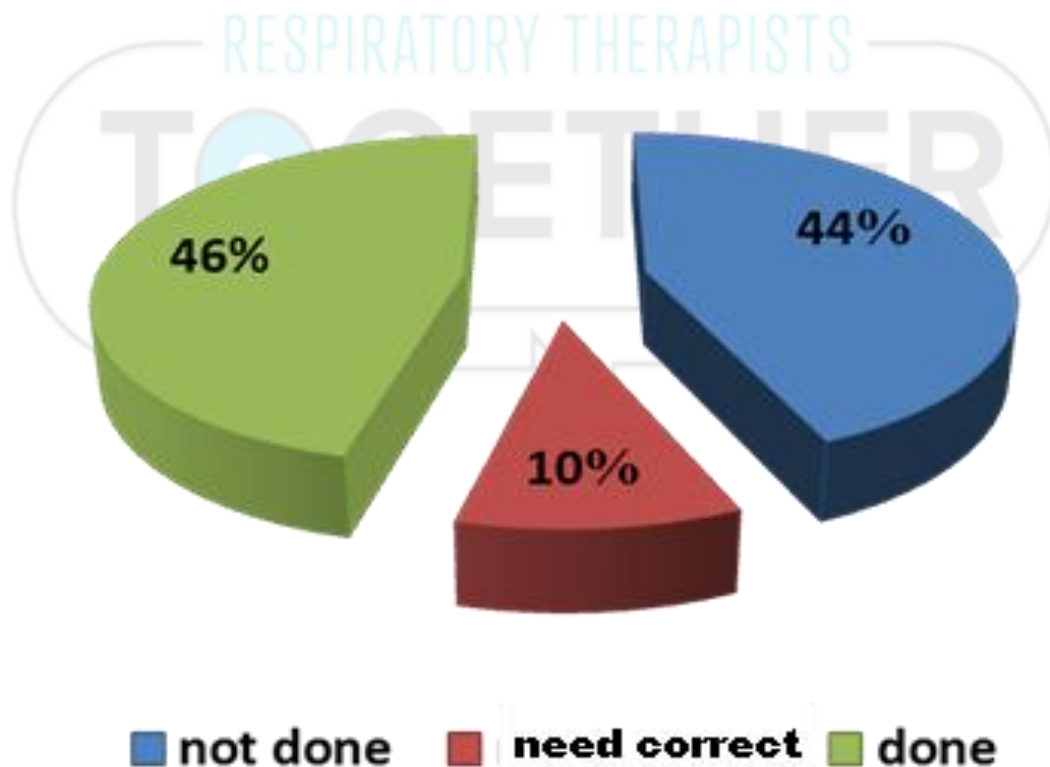
Association between level of knowledge toward WC from MV and workplace

Workplace	Level of knowledge			p-value
	Good	Moderate	Poor	
Hospital Name				0.180
• Al-Thowrah hospital	4	26	14	
• Al-Jomhury hospital	4	5	10	
• Al-Kuwait hospital	0	10	6	
• Al-Sabeen hospital	2	6	6	
Type of ICU				0.063
• General ICU	1	11	14	
• Pediatric ICU	0	8	7	
• Emergency ICU	1	6	6	
• Surgical ICU	1	5	1	
• Medical ICU	1	9	3	
• Other (Neuro, nephron and cardio)	10	47	36	

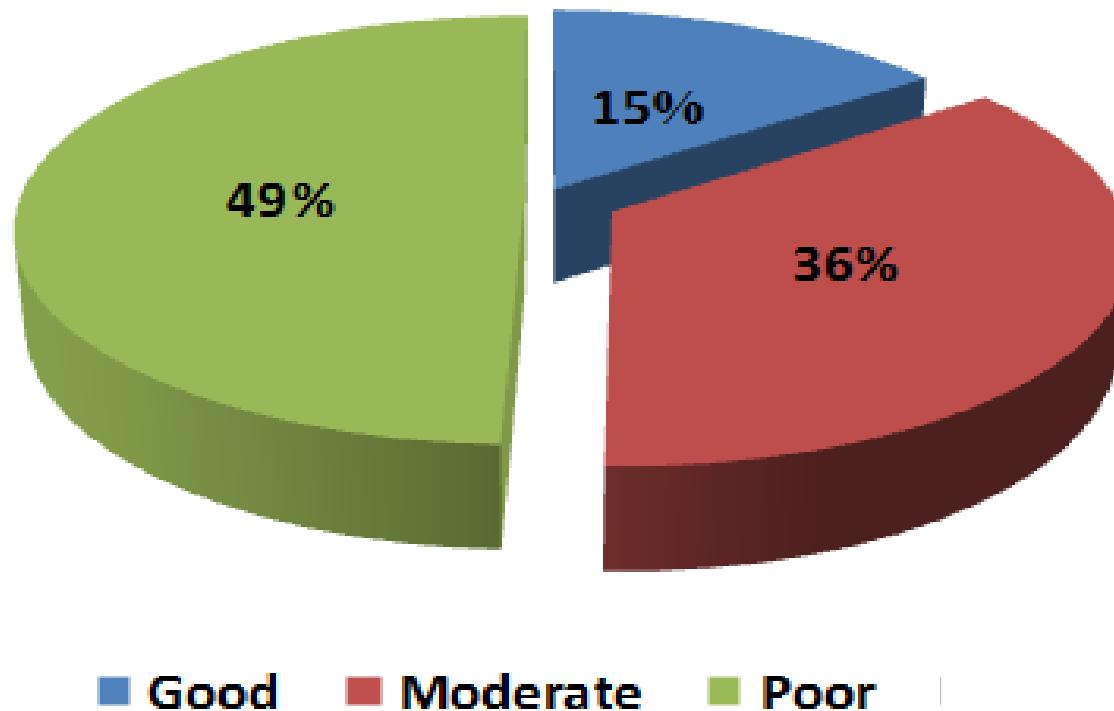
Overall knowledge scores toward WC from MV by training among nurses

Training	Overall score toward WCFMV		p-value
	Yes	No	
Courses training in ICU			
• Mean ± SD	45.1 ± 14.1	42.3 ± 12.2	0.309
Course training in weaning criteria			
• Mean ± SD	43.1± 15.9	43.5 ± 12.4	0.932
Diploma in respiratory therapy			
• Mean ± SD	51.8± 8.8	41.6± 12.7	0.004

Overall practice of ICU nurses toward WC from MV



Level of practice among ICU nurses toward WC from MV



Overall practice scores in relation to demographic characteristics of nurses

Demographic characteristics	Overall practices toward WCFMV	p-value
	Mean \pm SD	
Age group		0.004
• 20- 30	24.5 \pm 8.6	
• 31- 40	31.1 \pm 31.1	
• >40	26 \pm 8.5	
Sex		0.554
• Male	26.1 \pm 9.3	
• Female	27.2 \pm 9.2	
Marital status		0.031
• Single	24.4 \pm 9.7	
• Married	28.6 \pm 8.4	

Continue...Overall practice scores in relation to demographic characteristics of nurses

Demographic characteristics	Overall practices toward WCFMV	p-value
	Mean ± SD	
Educational level		0.016
• Diploma degree	24.8±8.5	
• Bachelor degree	29.4±9.8	
• Master degree	34.7±8.1	
Work experiences		0.048
• 1 to 5 years	25.6±9.3	
• 6 to 10 years	27.7±7.9	
• ≥10 years	34.1±9.0	

Overall practice scores by nurses training

Training	Overall score toward WCFMV		p-value
	Yes	No	
Courses training in ICU			
• Mean ± SD	29.1 ± 10.29	24.96 ± 8.1	0.033
Course training in weaning criteria			
• Mean ± SD	31.26± 10.1	25.76 ± 8.8	0.034
Diploma in respiratory therapy			
• Mean ± SD	31.31± 8.11	25.68 ± 9.1	0.026

Association between level of practice toward WC from MV and workplace

Workplace	Level of practices			p-value
	Good	Moderate	Poor	
Hospital Name				0.009
• Al-Thowrah hospital	11	17	16	
• Al-Jomhury hospital	2	10	7	
• Al-Kuwait hospital	1	2	13	
• Al-Sabeen hospital	0	4	10	
Type of ICU				0.04
• General ICU	1	9	16	
• Pediatric ICU	2	3	10	
• Emergency ICU	2	4	7	
• Surgical ICU	4	3	0	
• Medical ICU	1	6	6	
• Other (Neuro, nephron and cardio)	4	8	7	

CONCLUSION AND RECOMMENDATIONS

Conclusion

From the results of this study, we conclude that:

- *Knowledge outcomes:*

- (54%) of the nurses had correct overall knowledge toward weaning criteria from MV.
- (39%) of the nurses had poor level of knowledge, (50%) of the nurses had moderate level of knowledge, whereas (11%) of the nurses had good level of knowledge.
- A significant differences in the mean knowledge scores toward weaning criteria from MV by diploma degree in respiratory therapy was found ($P\text{-value} < 0.05$).

Conclusion....continue

- *Practices outcomes:*

- (44%) of the nurses were correctly practiced all procedures toward weaning criteria from MV.
- 49% of nurses had a poor level of practice, (36%) had moderate level of practices and (15%) had a good level of practices.

Conclusion....continue

- A statistically significant difference was found in the mean practice scores by demographic characteristics ($P\text{-value} < 0.05$) except for sex ($P\text{-value} > 0.05$).
- There was statistically significant differences in the overall practices by training ($P\text{-value} < 0.05$).
- There was a significant association between the level of practices and workplace ($P\text{-value} < 0.05$).

- ***Recommendations for Nursing Education***

1. The ICU training program should include evidence-based guidelines for the weaning criteria from mechanical ventilation. **Recommendations**
2. Nursing lecturers and clinical facilitators should incorporate evidence-based
3. The continuing professional development program should be made compulsory for nurses

Recommendationscontinue

- ***Recommendations for Clinical Practices***

1. The usage of the weaning protocol should be encourage.
2. Daily /on even shift comprehensive assessment on patients should be done
3. Training on identification of weaning failure.
4. Continuous assessment of the patients who is being weaned to detect early signs of failure.

Recommendationscontinue

- ***Recommendations for Nursing Research***

1. A similar study is recommended to include a large sample
2. Further research should be conducted to test knowledge and practice levels of nurses prior to and after the educational program.

THANK YOU

“Save one life,
you’re a *hero*.
Save 100 lives,
you’re a *nurse*.”

- Anonymous





