

## Evaluation of Intensive Care Units Nurses' Knowledge regarding Ventilator Associated Pneumonia Prevention in Al-Nasiriya City.

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**Abstract :** A form of lung infection known as ventilator-associated pneumonia affects patients in hospitals who are on mechanical ventilators. Usually, it influences the cause of rising rates of disease and mortality. Hospital stays for patients with ventilator-acquired pneumonia are longer, and their mortality rate might reach 20–30%. The purpose of the present study was to evaluate the nurses' knowledge concerning preventing of ventilator-associated pneumonia in the intensive care units of Al-Nasiriya City hospitals. Descriptive study was conducted through the present investigation from 31<sup>st</sup> March, 2020 to 30<sup>th</sup> of September, 2020. Eighty nurses chosen purposive from intensive care units at AL-Hussein Teaching hospital and Al-Nasiriyah Heart Center. Including (44) females and (36) males. To measure the variables, the researcher constructed a questionnaire. The questionnaire was divided into two sections: demographic information as well as nurses' knowledge about how to prevent ventilator-associated pneumonia. A panel of specialists determined the validity. The data analyzed through descriptive and inferential statistics. The majority of the participants were having poor knowledge about prevention of ventilator associated pneumonia. Non-significant correlation between socio-demographic variables (age, gender, marital status, qualification of nurses, working shift, years of experience in ICU as well as working place) and nurses' Knowledge regarding prevention of ventilator associated pneumonia. New nurses working in ICU should participate in a training program to increase their knowledge of how to prevent ventilator-associated pneumonia. Periodically evaluating as well as for training ICU nurses to increase their understanding of evidence-based practices and nursing interventions for ventilator-associated pneumonia prevention.

**Key Words:** Intensive Care Units Nurse's Knowledge, Prevention, Ventilator Associated Pneumonia.

### 1. INTRODUCTION :

An inflammation of the lung that mostly affects the alveoli is called pneumonia. It is typically caused by bacterial, viral, or other microorganism infections.(Mani, C. S. (2018)). With a 10% to 70% frequency, ventilator-associated pneumonia (VAP) regarded as one of the most common nosocomial infections in ICU. 2. Xie, J., Yang, Y., Huang, Y., Kang, Y., Xu, Y., Ma, X., ... & Qiu, H. (2018).

Pneumonia that appears 48–72 hours after endotracheal intubation is known as ventilator-associated pneumonia and its affects 9–27% of intubated patients. (Mohanty, D., Routray, S. S., Mishra, D., & Das, A. (2016)).

Apart from its impact on patient outcomes, this infection raises medical expenses for both critical ill patients as well as the healthcare system. So, prevention of VAP is a crucial issue in the treatment of patients admitted to ICU .(de Lacerda Vidal, C. F., Vidal, A. K. D. L., Monteiro, J. G. D. M., Cavalcanti, A., Henriques, A. P. D. C., Oliveira, M., ... & Lacerda, H. R. (2017)). Additionally, it is associated with a significant rise in mortality, longer hospital and critical care unit stays, longer IV antibiotic use, and a greater need for mechanical ventilation .(Duszynska, W., Rosenthal, V. D., Szczesny, A., Zajackowska, K., Fulek, M., & Tomaszewski, J. (2020)).

Between 15 and 50 percent of VAP patients having die. The death rate varies according to the type of organism and patient population. The direct admission of microorganisms into the lower respiratory tract through the endotracheal tube, which raises pulmonary infections risk, is one of the causes of VAP. Further risk factors for VAP include excessive amount of mucus besides cough reflex absence among intubated patients. Because they are able to incorporate established VAP prevention techniques into clinical practice, ICU nurses play a vital role in the prevention, managing, as well as treatment of hospital-acquired infections among patients with endotracheal intubation. Nurses' knowledge should increase their own confidence in making the right decisions and contribute to the successful recovery of mechanical ventilation patients .(Said, A. T. (2012)).

It is required of nurses working in ICU to use evidence-based VAP preventive strategies so as to deliver high-quality care. (O'Keefe-McCarthy, S., Santiago, C., & Lau, G. (2008)). Despite the fact that there are numerous evidence-based recommendations for preventing VAP, research has shown that one obvious cause of VAP is a lack of knowledge and adherence to nursing procedures .(Musvosvi, E. (2013))., (Ali, N. S. (2013)).

In order to enhance the outcomes for critical patients, nurses must have adequate knowledge also adhere to correct practices. Given the importance of nurses in preventing VAP and the dearth of data on their practices and expertise in Iraq, the current study aims to evaluate ICU nurses' knowledge of VAP prevention..

## **2. MATERIAL AND METHODS**

**Research approach :** A quantitative approach was adopted in the current study.

**Study Design:** Descriptive study was carried from 31<sup>st</sup> March, 2020 to 30<sup>th</sup> of September, 2020.

**Ethical consideration:** Each nurse gave their independent, informed verbal consent to participate once the researcher had fully explained the study pupose. Complete secrecy and anonymity were ensured, in addition it was promised that the data gathered would only be utilized for study.

**Study Setting:** The present study was conducted at two ICUs in an AL- Nasiriyah City, these units are located in the AL Hussein Teaching hospital as well as an AL-Nasiriyah Heart Center, in Al- Nasiriyah city, Thi-qar government, Iraq.

**Population:** Population included nurses of both sexes working in ICUs at AL Hussein Teaching hospital besides an AL-Nasiriyah Heart Center.

**The Sample of the Study:** Eighty nurses selected purposively from ICUs as a sample of the current study. The samples have been selected based on the following criteria:

- Those who have been working in intensive care units
- Those who are (18) years of age and older

**The study instrument:** the questionnaire was created by the researcher. It's consisted of two parts include:

**1. Socio- Demographic Data Part:** It comprises of seven items. It was concerned with collection of socio-demographic data obtained from study participants, including age, gender, nursing qualification, marital status, working shift, working unit and finally years of experience in ICUs.

**2. Nurses Knowledge regarding Prevention of Ventilator Associated Pneumonia Part:** It was composed of (10) multiple choice Items. The items were true and false questions.

**Validity of the Questionnaire:** A panel of specialists with over six years of expertise in their own fields were used to assess the content validity of the early-developed instrument. They look into the questionnaire's clarity, relevance, and suitability for achieving study goals.

**pilot study:** A sample of ten nurses with experience working in intensive care units was chosen to determine the reliability of the study tools. The study was conducted at AL Hussein Teaching Hospital and AL-Nasiriyah Heart Centre. Pilot study sample was excluded from the original study according table (1) distribution to their Setting .

Furthermore, the reliability of the pilot study was displayed in table (2), and the results specify that both the intra- and inter-examiners documented a high and appropriate reliability.

Pilot study results showed that the study's questionnaire was a dependable tool.

**Reliability:** Using the primary statistical metric, the reliability results confirmed a very high level of accuracy as well as internal consistency of the questionnaire responses, demonstrating that the coefficient of the individual correlation is (0.93).

**Data collection procedure:** The researcher asked the participants to complete the questionnaire during break time in order to reduce the possibility of interfering with their time and daily routine. It took them roughly 20 to 30 minutes to complete the questionnaire.

### 3. RATING AND SCORING

The following designs were used for rating and scoring of the items :

- Multiple choice likert scale was used to collect data from the study sample (2) for correct answer and (1) for wrong answer.

Greater knowledge is indicated by a higher score.

**Table 1. Distribution of the sample of pilot Study regarding to the Setting**

NO	Setting	No.	%
1	AL- Hussein Teaching Hospital	6	60
2	An Nasiriyah Heart Center	4	40
	Total	10	100%

**Table 2. Reliability Coefficients of the Pilot Study**

Groups	Reliability Coefficients	The Actual values %
Students	Inter Examiners	92.24 (19:25)
	Intra Examiner	91.6 (21:25)

**Table 3. Reliability Coefficients of the Questionnaire regarding Internal Consistency**

Reliability Coefficients	Standard lower bound	The Actual values	Assessment
Alpha (Cronbach - $\alpha$ )	0.90	0.93	Pass

**Statistical Analysis:** The SPSS version program (22) was used to analyze the data. That include descriptive statistics such as mean, percentage, as well as frequency, while inferential statistics using ANOVA

**Limitations and challenges:** The outcomes of the study, which was carried out at the An Nasiriyah Heart Centre and AL Hussein Teaching Hospital, may not be representative of all Iraqi hospitals. The lack of comparable studies conducted in the nation and the scant number of studies conducted abroad represent yet another significant obstacle.

#### 4. RESULT

**Table 4. The Distribution of the Sample regarding to the Socio-Demographical Data.**

Variable	Groups	Frequency	Percentage (%)
Age Groups (yrs.)	18 – 27	40	50
	28- 37	36	45
	38 – 47	4	5
	Total	80	100
Gender	Male	36	45
	Female	44	55
	Total	80	100
Marital Status	Married	54	67.5
	Single	24	30

	<b>Divorced</b>	<b>2</b>	<b>2.5</b>
	<b>Total</b>	<b>80</b>	<b>100</b>
<b>Nursing qualification</b>	<b>Diploma</b>	<b>20</b>	<b>25</b>
	<b>Bachelor</b>	<b>48</b>	<b>60</b>
	<b>Post-graduate study</b>	<b>12</b>	<b>15</b>
	<b>Total</b>	<b>80</b>	<b>100</b>
<b>Working shift</b>	<b>Morning</b>	<b>40</b>	<b>50</b>
	<b>Night</b>	<b>16</b>	<b>20</b>
	<b>Both</b>	<b>24</b>	<b>30</b>
	<b>Total</b>	<b>80</b>	<b>100</b>
<b>Experience in ICU</b>	<b>less than one year</b>	<b>16</b>	<b>20</b>
	<b>From 1-5 year</b>	<b>40</b>	<b>50</b>
	<b>From 6-10 year</b>	<b>22</b>	<b>27.5</b>
	<b>More than or equal to 11 year</b>	<b>2</b>	<b>2.5</b>
	<b>Total</b>		
<b>Working place</b>	<b>AL-Hussein Teaching hospital</b>	<b>48</b>	<b>60</b>
	<b>Al-Nasiriyah Heart Center</b>	<b>32</b>	<b>40</b>
	<b>Total</b>	<b>80</b>	<b>100</b>

**Freq.=Frequencies, %=Percentages,**

This table indicated that 40 (50%) of the nurses within age group of (18 – 27 years). with mean of (29.2) years. Concerning to the gender, the greater number of study sample are 44 females and account for (55 %). The largest proportion of the participants in the study are married (n= 54; 67.5%).Regarding to the level of education, the greater number of them are Baccalaureate degree (n= 48) with percent 60 %. Related to Working shift, the findings specified that the highest percentage of them are morning shift and they were accounted for (n= 40; 50 %). Concerning to the years of experience the majority of ICUs nurses have between (1-5) years of experience and account for 40 (50.00) of study sample. Related to Working place, the majority of the study participants were from AL-Hussein Teaching hospital and they were accounted for (n= 48; 60 %).

**Table 5.The Distribution of the participants regarding their Knowledge Related to ventilator associated pneumonia prevention**

<b>No.</b>	<b>Items</b>	<b>Correct</b>		<b>False</b>		<b>M.S</b>
		<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>	
<b>1</b>	<b>The definition of VAP</b>	<b>30</b>	<b>37.5</b>	<b>50</b>	<b>62.5</b>	<b>1.38</b>
<b>2</b>	<b>What is the pathogenesis of VAP?</b>	<b>38</b>	<b>47.5</b>	<b>42</b>	<b>52.5</b>	<b>1.48</b>
<b>3</b>	<b>The clinical manifestation</b>	<b>24</b>	<b>30</b>	<b>56</b>	<b>70</b>	<b>1.30</b>
<b>4</b>	<b>Which pathogen does not cause VAP?</b>	<b>22</b>	<b>27.5</b>	<b>58</b>	<b>72.5</b>	<b>1.28</b>
<b>5</b>	<b>component of the vap care bundle include all of the following except:</b>	<b>20</b>	<b>25</b>	<b>60</b>	<b>75</b>	<b>1.25</b>
<b>6</b>	<b>Which interventions can prevent VAP</b>	<b>22</b>	<b>27.5</b>	<b>58</b>	<b>72.5</b>	<b>1.28</b>

7	To reduce the risk of developing VAP, the head of the patient's bed should be placed on	44	45	55	70	1.55
8	Which solution is recommended for oral care	10	12.5	70	87.5	1.13
9	How often should you attempt spontaneous awakening and breathing trails, unless contraindicated	42	52.5	38	47.5	1.53
10	stress ulcer prophylaxis should be prescribed in all patients who are mechanically ventilated	6	7.5	74	92.5	1.08

This table shows that information of study participants were presented (pass) in items (7, and 9), and they (failed) in all other items

**Table 6. Category of the Total Nurses' Knowledge Regarding Ventilator Associated Pneumonia Prevention**

Category			Frequency	Valid Percent
Valid	Poor	< 50% score	70	87.5
	Average	50- 75% score	10	12.5
	Good	>75% score	0	0
	Total		80	100

This table specified that the largest proportion of the participants were having poor knowledge related to ventilator associated pneumonia prevention.

**Table 7. The Association between Sociodemographic Factors and Nurses' Knowledge of Ventilator-Associated Pneumonia Prevention**

Socio- demographic variables	Study group (N= 80)				
	Sum of squares	D.F.	Mean square	F	Sig.
Age	.002	2	.001	.067	.935
Gender	.032	1	.032	1.904	.176
Nursing qualification	.010	2	.005	.273	.762
Marital status	.008	2	.004	.230	.795
Working shift	.014	2	.007	.401	.673
Years of Experience in ICU	.034	3	.011	.654	.586
Working place	.002	1	.002	.086	.771

D.F. = degree of freedom, N= sample, F= frequency, sig.= significant

This table shows non-significant correlation between socio-demographic characteristics involving (age, sex, marital status, nursing qualification, shift, years of experience in ICUs and workplace) and nurses' Knowledge Related to VAP prevention.

## **5. DISCUSSION**

The findings that were shown in table (1) confirmed that more than half of the ICUs nurses aged from 18 to 27 yrs. years old, which accounted for (40), indicating that the younger nurses are in the majority in this population group. These findings similar to a study conducted to assess Nurses Knowledge in addition to Practice of Evidence-based Guidelines for the Prevention of VAP by Abusaad & Tantawey (2013) that showed the highest percentage of study participants were aged (20- 30) years (n=33) with percent 64.7%. (Abusaad, F., & Tantawey, N. (2010)).

Relative to gender, this study showed that both male and female work in intensive care units with the small majority being females (55%) than males (43.3%) Comparing this study to others, once conducted in Critical Care Units at Cairo University Hospitals to evaluate Knowledge and Compliance Nurses with VAP Bundle (2013) by Ali who found that females with percent 75.6%.(Ali, N. S. (2013)).

The majority of the ICU nurses were married, based on their marital status. (n=54) accounted for (67.5%) of the total sample. This result was similar to result of a study done by Shehab, et al. (2018) who specified that the largest proportion of the nurses working in ICU at Hospital of Suez Canal University were married (73.3%). (Shehab, M. S., Ibrahim, N. M., & Abd-Elkader, H. (2018)).

Concerning nursing qualification, the greater number of the study sample were Bachelor that comprised 60% of total study sample. This finding agreed with study conducted by Majeed (2017) at intensive care unit in Baghdad. who reported that the percent of Bachelor participants were 54% of the entire sample. (Majeed, H. M. (2017)).

In regards to experience in ICU, the majority of the study sample is from 1 to 5 year with the percent (50%). This result was in line with a study carried out by Arrar & Mohammed (2020) that assess knowledge besides practices of nurses about nursing care guidelines in IC at Hospitals of Misan Governorate. The study confirmed that highest proportion of the participants had 1-5 yrs of experience (38.3%).(Arrar, A. A., & Mohammed, S. (2020)).

The results of the current study specified that the majority of the participants having poor knowledge with percent (87.5%). These findings agreed with a study conducted to evaluate knowledge of Nurses at Critical Care concerning Prevention VAP in Khartoum by Al Shameri, (2017) who reported that (64.1%) of the participants had inadequate knowledge level. Additional support of a study conducted by Ali to evaluate knowledge of critical care Nurses' concerning VAP, who reported that their knowledge was inadequate.(Al Shameri, F. A. (2017)).

The results of this study show non-significant correlation between socio-demographic variables including (age, sex, marital status, nursing qualification, working shift, years of experience and working place) and nurses' Knowledge related to prevention of VAP. These findings agreed with a study conducted by Ali, (2013) who concluded no significant correlations were observed between sociodemographic characteristics (age and experience) and nurses' knowledge. (Ali, N. S. (2013)).

On the other hand, a study carried out by Yaseen & Salameh (2015) showed inconsistent results regarding this area. (Yaseen, R. W., & Salameh, T. N. (2015)).

## 6. CONCLUSIONS

According to the present study finding the researcher has been able to conclude the following:

- The study demonstrates that intensive care unit nurses have inadequate knowledge on preventing ventilator-associated pneumonia.
- Sociodemographic factors like age, sex, marital status, nursing qualification, working shift, years of experience, and workplace do not significantly correlate with nurses' knowledge correlated to preventing of VAP.

## RECOMMENDATIONS

- This study should be applied on a large population (national level) to generalize results.
- New nurses working in critical care units should participate in a training program to increase their understanding of how to prevent ventilator-associated pneumonia.
- Conducting a periodic assessment as well as training programs for ICU to enhance their knowledge about evidence based guidelines and performance of nursing actions to prevent VAP

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