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Relationship between Critical Care Nurses' Knowledge and Clinical Decision Making Role in Managing Mechanically Ventilated Patients

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Abstract: **Background:** Mechanical ventilation is a lifesaving procedure that is indicated for critically ill patients. Clinical decision making in nursing practice is a complex process that is integrated into the nursing profession. Critical care nurses are continually faced with situations where they have to make knowledgeable decisions. **Purpose:** To identify the relationship between critical care nurses' knowledge and clinical decision making role in managing mechanically ventilated patients. **Research Design:** A descriptive correlational research design was used in this study. **Setting:** The study was conducted at intensive care units in Nasser Institute. **Sample:** A purposive sample of 109 critical care nurses were selected. **Instruments:** Data was collected using three instruments (critical care nurses' characteristics structured questionnaire, critical care nurses' knowledge structured interview questionnaire, and clinical decision making in nursing scale (CDMNS)). **Results:** The majority of the studied sample (95.4%) had a satisfactory level of knowledge about caring for patients on mechanical ventilation, more than two thirds of the studied sample (73.4%) had moderate insight of decision making role. There is a statistical significant positive correlation between total decision making and general information about, communication, checking ventilator settings and modes, standard care for endotracheal suction, and management of ventilator alarm. Conclusion: There is a positive correlation between nurses' knowledge and clinical decision making role. **Recommendations:** The principles of mechanical ventilation must be explained and incorporated into interactive training programs, Training courses regarding clinical decision making for critical care nurses must be provided. Replication of the same study on larger probability samples at different geographical locations for data generalization.

Keywords: *clinical decision-making, critical care nurses, knowledge, mechanically ventilated patients.*

Introduction

The Intensive Care Unit (ICU) is a complex care area with a mission to provide patients with the specialized care they need to improve their clinical condition. The number of patients needing intensive care is on the rise everywhere. Most countries treat these patients who require mechanical ventilation (MV) only in intensive care units (Medtronic, 2020). Users have access to a variety of critical care therapies, including life support via

MV, to maintain the correct balance between gas exchange, oxygen demand, and delivery. Therefore, MV is considered a non-curative method to support patients with compromised respiratory function with possible hemodynamic consequences and functional problems (De-Miguel et al, 2019).

A life-sustaining technique often used when treating critically ill patients is mechanical ventilation. The aging of the population, the development of advanced surgical techniques, more aggressive medical, neurological and oncological treatments and better management of serious illnesses are all contributing factors to the increasing use of mechanical ventilation, which is correlated to the increase in hospitalizations in intensive care units. According to recent epidemiological studies, approximately 310 out of 100,000 adults in the United States receive invasive ventilation for nonsurgical reasons (Nagata, et al., 2019).

Mechanical ventilation is indicated for multitudinous clinical and physiological reasons. The nursing management of the mechanically voiced case is challenging in numerous situations from the accession of largely specialized chops; expert knowledge on invasive monitoring; and perpetration of interventions to watch for the case (Branson, 2018). Each critically ill patient brings the clinical rationale for MV and additional complexities associated with their illness. It is recognized that the reason for MV and patient admission impacts on patient assessment and management (Hashemian, etal, 2018).

Diagnostics and related judgments are constantly present in nursing practice; however, ICU professionals must respond quickly and decisively in conditions characterized by high levels of stress, ambiguity, and a lack of physiological reserve in patients. The diagnostic choices of acute disciplines often subject patients to therapeutic approaches which, if incorrect, can be harmful (vaunt, et al 2018).

The critical care nursing part has been expanded in response to new knowledge, political pressure and specialized advances in health care. Decision making is considered as a complex process and it's important at all situations of the management process and comprises of different situations of complexity. Effective decision making depends on the delicacy of assessments and the consequences that are drawn from nurses before action is taken (Pitel & Mentel 2019).

Decision making is seen as one of the most important aspects of being a critical care nurse and an essential component of providing critical care. Critical care nurses are frequently put in positions where they must make informed decisions. These decisions may involve the nurse alone in certain cases and the medical personnel and other members of the healthcare team in others. Critical care nurses make a variety of decisions, from straightforward routine ones to more complicated moral ones (Maharmeh, Alasad, Saleh & Darawad, 2016).

The difficulty of nursing in recent years has highlighted the growing role of critical thinking (CT) in nursing practices. Consequently, nurses will develop best practices in an evidence-based healthcare environment by improving their CT skills and attitudes (Berman & Snyder, 2019). It has the potential to develop exceptional outcomes and decisions in clinical practice and is seen as the foundation of competent decision making (Manetti, 2019). Consequently, nurses working in an ICU setting must make quick choices, have a thorough understanding of difficult situations,

and generally take on greater responsibility (Nibbelink & Brewer, 2018) ICU nurses must make accurate and appropriate decisions through the critical thinking that emerges from the understanding of specific and theoretical knowledge because correct and correct decisions are the basis of the patient's intensive care (Ntantana et al 2017).

Clinical decision-making is an essential component of competent nursing care, and the ability of nurses to make effective clinical decisions is the most important factor influencing the standard of care (Dorgham & Al Mahmoud, 2013). End the discussion by adding clinical judgment (CJ), which combines critical thinking and analysis of the clinical situation, before asking a person to make a decision about what to do. Clinical judgment involves the use of clinical reasoning to analyze complex patient situations over time. All of the preceding insights feed into the CDM, which progresses from cognitive activity to an action taken or a decision not to act. Figure (1) shows how CDM, which is the culmination of the other three words, depends on it to provide an informed cognitive context for making the right decisions in clinical scenarios (Lasater & Nielsen, 2019).

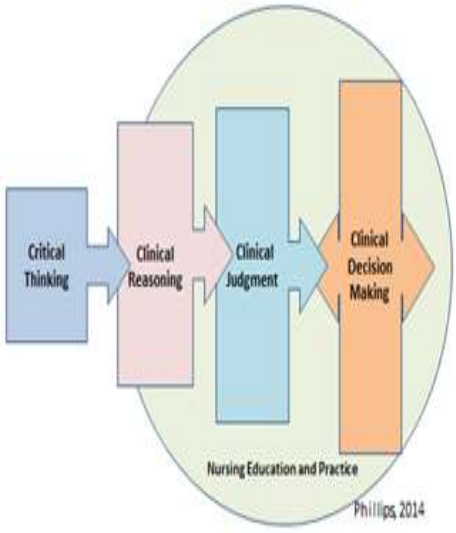

Figure 1. Connection between CT=critical thinking, CR= clinical reasoning, CJ= clinical judgment, and CDM= clinical decision making.
Adopted from Benner, P., Hughes, R.G., & Sutphen, M. (2008). Clinical reasoning, decision making, and action: Thinking critically and clinically.

Significance of the study:

Critical care nurses (CCNs) provide complete remedies and a way of subsistence for sufferers in in depth care gadgets from the time of admission till leave (ICUs). Additionally, mechanical ventilator guide is a vital life-saving degree for around 90% of all ICU sufferers. 30% of sufferers require mechanical respiration and battle to wean themselves (Todorova, Vassilev & Matveev, 2019). Nurses should be informed approximately the operation and barriers of ventilator modes, the reasons for respiration misery and ventilator desynchronize, and the powerful control of those situations so that they can offer exceptional patient-focused care (Grossbach, Chlan & Tracy, 2019).

A dynamic and collaborative decision-making manner is vital for the best control of mechanical respiration in an effort to decrease troubles and keep away from delays with inside the transition to extubating. Effective collaboration necessitates comprehensive, coordinated verbal exchange in addition to shared crew dreams in order to enhance care quality, affected person safety, and discharge. In the absence of teamwork, air flow decision-making can be fragmented, uneven, and delayed (Hansen & Severinsson, 2019).

Imperative factors necessary to prepare nurses when a prolonged period of postponing weaning is needed require nurses with much experience and extensive training. The management of

ventilated patients undergoing extended weaning requires the assistance of a team of nurses and doctors under the guidance of a respiratory therapist to communicate the treatment plan coherently. Teams of specialists with enough members to make good choices may reduce the number of patients spending unnecessary time on ventilators or ICUs. (Henneman et al., 2016).

The capability to make judgments effectively in a grueling and constantly evolving healthcare terrain is essential for nurses (Johansen &O'Brien, 2016). Nurses are medical professionals that precedence treatment grounded on their analysis of patient condition data and clinical decision- making in collaboration with the case and family (Pitel & Mentel 2019).

During the clinical experience, it was observed that, nurses who work in intensive care units don't have clinical decision making role in the care of patients connected to the mechanical ventilator, so, the researchers initiated to investigate the relationship between critical care nurses' knowledge and clinical decision making role in managing mechanically ventilated patients. Therefore the nurse should apply knowledge and practical skills in providing care for the critically ill patients in order to improve the patient outcome, prevent complication, and decrease the length of ICU stay.

Methods:

Purpose

To identify the relationship between critical care nurses' knowledge and clinical decision making role in managing mechanically ventilated patients.

Research Design

A descriptive correlational research design was utilized in this study.

Research questions

To achieve the aim of the current study, the following research questions were formulated:

- Q1: What is the critical care nurses' knowledge of managing mechanically ventilated patients?
- Q2: What is the critical care nurses' clinical decision-making role in managing mechanically ventilated patients?
- Q3: What is the relationship between critical care nurses' knowledge and clinical decision-making role in managing mechanically ventilated patients?

Setting

The study was carried out at different intensive care units at Nasser Institute Hospital in Egypt. It is considered one of the largest specialized medical centers affiliated to the Ministry of Health. The hospital is composed of four buildings. The main building contains eight floors, with a capacity of 850 beds distributed over all medical specialties in addition to 68 intensive care beds for different specialties, such as surgical, medical, cardiac, neurological, and urological intensive care units.

Sample

A purposive sample of 109 critical care nurses from different intensive care units with at least one year of experience of work in the intensive care unit. Also, they should have previous experience of providing care for patients connected to mechanical ventilators.

Instruments:

Three instruments were utilized to collect data as follows:

Instrument one-: Critical Care Nurses' Characteristics structured questionnaire Sheet

It contains data related to critical care nurses' such as gender, age, level of education, years of experience etc.

Instrument Two: Critical Care Nurses' Knowledge Structured Questionnaire:

This questionnaire was developed by the researchers after an extensive reviewing of the literature. It included 47 true/ false questions that covered essential knowledge for caring of patients on mechanical ventilation, general information (5 items), communication (2 items) checking ventilator settings and modes (14 items), standard care for endotracheal suction (6 items), endotracheal tube care (4 items), management of ventilator alarm (4 items), preventing Ventilator-associated pneumonia (VAP) (6 items), patient and family education (2 items), weaning (4 items). The Scoring system for the questionnaire is as follows; the correct answer is given the score of "ONE" and the wrong answer is given the score of "ZERO. Based on the scoring system utilized, the knowledge level is categorized as follows: satisfactory level is ≥ 70% and unsatisfactory level is < 70%.

Reliability:

Cronbach's alpha test of critical care nurses' knowledge structured questionnaire was 0.86.

Instrument three:-Clinical Decision Making in Nursing Likert Scale (CDMNS).

The Clinical Decision Making in Nursing Scale is a self-report instrument that took approximately 10 minutes to complete. It was originally developed by Jenkins (1985) as an assessment questionnaire for decision making in professional nursing and nursing education.

The scale contains 40 items on four subscales (ten items each): the search for alternatives and options, canvassing of objectives and values, evaluation and reevaluation of consequences, and search for information and unbiased assimilation of new information. Answers are provided using a five item likert scale with both positive and negative items answers ranging from always (A) to never (N). 22 items (1, 3, 5, 7, 8, 9, 10, 11, 14, 16, 17, 18, 20, 26, 27,28, 29, 33, 35, 36, 37 and 38) are written as positive, 18 items (2, 4, 6, 12, 13, 15, 19, 21, 22, 23, 24, 25, 30, 31, 32, 34, 39, and 40) are written as negative. The potential score on the CDMNS can range from 40 to 200.

Scoring system:

Each item of the scale is evaluated through the five-point Likert scale as 5=Always, 4=frequently, 3=occasionally, 2=Seldom, and 1=Never. There are 18 items that are inversely scored. Minimum and maximum points to be taken are 40 and 200 in the whole scale and 10 and 50 in the subscales, and there is no cutting point. Then clinical decision skills ranked as low ≤ 60 %, moderate from 60-75%, High > 75%. The scale is evaluated through the scores obtained from each subscale and the total scale (Jenkins, 1985; 2001).

Reliability:

Cronbach's alpha reliability coefficient of the original CDMNS internal consistency was found to be .83 and the explanatory factor analysis has shown that the four-factor structure explains 72.3 % of the total variance (Jenkins, 1983 & 1985).

Content validity

Content validity of the developed was reviewed by a panel of 5 experts (two professors in addition to three assistant professors) in the field of critical care and emergency nursing and nursing administration in order to ensure content comprehensiveness, clarity, relevance, and applicability.

Pilot study:

A pilot study was conducted on 10% (n=11 nurses) to evaluate the feasibility of the instruments, their clarity as well as to estimate the time needed for filling the data collection instrument.

Ethical Considerations

A primary approval was obtained from the ethical committee, Faculty of Nursing, Cairo University, (IORG; 0006883 Cairo University, RHDIRB; 2019041701, FWA; 00026458). The participation in this study was voluntary. Each nurse had the right to withdraw from the study at any time. An oral description of the study was clarified to the nurses. Written consent was obtained from the nurses regarding their acceptance to participate in the current study. The confidentiality and anonymity of each nurse were assured through coding of all data.

Procedure:

After obtaining permission to proceed with the study from the ethical committee, and the authorized personnel, the researchers initiated data collection by obtaining a list of nurses in the different ICUs. Data collection was conducted at the selected setting daily during the morning shift.

The interview technique was used to fill the questionnaire sheet, it took 30 to 40 min, to fill out the questionnaire forms by the researchers. The researchers started with collecting data about characteristics of the critical care nurses by using instrument one. Then, assessment of critical care nurses' knowledge about management of patients connected with mechanical ventilators was done utilizing instrument two. Finally, the researchers assessed the nurses' decision making role in managing mechanically ventilated patients utilizing instrument three. Finally, the researchers thanked the participants for their cooperation and voluntary participation. The data were collected from October 2021 to December 2021.

Statistical analysis

Data entry and statistical analysis were done using SPSS 25 statistical software package. Data was presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations. Chi-square and t-test were used for comparison between two means Pearson correlation test was used for relationships.

Results:

Table 1 shows that more than half (50.5%) of the studied sample were females, with a mean age of 28.4 ±5.7 regarding the level of education; more than half (58.7%) of them had two years above secondary school diploma. More than half (53.2%) of them had nursing experiences <5 years.

For nurse-to-patient ratio, the majority of the studied sample (94.5%) was 1:2. Therefore, less than two thirds (60.6%) of the studied sample received training courses about the management of patients with mechanical ventilation, More than two thirds (69.7%) of them didn't receive any previous training course about nursing administration.

Figure 1 illustrates that the majority of studied sample (95.4%) had a satisfactory level of knowledge related to caring for patients connected with mechanical ventilation.

Figure 2 reveals that more than two thirds of the studied sample (73.4%) had moderate insight of decision making role. While the lowest percent (2.8%) had high insight of decision making role.

Table 2 clarifies that the majority (99.1%) of the studied sample had a satisfactory level of knowledge related to endotracheal tube care and weaning.

Table 3 shows that one third of studied sample (31.2%) reported that they always search for alternatives or options, and (27.5%) reported their frequent evaluation and reevaluation of consequences. While (3.7%) reported their never search for alternatives or options.

Table 4 shows that more than two thirds (73.4%) of the studied sample had moderate level of searching for alternatives or options dimension. While (2.8%) had high level in canvassing of objectives and values dimension.

Table 5 represents that there is a significant positive correlation between total clinical making and nurses' knowledge about general information, communication, checking ventilator settings and modes, standards care for endotracheal suction, and management of ventilator alarm. Also, checking ventilator settings and modes and providing standard care for endotracheal suction are correlated with each dimension of clinical decision making. Also, evaluation and reevaluation of consequences is directly positively correlated with all dimensions of knowledge. Each knowledge dimension (except endotracheal tube care, prevention of ventilator-associated pneumonia and weaning) is positively correlated with clinical decision making.

Table 6 shows that there is a statistical significant positive correlation between age and clinical decision making and between education and clinical decision making.

Table 7 indicates that there is no statistical significant correlation between levels of knowledge and clinical decision making.

Table 8 shows that there is a statistical significant direct effect of knowledge about checking ventilator settings and modes, standard care for endotracheal suction, management of ventilator alarm and prevention of ventilator-associated pneumonia (VAP) on clinical decision making. Also, the whole regression effect of knowledge dimensions on clinical decision making is significant and the R square is 0.5 which indicates the obvious effect of knowledge on clinical decision making.

Table (1): Frequency Distribution of the Studied Sample According to Their Characteristics (N=109):

Characteristics	No	%
Gender		
Male	54	49.5
Female	55	50.5
Age		
20-30	81	74.3
31-40	25	22.9
41-50	3	2.8
X ± SD 28.4 ±5.7		
Level of Education		
Secondary School Nursing Diploma	7	6.4
Two Years Above Secondary School Diploma	64	58.7
Baccalaureate	38	34.9
Years of Experience		
<5	58	53.2
5-10	35	32.1
>10	16	14.7
Nurse to patient ratio		
1:1	4	3.7
1:2	103	94.5
1:3	2	1.8
Exposed to training courses about management of patient with MV		
Yes	66	60.6
No	43	39.4
Exposed to training courses about nursing administration		
Yes	33	30.3
No	76	69.7

Figure (1): Percentage Distribution of the Studied Sample as Regards to level of Knowledge (N=109):

Figure (2): Percentage Distribution of the Studied Sample as Regards to Clinical Decision Making Levels (N=109):

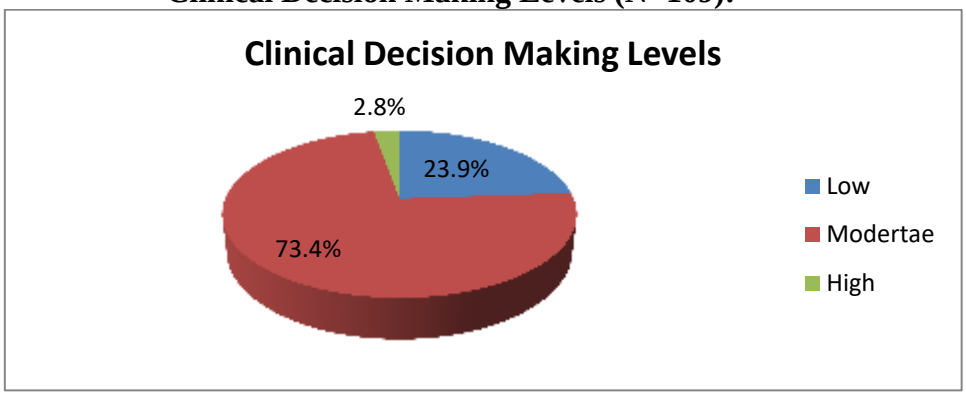

Table (2): Frequency Distribution of the Studied Sample as Regards to knowledge about caring for Patients on Mechanical Ventilation (N=109):

Knowledge dimensions	Mean ± SD	Unsatisfactory		Satisfactory	
		No.	%	No.	%
1-General information	4.65 ± 0.12	4	3.7	105	96.3
2-Communication	1.81 ± 0.22	19	17.4	90	82.6
3-Check ventilator settings and modes	12.30 ± 0.14	4	3.7	105	96.3
4-Standard care for Endotracheal Suction	5.25 ± 0.16	31	28.4	78	71.6
5-Endotracheal tube care	3.88 ± 0.09	1	0.9	108	99.1
6-Management of ventilator alarm	3.79 ± 0.13	4	3.7	105	96.3
7-Prevent Ventilator-associated pneumonia (VAP)	5.79 ± 0.11	9	8.3	100	91.7
8-Patient and family Education	1.90 ± 0.11	10	9.2	99	90.8
9-Weaning	3.92 ± 0.07	1	0.9	108	99.1
Total knowledge	43.19 ± 4.37	5	4.6	104	95.4

Table (3): Frequency Distribution of the Studied Sample as Regards to Clinical Decision Making levels (N=109):

Clinical decision-making Dimensions	Always		Frequently		Occasionally		Seldom		Never	
	No.	%	No.	%	No.	%	No.	%	No.	%
1-Search for alternatives or options	34	31.2	33	30.3	30	27.5	8	7.3	4	3.7
2-Canvassing of objectives and values	33	30.3	32	29.4	27	24.8	9	8.3	8	7.3
3-Evaluation and reevaluation of consequences	30	27.5	34	31.2	30	27.5	8	7.3	7	6.4
4-Search for information and unbiased assimilation of new information	30	27.5	33	30.3	30	27.5	9	8.3	7	6.4
Total	31	28.4	33	30.3	29	26.6	8	7.3	8	7.3

Table (4): Frequency Distribution of the Studied Sample as Regards to Clinical Decision making levels (N=109):

Clinical decision-making dimensions	Mean ± SD	Low		Moderate		High	
		No.	%	No.	%	No.	%
1-Search for alternatives or options	35.04±4.04	22	20.2	80	73.4	7	6.4
2-Canvassing of objectives and values	31.05±3.50	60	55.0	37	33.9	4	3.7
3-Evaluation and reevaluation of consequences	31.61±3.31	55	50.5	51	46.8	3	2.8
4-Search for information and unbiased assimilation of new information	31.61±4.03	55	50.5	40	36.7	4	3.7
Total clinical decision making	129.31±11.92	26	23.9	80	73.4	3	2.8

Table (5): Correlation between knowledge of the studied sample and their clinical decision making (N=109):

knowledge dimensions	1-Search for alternatives or options		2-Canvassing of objectives and values		3-Evaluation and reevaluation of consequences		Search for information and unbiased assimilation of new information		Total clinical decision making	
	r	p	r	p	r	p	r	p	r	P
1-General information	0.34	0.001*	0.06	0.49	0.25	0.007*	0.07	0.45	0.22	0.01*
2-Communication	0.38	0.0001*	0.06	0.53	0.23	0.01*	0.14	0.13	0.26	0.006*
3-Check ventilator settings and modes	0.32	0.001*	0.3	0.001*	0.4	0.0001*	0.4	0.0001*	0.44	0.0001*
4-Standard care for Endotracheal Suction	0.25	0.008*	0.37	0.0001*	0.18	0.055	0.33	0.0001*	0.36	0.0001*
5-Endotracheal tube care	0.08	0.4	0.004	0.96	0.27	0.003*	0.11	0.22	0.14	0.13
6-Management of ventilator alarm	0.16	0.09	0.07	0.43	0.22	0.01*	0.23	0.01*	0.21	0.02*
7-Prevent Ventilator-associated pneumonia (VAP)	0.19	0.04*	0.03	0.73	0.3	0.001*	0.1	0.27	0.17	0.06
8-patient and family Education	0.26	0.006*	0.07	0.41	0.22	0.02*	0.17	0.07	0.23	0.01*
9-Weaning	0.16	0.08	0.1	0.29	0.16	0.09	0.05	0.57	0.14	0.12
Total knowledge	0.2	0.049*	0.19	0.04*	0.17	0.06	0.3	0.001*	0.26	0.005*

*Significant at p-value<0.05

Table (6): Correlation between Selected Characteristics of the Studied Sample, knowledge, and Clinical Decision Making (N=109):

Variables	Knowledge		Clinical Decision making	
	r	P	r	p
Age	0.06	0.5	0.23	0.01*
Education	0.02	0.82	0.2	0.03*
Experience	0.05	0.56	0.05	0.6
Ratio nurses/patients	0.06	0.47	0.04	0.64

*Significant at p-value<0.05

Table (7): Correlation between levels of Knowledge and Clinical Decision Making of the studied Sample (N=109):

Knowledge level	Clinical decision making levels						Chi-square	p-value
	Low		Moderate		High			
	No.	%	No.	%	No.	%		
Unsatisfactory	2	7.7	3	3.8	0	0.0	**0.84**	**0.65**
Satisfactory	24	92.3	77	96.2	3	100.0		

Table (8): Regression Analysis for Effect of Knowledge on Clinical Decision Making:

Knowledge	Results			
	Coeffieicient	s.e	T	P
General information	10.195	10.888	.936	.351
Communication	8.394	8.542	.983	.328
Check ventilator settings and modes	41.832	7.569	5.527	.0001*
Standard care for Endotracheal Suction	26.016	7.175	3.626	.0001*
Endotracheal tube care	22.213	15.841	1.402	.164
Management of ventilator alarm	17.646	8.303	2.125	.036*
Prevent Ventilator-associated pneumonia (VAP)	18.197	16.139	1.128	.262
patient and family Education	12.902	14.699	.878	.382
Weaning	22.054	18.705	1.179	.241
R square	0.5			
F	11.2			
P	0.0001*			

*Significant at p-value<0.05

Discussion:

A mechanically ventilated patient needs a nurse who can make judgments quickly and precisely. Additionally, they frequently face decisions related to the management of patients care and life-sustaining treatments. The incorrect use of antibiotics, feeding, cardiopulmonary resuscitation, and artificial breathing are at the center of these decisions (Rose, Nelson, Johnston, & Presneill, 2007). Additionally, nurses working in critical care units must make decisions that could save a patient's life, and they find the environment in these units is particularly demanding and stressful. There is currently little knowledge of how critical care nurses manage patients who are mechanically ventilated despite the fact that appropriate and correct decisions are the cornerstone of intensive patient care. It is crucial that CCNs make exact and appropriate decisions using critical thinking based on knowledge-specific and theoretical information (Pradhan & Shrestha, 2017).

In the current study, the majority of studied sample had satisfactory knowledge regarding managing mechanically ventilated patients, endotracheal tube care and weaning. These findings are consistent with Perrie (2016) who studied knowledge of intensive care nurses in selected care areas and concluded that the majority of nurses had good knowledge about definition of mechanical ventilation and definition of ventilator weaning However, these findings were in contradictory with Demingo (2011) who studied professional nurses' knowledge about weaning the critically ill patient from mechanical ventilation and reported that 92.5% of respondents had a knowledge score ≤ 50%. Whereas only 7.5% of respondents had higher knowledge scores. From the researchers' point of view, this could be attributed to the fact that more than two thirds of studied sample received training courses about caring for patients connected with mechanical ventilation.

Regarding decision making, the current study findings revealed that there is a significant positive correlation between total clinical decision making and nurses' knowledge about caring for patients connected with MV. These findings were in agreement with Keshk, Qalawa, & Aly (2018) in their study of clinical decision-making experience of critical care nurses' and its effect on their job satisfaction: opportunities of good performance, and. It was concluded that the steps of clinical decision making were more associated with critical care nurses knowledge and higher educational qualifications. Furthermore, Dorgham & Mahmoud (2013) who studied leadership styles and clinical decision making autonomy among critical care nurses reported that CCNs had a greater need for autonomy. CCNs' autonomy was positively associated with their increased capability to make decision related to care of critical Patient.

The findings of the current study also illustrated that there is a statistical significant positive correlation between total clinical decision making level and knowledge level about general information, communication, check ventilator settings and modes, standard care for endotracheal suction, and management of ventilator alarm. Also, checking ventilator settings and modes and providing standard care for endotracheal suction are positively correlated with each dimension of decision making. Also evaluation and reevaluation of consequences is directly correlated with all dimensions of knowledge. However, these findings

are consistent with Rose, Nelson Johnston, & Presneill (2007) who studied decisions made by critical care nurses during mechanical ventilation and weaning in an Australian hospital. They stated that the most effective clinical decision making for mechanical ventilation and weaning are derived from effective communication of evaluation results and planning for re-evaluation by a multidisciplinary team. This approach has been linked to improved outcomes for patients in a number of studies.

Moreover, the findings of the current study revealed that there is no statistical significant correlation between education and work experience of the studied sample and clinical decision making role. This finding is in the same line with Hoffman, Donoghue, & Duffield (2004) who studied decision making in clinical nursing and found that education and experience were not significantly related to decision-making. These findings are supported by Maharmeh, Alasad, Saleh, & Darawad (2016) who noted that no statistical significant differences were found between the decision making abilities of nurses with different educational levels. In the same line Pretz,& Folse (2011) who investigated the kind of decisions nurses can make and found that nurses frequently did not independently or consistently make patient care decisions in areas such as rest, nutrition, elimination and mobility. However, they determined that education had a positive influence on decision making. Moreover, Ramezani-Badr, Nasrabadi, Yekta, & Taleghani (2009) added that the links between nurses' educational level and decision making are not consiste. Also, they concluded that basic educational level alone did not influence their decision-making ability. From the researchers' point of view, it might be caused by the majority of the studied sample had a limited educational level, few years of experience and most of them didn't receive any training course in nursing administration, or clinical decision making. Besides, clinical decision making is associated with medically managing of mechanically ventilated patients has been associated with the responsibility of medical staff more than nursing staff in the majority of intensive care units in Egypt.

Regarding the relationship between years of experience and clinical decision making, the importance of experience for clinical decision making is conflicting. This may be due to the fact that it is very difficult to design studies to measure the effect of experience adequately (Stinson & Kristi, 2013). The current study revealed that, there is a significant direct relationship between knowledge about checking ventilator settings and modes, providing standard care for endotracheal suction, management of ventilator alarm, prevention of ventilator-associated pneumonia (VAP) and clinical decision making.

Also, the whole regression between knowledge dimensions and decision making is significant which indicates the obvious effect of knowledge on decision making. These findings are in accordance with O'Neill et al, (2016) who found that there was a statistically significant positive correlations between total knowledge of mechanically ventilated patient and the overall clinical decision making which is mostly associated with the area of canvassing of the objectives and values. The lowest association was related to the area of searching for information. However, this could be due to the complexity of clinical decision-making that requires a broad knowledge base and access to reliable information sources as well as working in a supportive environment.

Conclusion:

The critical care nurses had satisfactory knowledge about caring for patients connected with mechanical ventilation. The majority of critical care nurses had either moderate or low levels of clinical decision making. Furthermore, there is a positive correlation between nurses' knowledge and clinical decision making role.

Recommendations:

Based upon the findings of the current study, the following are recommended: The principles of mechanical ventilation and weaning must be explained and incorporated into interactive training programs. Training courses regarding clinical decision must be conducted for critical care nurses. Replication of the same study on larger probability samples at different geographical locations are needed for data generalization.

Limitations of the study

This study was conducted in only one hospital. Therefore, the potential for generalization may be limited.

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