

**Original Article****Knowledge Regarding Evidence-Based Guidelines on Ventilator-Associated Pneumonia Prevention Bundle among Critical Care Nurses**

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In critical care units, ventilator-associated pneumonia is still a frequent and possibly fatal consequence of ventilator therapy. Choosing the most urgent care and knowing how to prevent ventilator-associated pneumonia may help nurses become more alert, which will improve the quality of care and prevent a serious problem in Nepal. Thus, this study aimed to assess the knowledge regarding evidence-based guidelines on ventilator-associated pneumonia prevention bundle among critical care nurses.

**Materials and Methods**

Data were collected through a self-administered structured questionnaire using the non-probability total enumerative sampling technique among 132 critical care nurses. Data analysis was carried out using SPSS version 20. For descriptive statistics frequency, percentage, mean, and standard deviation were calculated. For inferential statistics, the Chi-square test was used to find out the association between the levels of knowledge regarding Evidence-Based Guidelines on the VAP Prevention Bundle among Critical Care Nurses.


**Results**

One hundred and thirty-two critical nurses participated in this study. 51.5 % had a poor level of knowledge, whereas, 45.5 % had an average level of knowledge and only 3.0 % had a good level of knowledge. There was a statistically significant association between the level of knowledge and the respondents' working experience.

**Conclusion**

According to the study's findings, the majority of respondents had inadequate knowledge. Regular formal training and interactive educational sessions are required to evaluate knowledge of the VAP prevention bundle, particularly in light of the high nurse turnover rate.

**Keywords:** Knowledge, Nurses, Ventilator-associated pneumonia

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## Introduction

In a patient undergoing mechanical ventilation, ventilator-associated pneumonia (VAP) is referred to as a form of pneumonia that either did not exist at the time of hospital admission or developed 48 hours later [1].

VAP is considered the most significant cause of death in the ICU [2, 3]. A lack of understanding among nurses may make it difficult for them to follow evidence-based recommendations for reducing ventilator-associated pneumonia [4]. The nurses who work in the ICU are best equipped to use evidence-based knowledge, and as a result, they are crucial to the prevention of VAP [5]. Nurses who are knowledgeable and skilled are essential to the delivery of patient care, and making the right decisions at the right time helps to reduce patient risks. Studies have shown that nurses generally lack an understanding of evidence-based methods for reducing VAP [6, 7].

This study aims to assess the level of knowledge Regarding Evidence-Based Guidelines on VAP Prevention Bundle among critical care nurses.

## Materials and Methods

A descriptive cross-sectional study was conducted among critical care nurses at Nobel Medical College Teaching Hospital, Biratnagar, Nepal from February 2023 to March 2023. The study was started after acquiring approval from the Institutional Review Committee of Nobel Medical College. Nurses working in the General ICU, Neuro ICU, PICU, NICU, and Cardiac ICU of Nobel Medical College and Teaching Hospital were included, and Nurses who are not willing to participate were excluded from the study, and participants scoring between 75%-100% were considered to have good knowledge, 50-75% were considered to have average knowledge, and participants scoring less than 50% were considered to have poor knowledge. The sample size was calculated as 100 by using Cochran's formula,  $n = z^2 Pq/d^2$  [n is the minimum number of sample required, Z is 1.96 at a 95% confidence interval, P= 49.1% [1], q=1-p and d= margin of error, 5%]. However, 132 samples in total were considered for the study by using a non-probability total enumerative sampling technique.

132 critical care nurses were chosen for the study by means of a self-administered structured questionnaire, which comprised two parts. Part I of the questionnaire consisted of the Socio-demographic characteristics of the critical care nurses, which included Age, Professional qualification, Designation, working experience, Area of

working, and Training on the VAP bundle. Part II Contains items that elicit information on knowledge Regarding Evidence-Based Guidelines on VAP Prevention Bundle among critical care nurses. The tool consists of 26 structured questionnaires. There were 3 multiple response questions and 17 multiple-choice questions. For multiple-choice questions, the correct answer will be given 1 mark and the incorrect answer will be given 0 mark. For multiple-response questions, each correct answer will be given 1 mark. The total score was 35. The collected data was analyzed using SPSS version 20, for descriptive statistics frequency, percentage, mean, and standard deviation were calculated and for inferential statistics, the Chi-square test was used to find out the association between the level of knowledge on knowledge Regarding Evidence-Based Guidelines on VAP Prevention Bundle among Critical Care Nurses with their selected socio-demographic variables.

## Results

One hundred and thirty-two critical nurses participated in this study. 51.5 % had a poor level of knowledge, whereas, 45.5 % had an average level of knowledge and only 3.0 % had a good level of knowledge. There was a statistically significant association between the level of knowledge and the respondents' working experience. Socio-Demographic characteristics of the respondents, the Respondent's level of knowledge regarding the VAP prevention bundle, and the Association of the level of knowledge with socio-demographic variables are presented in Tables 1, 2 and 3

**Table 1: Socio-Demographic of the respondents n=132**

Characteristics		Frequency (N)	Percentage (%)
Age in years	<25	93	70.5
	>25	39	29.5
Mean ± SD		24.36±2.393	
Designation	Staff Nurse	122	92.4
	Incharge	10	7.6
Professional Qualification	Proficiency Certificate Level	73	55.3
	Bachelor's Degree	59	44.7
Working Experience	Less than 12 months	40	30.3
	12-24 months	35	26.5
	More than 24 months	57	43.2
Area of working	General ICU	61	46.2
	Neuro ICU	21	15.9
	PICU	19	14.4
	NICU	20	15.2
	Cardiac ICU	11	8.3
Training on VAP bundle	Received	25	18.9
	Not received	107	81.1

Table 1 shows the majority, (70.5%) of the respondents belong to less than 25 years of age



with Mean  $\pm$  SD (24.36 $\pm$ 2.393). Regarding designation, most (92.4 %) respondents were staff nurses. Regarding Professional Qualifications, less than half (55.3%) of the respondents were Proficiency Certificate Level qualified. Moreover, less than half (43.2%) of the respondents have more than 24 months of working experience. Similarly, less than half (46.2%) of the respondents were working in general ICU. Whereas, the majority 81.1% of the respondents did not receive any training on the VAP prevention bundle.

**Table 2: Respondent's level of knowledge regarding the VAP prevention bundle n=132**

Level of knowledge	Frequency (N)	Percentage (%)
Poor	68	51.5
Average	60	45.5
Good	4	3.0

Table 2 shows more than half (51.5%) of the respondents had poor knowledge regarding the VAP prevention bundle. Whereas 45.5% of the respondents had an average level of knowledge and only 3% of the respondents had a good level of knowledge regarding the VAP prevention bundle.

**Table 3: Association of the level of knowledge with socio-demographic variables n=132**

Characteristics		Knowledge			p-value
		Poor N (%)	Average N (%)	Good N (%)	
Age in years	<25	45(48.4)	46(49.5)	2(2.2)	0.284
	>25	23(59)	14(35.9)	2(5.1)	
Designation	Staff Nurse	64(52.5)	54(44.3)	4(3.3)	0.574
	Incharge	4(40.0)	6(60.0)	-	
Professional	Proficiency Certificate Level	41(56.2)	28(38.4)	4(5.5)	0.057
Qualification	Bachelor's Degree	27(45.8)	32(54.2)	-	0.024*
Working Experience	Less than 12 months	16(40.0)	24(60.0)	-	
	12-24 months	15(42.9)	19(54.3)	1(2.9)	
	More than 24 months	37(64.9)	17(29.8)	3(5.3)	
Area of working	General ICU	36(59.0)	24(39.3)	1(1.6)	0.052
	Neuro ICU	9(42.9)	10(47.6)	2(9.5)	
	PICU	9(47.4)	10(52.6)	-	
	NICU	5(25.0)	14(70.0)	1(5.0)	
Training on VAP bundle	Cardiac ICU	9(81.8)	2(18.2)	-	0.899
	Received	12(48.0)	12(48.0)	1(4.0)	
	Not received	56(52.3)	48(44.9)	3(2.8)	

Note: \*p-value<0.05 is significant

Table 3 shows the association of the knowledge score with socio-demographic variables. There was a statistically significant (p=0.024) association between the level of knowledge with working experience. Likewise, there was no statistically significant association between level of knowledge with age, designation, professional quali-

fication, area of working, and training on the VAP bundle.

## Discussion

In critical care units (ICUs), ventilator-associated pneumonia (VAP) is still a frequent and possibly fatal consequence of ventilator therapy. Critical care nurses need to constantly update themselves with the current knowledge and scientific evidence intervention to decrease issues in ICUs including VAP [1]. From the different articles, it was found that nurses have a poor level of knowledge of the VAP prevention bundle. Critical care assessment 'The awareness raised by nurses' understanding of VAP prevention could improve patient care and help Nepal avoid a significant issue.

The result of the current study highlighted that the socio-demographic pattern of 132 critical care nurses was an age in years, designation, professional qualification, working experience, area of working, and training on the VAP bundle. The majority (70.5%) of the respondents belong to less than 25 years of age with Mean  $\pm$  SD (24.36 $\pm$ 2.393). Regarding designation, most (92.4%) respondents were staff nurses. Less than half (55.3%) of the respondents were Proficiency Certificate Level qualified. Moreover, less than half (43.2%) of the respondents have more than 24 months of working experience. Similarly, less than half (46.2%) of the respondents were working in General ICU. Whereas, the majority 81.1% of the respondents did not receive any training on the VAP prevention bundle.

The findings of the study showed that out of 132 critical care nurses, more than half (51.5%) of the respondents had poor knowledge regarding the VAP prevention bundle. Similarly, less than half (45.5%) of the respondents had an average level of knowledge regarding the VAP prevention bundle whereas, only 3% of the respondents had a good level of knowledge regarding the VAP prevention bundle.

Similar to this study, a study conducted at a tertiary care center, in India i.e. 75.93% of nurses had an average level of knowledge, 22.22% of nurses had a good level of knowledge and only 1.85% of nurses had a poor level of knowledge [8]. Another study was conducted at a military hospital, in Egypt, i.e. 23.2% of nurses had an excellent level of knowledge, 32.5% of nurses had a good level of knowledge and 44.3% of nurses had a poor level of knowledge [9]. In another study conducted at Amhara regional state referral hospital, Ethiopia i.e. 48.04 percentage had a good level of knowledge and 51.96%





had a poor level of knowledge [4].

The contrast result was reported in a tertiary hospital, Rupandehi Nepal i.e. 49.1% of the nurses had a high level of knowledge, 7.8% of the respondents had an average level of knowledge, and 43.1% of the nurses had a low level of knowledge [1]. Similarly, in a study conducted at a tertiary care center, in India i.e. 75.93% of nurses had average knowledge, 22.22% had good knowledge and only 1.85% had poor knowledge [8]. Another study was conducted at a tertiary care center, in India i.e. 20% of nurses had poor knowledge, 57% had average knowledge and 23% had good knowledge [10].

In the present study, there was a statistically significant association between the level of knowledge with working experience ( $p=0.024$ ) which was similar to the study conducted at a military hospital, in Egypt i.e. there was a statistically significant association between the level of knowledge with working experience ( $p=0.000$ ) [9]. In relation to contrast to the present study, a study conducted in Iran shows there was no statistically significant association between nurses' knowledge and work experience ( $p=0.327$ ) [11]. The present study shows there was no statistically significant association between the level of knowledge with age, designation, professional qualification, area of working, and training on the VAP bundle, which was similar to the study conducted at a tertiary hospital, Rupandehi Nepal shows there was no statistically significant association between the level of knowledge with working experience and qualification at ( $p<0.05$ ) [1]. Another similar conducted at a tertiary care center, India shows there was no statistically significant association between the level of knowledge with age, educational qualification, and years of experience [10]. In relation to contrast to the present study, a study conducted at a military hospital, in Egypt shows there was a statistically significant association between the level of knowledge with age and education at ( $p<0.05$ ) [9].

### Conclusion

More than half of the respondents had inadequate knowledge about the VAP preventive bundle, according to the study. The study also shows that working experience and knowledge level had a statistically significant relationship. Particularly in light of the frequent nurse turnover, formal training and interactive educational sessions are required on a regular basis to evaluate key personnel's knowledge of the VAP prevention bundle.

### Recommendation

A descriptive study can be conducted among critical care nurses on practice regarding the VAP prevention bundle. A similar study can be replicated on a larger scale to generalize its findings. The interventional study can be conducted on the same topic and practice regarding the VAP prevention bundle. A comparative study can be conducted among all health professionals on the knowledge regarding the VAP prevention bundle.

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**Conflict of interest:** None

### References

- [1] Ghimire S, Neupane S, Knowledge regarding prevention of ventilator-associated pneumonia among nurses in a tertiary hospital, Rupandehi, Nepal, Journal of Universal College of Medical Sciences. 6:1 (2018) 27-31. DOI: <https://doi.org/10.3126/jucms.v6i1.21721>
- [2] Klompas M, Branson R, Eichenwald EC, Greene LR, Howell MD, Lee G, Magill SS et. al., Strategies to prevent ventilator-associated pneumonia in acute care hospitals: 2014 update, Infection Control & Hospital Epidemiology. 35:8 (2014) 915-36. DOI: 10.1086/677144.
- [3] Micic S, Besic N, Johnson N, Han M, Hamlyn S, Ball H, Reducing risk for ventilator-associated pneumonia through nursing-sensitive interventions, Intensive and Critical Care Nursing. 29:5 (2013) 261-5. DOI: 10.1016/j.iccn.2013.04.005.
- [4] Getahun AB, Belsti Y, Getnet M, Bitew DA, Gela YY, Belay DG et al., Knowledge of intensive care nurses' towards prevention of ventilator-associated pneumonia in North West Ethiopia referral hospitals, 2021: A multicenter, cross-sectional study, Annals of Medicine and Surgery.78:103895 (2022). DOI: 10.1016/j.amsu.2022.103895
- [5] Allen Furr L, Binkley CJ, Mc Curren C, Carrico R, Factors affecting the quality of oral care in intensive care units, Journal of advanced nursing. 48:5 (2004) 454-62. DOI: 10.1111/j.1365-2648.2004.03228.x
- [6] Al-Sayaghi KM, Prevention of ventilator-associated pneumonia, Saudi Medical Journal. 35:3 (2014) 269-76. DOI: <https://pubmed.ncbi.nlm.nih.gov/24623207/>
- [7] Aziz Z, Kausar S, Zahid S, Farooqi S, Aziz Z, Ahmad RA, Knowledge and practice of ventilator care bundle for preventing ventilator-associated pneumonia by ICU nurses of tertiary care hospitals of Lahore, Anesthesia, Pain & Intensive Care. 24:4 (2020) 426-34. DOI: <https://doi.org/10.35975/apic.v24i4.1315>.
- [8] Kalyan G, Bibi R, Kaur R, Bhatti R, Kumari R, Rana R et al., Knowledge and practices of intensive care unit nurses related to prevention of ventilator-associated pneumonia in selected intensive care units of a tertiary care center, India, Iranian Journal of Nursing and Midwifery Research. 25:5 (2020) 369-375. DOI: 10.4103/ijnmr.IJNMR\_128\_18
- [9] Aboul-Fotouh AM, Megahed LA, Elnakib MM, Madany NM, Abd HA, Assessment of nurses' knowledge and



- compliance to evidence-based guidelines regarding bundle of ventilator-associated pneumonia in a military hospital, *GSC Biological, and Pharmaceutical Sciences*. 21:3 (2022) 028-98. DOI: <https://doi.org/10.30574/gscbps.2022.21.3.0466>
- [10] Mishra R, Rani N, Effectiveness of Structured Teaching Program on Knowledge and Practice Regarding Care Bundle on Prevention of Ventilator-Associated Pneumonia among Nurses, *International Archives of Nursing and Health Care*. 6:149 (2020) 147-51. DOI: [org/10.23937/2469-5823/1510149](https://doi.org/10.23937/2469-5823/1510149)
- [11] Yeganeh M, Yekta H, Farmanbar R, Khalili M, Khaleghdoost T, Atrkar Roushan Z, Knowledge of evidence-based guidelines in ventilator-associated pneumonia prevention, *Journal of Evidence-Based Medicine*. 12:1 (2019) 16-21. DOI: [10.1111/jebm.12188](https://doi.org/10.1111/jebm.12188)

