

Knowledge of Nurses in The Respiratory Care Unit towards Transmissible Pathogenic Bacteria in Patients on Ventilators Continous Positive Airway Pressure

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Abstract. Background: A case of ventilator-associated pneumonia (VAP) occurs when a patient's infection with a lung infection was either not detected upon hospital admission or occurred within 48 hours of intubation and mechanical breathing. Mechanical Ventilation (MV) is a life-saving method by supporting the patient who is unable to oxygenate by their own. It is referring to deliver a volume of gas into a patient's lungs over long period of time to wash CO₂. Control measures of Infection for MV patients should be done to prevent infection and complications. So that, A major responsibility that the nurse must focus on. Nurses play critical role in VAP prophylactic measures, so their knowledge in this subject is importance. Objectives: to identify level of knowledge of health care workers in the respiratory care unit (RCU) towards transmissible pathogenic bacteria in patients on ventilators (CPAP) in Al-Diwaniyah Teaching Hospital, Iraq. Methods: A descriptive design study was conducted at Al-Diwaniyah Teaching Hospital. Face-to-face questionnaire was used. The questionnaire consists of the following parts: demographic information (5 questions), Assessment of nurse's knowledge towards transmissible pathogenic bacteria in patients on ventilators CPAP (20 questions). 23 nurses working in RCU was choosen, the sample was collected during the period from (April 1, 2024) to (August 1, 2024). Results: The study showed that most of nurses age group (95.7%) are between (20-29) years old while the majority of the participants are females (87%). Additionally, the results indicate that (52.2%) of the participants are Bachelor in Nursing. Regarding the years of experience in nursing the study results show that the participants had (1-5) Years of experience with (87%). Regarding to the participation in a previous course related to research topic, the results show that (82.6%) of the participants are not Participate in a previous course. The overall assessment show good assessment. In addition, it was determined that there was no statistically significant in participants knowledge with their socio-demographic data with ($p > 0.05$). Conclusion: The researcher concludes that the overall assessment, which represents the knowledge of nurses in the respiratory care unit (RCU) towards transmissible pathogenic bacteria in patients on ventilators (CPAP) in Al-Diwaniyah Teaching Hospital, shows a good overall assessment

Highlights:

1. Nurses play a crucial role in preventing VAP in ventilated patients.
2. Descriptive study with a questionnaire involving 23 RCU nurses in Iraq.

3. Nurses demonstrated good knowledge of VAP prevention and pathogenic bacteria.

Keywords: knowledge, respiratory care unit , transmissible pathogenic bacteria, CPAP

Introduction

In patients receiving mechanical ventilation, ventilator-associated pneumonia (VAP) is a form of lung infection that either occurred within 48 hours of intubation and mechanical ventilation (MV) or was not discovered at the time of hospital admission (1).

MV is a life-saving method by supporting the patient who is unable to oxygenate by their own. It is referring to deliver a volume of gas into a patient's lungs over long period of time to wash CO₂. (2). Control measures of Infection for MV patients should be done to prevent infection and complications. So that, A major responsibility that the nurse must focus on. (3). To reduce these hazards, intubation procedures are only permitted to be performed by practitioners who have proven their skill. When intubating a patient, a nurse may be called to help and monitor the patient (4).

MV patients require specialized nursing care, which requires certain technical abilities. Depending on the patient's response and the disease state, the nurse must carry out particular interventions. In addition to early indicators of infection, the nurse must record any changes in the patient's vital signs or any notable variations in blood gases that could indicate a major issue (such as a pulmonary embolism, pneumothorax, or tube displacement) (5).

Nurses play critical role in VAP prophylactic measures, so their knowledge in this subject is importance (6). The control and prevention of VAP in respiratory care unit depend on the education of RCU staff upon the prevent its occurrence (7)

This research is one of the research priorities issued by the Ministry of Health/National Center for Training and Human Development No. 6 and is required to be conducted by the Ministry of Health employees (8).

Objectives of the Study:

- a) Assessment of nurse's knowledge towards transmissible pathogenic bacteria in patients on ventilators CPAP.

- b) Find out the difference between their socio-demographic variables and level of nurses' knowledge.

Methods

Design of the study

A cross-sectional study design used in this research to obtain the study goals about nurse's knowledge towards transmissible pathogenic bacteria in patients on ventilators CPAP in Al-Diwaniyah Teaching Hospital in Iraq. This study applied at Al-Diwaniyah Teaching Hospital (RCU) from (April 1, 2024) to (August 1, 2024).

Sampling And Data Collection

Purposive (non-probability) sampling is used to collect representative and accurate data. 25 nurses in all are employed in Diwaniyah Teaching Hospital's respiratory care unit. Yamane states that the sample size for $p = 0.5$ and the 95% confidence level should be:

$$n = N / (1 + N (e)^2)$$

$$n = 25 / (1 + 25 (0.05)^2)$$

$$n = 23$$

(N= 25) Total number of respiratory care unit nurses in Diwaniyah Teaching Hospital.

(e= 0.05) is the level of precision.

(n= 23) refers to the representative sample of the present study, which included the nurses working in the Diwaniyah Teaching Hospital respiratory care unit (9)

After obtaining permission from the institution, the questionnaire that used filled by the nurse staff and then data collected. The interview method that took 15-20 minute approximately was face-to-face with the nurse staff to fill in the questionnaire. The researcher obtains the consent of each nurse participating in the study and show the study form.

Study Instrument

Researchers in Saudi Arabia used this questionnaire. It was created by (Abalkhail, et al 2021)(10) and administered in Saudi Arabia. The questionnaire consists of the following parts:

- I. Part I: Demographic Information (5 Questions) involving gender, age, years of experience in nursing, level of education, participation in educational courses related to research topic.
- II. Part II: Assessment of nurse's knowledge towards transmissible pathogenic bacteria in patients on ventilators CPAP: This part consists of (20 Questions) (Abalkhail, et al 2021).

The score ranged from 0 to 20 points, with 20 being the highest attainable score. Knowledge was recoded into two groups for the logistic regression analysis: good (15–20 points, 75–100% correct answers) and moderate to poor (<15 points, <10% accurate answers).

The questions included in the tool are able to measure all dimensions of the study, as the reliability and validity of the research was relied upon (10) because we used the same questionnaire tool.

Ethical Considerations and Administrative Arrangements

After obtaining the approval from Director General of Diwaniyah Health Department to conduct the study in (28-02-2024).

Every nurse gave their spoken informed consent to the researcher. Before participants began the study, the researcher gave them an explanation of its goal and informed them that participation was completely optional and that they might leave at any moment. Additionally, he promised to protect the privacy of the data and to keep them safe both while and after the study was carried out.

Statistical Data

The data was processed using the statistical analysis system known as SPSS version 26. Frequencies, Percentages, Standard deviation, mean of scores. Mann-Whitney U and Kruskal-Wallis H used for data difference.

Limitations of the study

Place limits: Al-Diwaniyah Teaching Hospital Respiratory Care Unit, Al-Diwaniyah governorate, Iraq. The study conducted on Al-Diwaniyah RCU nurses (specific group), so the result represents specific nurses and not represent the whole of Iraqi nurse's society.

Result and Discussion

Table (1) : Participants' Socio-Demographic characteristic of the Study (n= 23)

Socio-demographic	Rating and Intervals	Frequency	Percent (%)
Age / years	20 – 29	22	95.7%
	30 – 39	1	4.3%
	40 – 49	0	0
	50 – 60	0	0
	Total	23	100%
Gender	Male	3	13%
	Female	20	87%
	Total	23	100%
Educational Level	Secondary School of Nursing	1	4.3%
	Diploma in Nursing	10	43.5%
	Bachelor in Nursing	12	52.2%
	Postgraduate	0	0
	Total	23	100%
Years of Experience in nursing	1 -5	20	87%
	6–10	3	13%
	11 –15	0	0
	16 – 20	0	0
	21-25	0	0
	26-30	0	0
	31-35	0	0
	Total	23	100%
participate in educational / training courses	No	19	82.6%
	Yes	4	17.4%
	Total	23	100%
Total		23	100%

Table (2): Overall knowledge of nurses in the respiratory care unit (RCU) towards transmissible pathogenic bacteria in patients on ventilators (CPAP)

Level of knowledge	Frequency	Percent	Overall assessment
Good	18	78.26%	Good
Fair	5	21.73%	
Poor	0	0%	
Total	23	100%	

Table (3) Difference between level of knowledge among nurses and their demographic data (participate in educational / training courses and Gender).

Socio-demographic	Rating and Intervals	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	p-value
Gender	Male	3	7.50	22.50	16.500	-1.278	.230
	Female	20	12.68	253.50			N.S.
participate in educational / training courses	No	19	12.45	236.50	29.500	-.715	.505
	Yes	4	9.88	39.50			N.S.

Table (4) Difference between between level of knowledge among nurses and their demographic data (Years of experience in nursing , Education levels, Age,).

Socio-demographic	Rating and Intervals	N	Mean Rank	Kruskal-Wallis H	D.F	P. Value
Age	20-29	22	11.77	.611	1	.434
	30-39	1	17.00			
	40-49	0	0			

		50-60	0	0			
		Secondary School of Nursing	1	17			
Education Levels	Diploma in Nursing	10	12.25	.709	2	.702	
	Bachelor in Nursing	12	11.38				N.S.
	Postgraduate	0	0				
	1 - 5	20	12.23				
		6 – 10	3	10.50			
Years of Experience in Nursing	11 – 15	0	0	.181	1	.670	
	16 – 20	0	0				N.S.
	21-25	0	0				
	26-30	0	0				
	31-35	0	0				
	31-35	0	0				

Discussion

The study findings at table (1) revealed that most of nurses age group (95.7%) were (20-29) years old. This finding Compatible with (11) who mentioned in their study that (63.4%) of participants were between (20-30) years old. Regarding the gender of the nurses, the results of the study showed that majority of the participants were female (87%). These results supported by (12) who found that less than thirds the participants were female (64%). As per educational level, the result of the study revealed that (52.2%) of nurses were bachelor in Nursing. These results are not consistent with (1) who stated that (65.5%) were diploma degree. Relative to the years of experience in nursing, study findings displayed that (87%) of the nurses were (1-5) years of experience. These results are not consistent with (6) who stated that (35%) were greater than 10 years of experience. The results of the study demonstrated that (82.6%) of the sample did not participate in educational / training courses related to research topic,

these findings Compatible with (Mohamed Thabet et al.,2015) who mentioned in their study that (85%) of participants did not attend training courses.

The results of the study tables (2) show illustrated that the level of knowledge among nurses in the respiratory care unit (RCU) towards transmissible pathogenic bacteria in patients on ventilators (CPAP) in Al-Diwaniyah Teaching Hospital more than three quarters are good at mean score (0.88).

These results are in line with those of a study that looked at the performance of 60 nurses in relation to infection control measures for patients on mechanical ventilation (2). The study found that around half of the nurses had the right amount of knowledge.

Regarding to table (3 and 4), the difference between nurses' knowledge and their socio-demographic data (age, Gender, Educational level, Years of experience in nursing and participate in educational / training courses) this study demonstrated that there is no statistically significant difference between them with p-value less than (0.05). This result disagreed with (13) who discovered statistically significant difference with socio-demographic data

Conclusion

Based on the results, the conclusions were as follows:

- I. The researcher concludes that the overall assessment which represent knowledge of nurses in the respiratory care unit (RCU) towards transmissible pathogenic bacteria in patients on ventilators (CPAP), the result show good overall assessment that consistent with the results of several studies.
- II. This study shown that there was no statistically significant difference in the participants' knowledge of their sociodemographic information ($p > 0.05$) in terms of age, gender, educational attainment, years of nursing experience, and participation in training or educational programs.

Recommendations

This study gives many recommendations, the most important of which are:

1. Increasing nurses' participation in educational courses or programs that increase awareness towards transmissible pathogenic bacteria.

2. Increasing specialized programs related to transmissible pathogenic bacteria in patients on ventilators (CPAP) by the Department of Continuing Education or through private organizations to improve the reality of nursing work.
3. There is an urgent need to conduct similar studies on more samples and different places in the governorate to evaluate and develop the work of the nursing staff, especially in critical units that need nurses with excellent knowledge

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