Volume 4, Issue 1, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

ASSESSING THE KNOWLEDGE AND ATTITUDES OF ICU HEALTHCARE PROVIDERS TOWARDS VAP PREVENTION AND MANAGEMENT AT TERTIARY CARE HOSPITALS PESHAWAR

Samar Gul[1], Alamdar Hussain[2], Muhammad Sadiq Nawaz[3], Naveed Ali[4], NaveedUllah Khan[5], Zabih Ullah[*6]

[1,2,3]*Wazir Muhammad institute of allied health sciences, Gandhara University*
[4]*Demonstrator, Wazir Muhammad institute of allied health sciences, Gandhara University*
[5]*Lecturer Emergency care technology At Kohat University of science and technology (KUST), Kohat*
[*6]*Senior Lecturer Emergency and intensive care technology at Wazir Muhammad institute of allied health sciences, Gandhara University*

[1]samarork333@gmail.com, [2]muhammadsadiqnawaz65@gmail.com, [3]hussainalamdar1255@gmail.com, [4]naveed17508@gmail.com, [5]naveed.bhai.9.com@gmail.com, [*6]zabijan790@gmail.com

DOI: https://doi.org/10.5281/zenodo.18218604

Keywords
Pneumonia, associative ventilator, staffs of ICU, infection control, attitude to health care, stop VAP, tertiary hospitals, Pakistan.

Article History
Received: 18 November 2025
Accepted: 25 December 2025
Published: 12 January 2026

Copyright @Author
Corresponding Author: *
Zabih Ullah

Abstract

Ventilator-associated pneumonia (VAP) is a well-recognized and prophylactic disease in intensive care units (ICUs), which leads to bad patient outcome and cost to health care. Prevention of this is based on the attitudes and knowledge of the healthcare providers in ICU. Intermittent infection control policies and staff training in resource-strained environments, such as Pakistan, help to perpetuate excessive VAP. Knowledge about the awareness and views of ICU staffs is also necessary in promoting care and minimizing the infection rates. Methods: An observational study or a cross-sectional study was carried out on 109 sample size in ICU health workers like doctors, nurses, and respiratory therapists working in tertiary care hospitals across the city of Peshawar. Information was obtained with the help of a structured questionnaire and analyzed in SPSS version 25.

Objectives: To identify knowledge and beliefs of ICU healthcare provider concerning the prevention, and management of Ventilator-Associated Pneumonia (VAP).

Results: Although 70.6 percent of them knew when VAP occurred, or when a patient contracted it, i.e., after 48 hours of intubation, 56 of them did not know the right frequency of oral care, and 68.8 of them did not understand that regular antibiotics use was incorporated in the VAP bundle. It is worth noting that only 54.1 percent were never trained in VAP formally. Attitudinally, 63.3% were motivated to adhere to the protocols however the support and training given by the institutions differ widely.

Conclusion: Even though ICU staff has a partial understanding of VAP, there are knowledge gaps that result to ineffective prevention as well as training lacking consistency. The organization and educational support through appropriate resources and policies will also play an important role in enhancing compliance and lowering the incidence of VAP in ICUs.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

INTRODUCTION

Ventilator-Associated Pneumonia (VAP) is one of the worst and life-threatening infections picked up in Intensive Care Unit (ICU) especially in patients on mechanical ventilation. It is characterized as an infection of the lungs which develops, following at least 48 hours of endotracheal intubation and mechanical ventilation and has been well known to contribute immensely to morbidity and mortality of patients in an intensive care setting (1). VAP development does not only increase the duration of mechanical ventilation and ICU stay but also increases healthcare costs and the chance of having undesired patient outcomes (2). In the world, about 10 to 25 per 1,000 days of patients ventilated are affected by the VAP, and it is different across various healthcare systems and countries based on various criteria, for instance, infection management techniques, employee education, and accessibility to resources (3). In high-income nations, the development of critical care medicine and strict policy regarding infection control measures have helped to decrease the prevalence of VAP. Nevertheless, it is disproportionately high in low- and middle-income countries, such as Pakistan, because streamlining issues, such as understaffed ICUs, poor infection surveillance, and poor execution of evidence-based practices, significantly affect the burden (4).

Research has shown that the rates of VAP in these facilities can be between 15 to 40 percent, which depends on the environment of the ICU and the health condition of the patients (5). Besides, the microbiologic cause of VAP in Pakistan frequently indicates the dominance of resistant pathogens, which makes clinical management even more challenging and associated with a higher occurrence of mortality (6).

To counter the threat of VAP to the health of the world population, various institutions such as the Centers for Disease Control and Prevention (CDC) and the Institute for Healthcare Improvement (IHI) have come up with detailed guidelines that are more preventive and earlier in intervention (7).

Among the most well known frameworks lie so-called Ventilator Bundle, i.e. a set of evidence-based interventions aimed at decreasing the risk of VAP. They are head of the bed elevation to 30 45 degrees, daily sedation holidays, readiness to extubating, routine oral mouth wash with chlorhexidine, and hand hygiene regimens (8).

Nevertheless, as much as these measures work, their success depends on the awareness, attitudes of health care providers serving in the ICU, and their consistency (9).

The topic of hand hygiene as a foundation of preventing VAP is also pointed out in several studies. Although hand hygiene compliance is one of the simplest and most effective interventions, compliance is not ideal in most of the critical care units, and especially in low resource settings (10).

Arguably the use of campaigns, visual reminders and frequent auditing can positively enhance the behavior of hand hygiene and help minimize the transmission of infections (11).

Problem Statement:

Ventilator-associated pneumonia (VAP) remains a major problem in intensive care as this pneumonia causes high morbidity and mortality rates in patients who are under mechanical ventilation. Although there are some well-developed strategies on prevention, the inconsistency and weak compliance in knowledge among the healthcare providers in ICU are still prevalent. The awareness and attitude level of the staff to the VAP prevention in PK does not have much research and in such a way, it is hard to elaborate special intervention, which could ensure the better results within the patients.

Rationale:

The prevention of VAP is one of the essential factors in enhancing patient outcomes in ICU. Nevertheless, prevention is dependent on the attitudes and knowledge possessed by healthcare givers in the ICU. Most hospitals particularly underprivileged countries such as Pakistan lack data regarding the level of staff comprehension of VAP prevention procedures as well as application. The purpose of the study is to determine areas of knowledge gaps and attitude-related obstacles in the circle of ICU professionals. This will assist to create more precise training opportunities and will also enable maintenance of the evidence based practice in

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

a better manner, thus raising the quality of care and patient safety.

Objectives:

To identify knowledge and beliefs of ICU healthcare provider concerning the prevention, and management of Ventilator-Associated Pneumonia (VAP).

Material & Methods Study Design:

The descriptive cross-sectional study titled as " Assessing the Knowledge and Attitudes of ICU Healthcare Providers Towards VAP Prevention and Management at Tertiary Care Hospitals Peshawar "

Study Settings:

It will be done in Tertiary Care Hospitals Peshawar which is a tertiary care hospital and offers emergency and critical care treatment in the Intensive Care Units (ICUs).

Study Duration:

The research is going to take 6th months, with data collection, analysis and reporting.

Sample Size:

The Raosoft Sample Size Calculator was used to get the sample size of this research and the size of the population was 150, confidence level of 95 percent, and 5 percent confidence interval as well as a 50 percent response distribution. Regarding these parameters, the required minimum sample size should amount to 109 participants in order to guarantee statistical reliability and representativeness of the results of the study.

Sampling Technique:

The non-probability convenience sampling approach is going to be used and the participants will be chosen with respect to their availability and their consent to participate. The doctors, nurses, and respiratory therapists of Intensive Care Units (ICUs) of Tertiary Care Hospitals Peshawar will be included. In this way, it will be possible to collect the data on qualified respondents who are easily available and offer some important information regarding the knowledge and attitude of ICU staff in regards to VAP prevention and management with the background of hospital establishment.

SAMPLE SELECTION: Inclusion Criteria: ¬

ICU healthcare professionals (doctors, nurses' respiratory therapists) employees HMC. ¬ 6 months in ICU experience at minimum. ¬ Equipped with Persistence, Availability, Cooperative, and Desire to help (Willingness to participate and give informed consent).

Exclusion Criteria: ¬

ICU staffs who were not present during the collection of data. ¬ Non-ICU staff or administration staff. ¬ Unreturned questionnaires or questionnaires that were not filled in completely.

RESULTS:

One hundred and nine healthcare professionals engaging in the work in ICU settings took part in the study. Demographic analysis pointed to influences that participants in the survey were between 20-30 years (71.6 %), 31-40 years old (25.7 %), and only in the minority group (2.8 percent) were 41-50 years old. Gender wise, 57.8 percent were males and 42.2 percent were females. When speaking of the occupational distribution, the highest percentage belonged to the nurses (54.1%), there were doctors (22.9%), respiratory therapists (17.4%), and others (5.5%). The sample was skewered to Medical ICUs (29.4%) and Neuro ICUs (23.9%) over the rest, which was mostly Surgical ICUs (18.3%), and the rest were other ICUs (28.4%).

Regarding the experience in ICU, 46.8 percent have a year to 3 years of experience, 24.8 percent less than one-year experience, and 20.2 percent 4-6 years' experience with only 8.3 percent experiencing over six years. The percentages of respondents reporting to have had training in the VAP prevention and management and the percentages of those never experiencing formal training reported 45.9 and 54.1 percentages respectively. Of those trained 31.2 percent were trained in the previous year, 11.9 were trained 1-2 years ago and 2.8 percent, still more than two years ago. Knowledge based responses revealed that 70.6 percent of respondents were right on knowing that VAP is most likely to happen past 48 hours of intubation. The response to the question of

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

which element is outside the VAP bundle was 68.8 percent; therefore, accurate that routine antibiotic prophylaxis was not a part of the bundle. On the same note, 56 percent were aware of what the recommended schedule was when it came to oral care as it relates to 4-6 hours.

Table No.1 Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20–30 years	78	71.6	71.6	71.6
	31–40 years	28	25.7	25.7	97.2
	41–50 years	3	2.8	2.8	100.0
	Total	109	100.0	100.0	

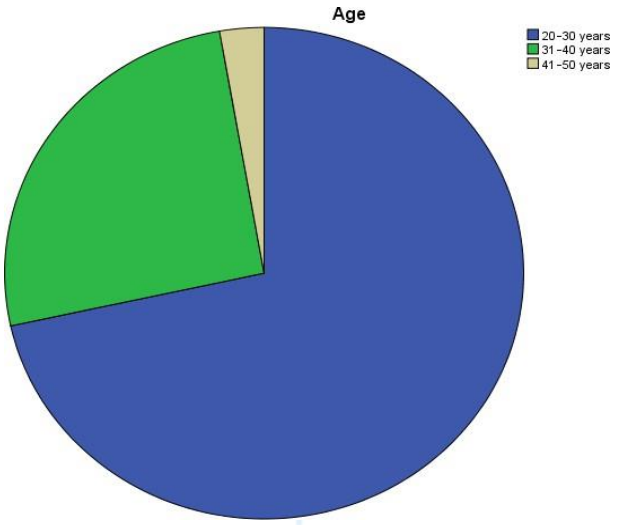


Table No.2 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	46	42.2	42.2	42.2
	Male	63	57.8	57.8	100.0
	Total	109	100.0	100.0	

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

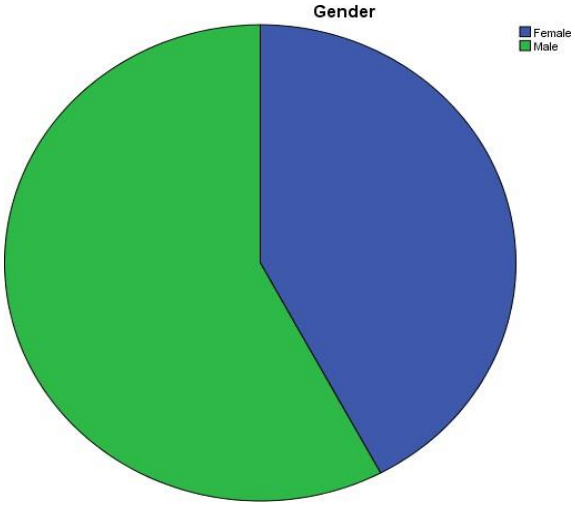
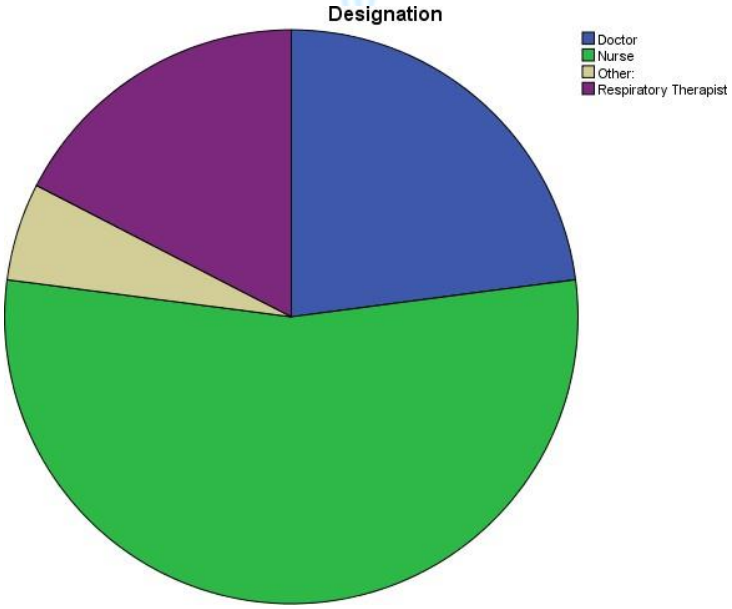


Table No.3 Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Doctor	25	22.9	22.9	22.9
	Nurse	59	54.1	54.1	77.1
	Other:	6	5.5	5.5	82.6
	Respiratory Therapist	19	17.4	17.4	100.0
	Total	109	100.0	100.0	



Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Table No.4 Department/Unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Medical ICU	32	29.4	29.4	29.4
	Neuro ICU	26	23.9	23.9	53.2
	Other:	31	28.4	28.4	81.7
	Surgical ICU	20	18.3	18.3	100.0
	Total	109	100.0	100.0	

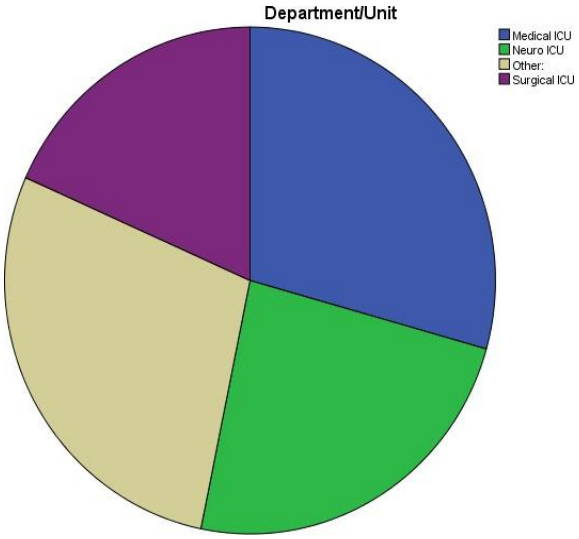


Table No.5 Years of ICU Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1–3 years	51	46.8	46.8	46.8
	4–6 years	22	20.2	20.2	67.0
	Less than 1 year	27	24.8	24.8	91.7
	More than 6 years	9	8.3	8.3	100.0
	Total	109	100.0	100.0	

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

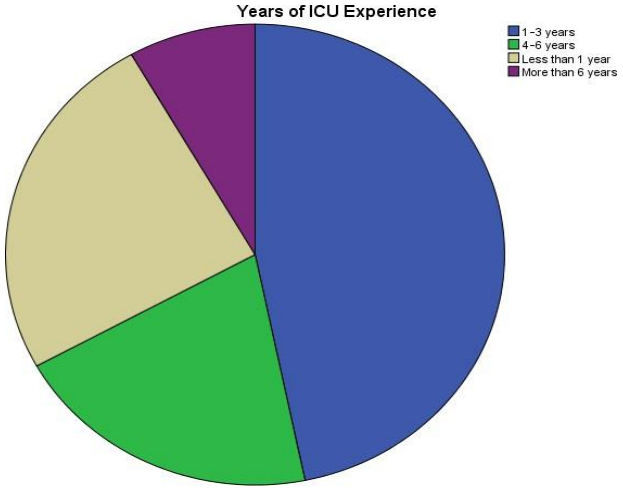
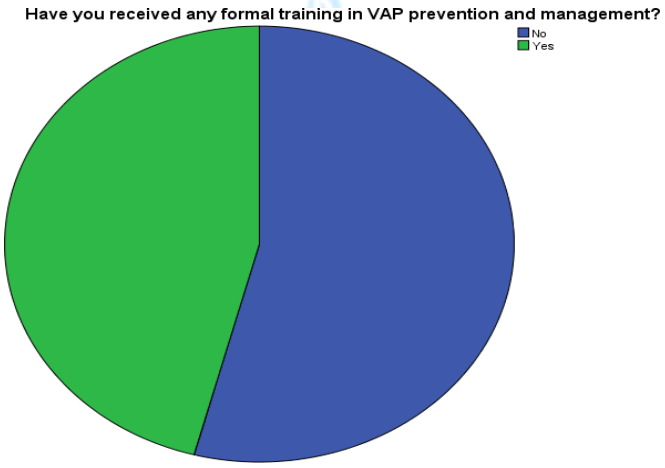


Table No.6 Have you received any formal training in VAP prevention and management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	59	54.1	54.1	54.1
	Yes	50	45.9	45.9	100.0
	Total	109	100.0	100.0	



DISCUSSION

This research has shown quite a worrying, but informative reflection of what we know and how we feel in terms of VAP prevention and care among healthcare professionals working in ICUs. It was found that, whereas a base level of awareness present, there were significant gaps that could have a potential negative impact of infection control activities within the setting of critical care.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Another important discovery was a comparatively young age and the lack of experience of most of the participants. Such demographic shift does not represent an exception in a tertiary hospital in Pakistan, where a high staff turnover is observed and junior professionals are recruited regularly. Younger professionals could inject the enthusiasm, but due to lack of experience they could influence the clinical decision making especially in a high-risk setting such as an ICU.

The largest knowledge deficiency referred to the VAP prevention practices. More than the half of the participants either had no formal training or did not update it during the last several years. It is a systemic problem because continuous professional development does not penetrate everyday work in the hospital. Therefore, in some cases, there may be some degree of knowledge, even though such knowledge is on the issue of the occurrence of VAP after 48 hours of ventilation, application of such knowledge may vary erratically or become outdated.

Only 55 percent of the respondents cited hand hygiene, which is one of the most important infection control measures. This figure is relatively low and highlights persisting issue in other studies (of low- and middle- income countries) in which hand hygiene compliance is also low due to no monitoring, unpredictable access to sanitizers, and insufficient understanding of its importance.

CONCLUSION

This paper undertakes a research on the knowledge and attitudes held by ICU healthcare providers on ventilator-associated pneumonia (VAP) in tertiary care hospitals of Peshawar. It established that despite the basic awareness level found in the majority providers, there were still big gaps in terms of knowledge and practice of the prevention strategies.

Most of the respondents acknowledged that VAP was a preventable healthcare-related infection. Nevertheless, knowledge deficits were discovered in the following sections as well as the proper frequency of oral care, the microbes most likely involved in VAP, and false beliefs about antibiotic prophylaxis. In addition to that, although some healthcare providers felt optimistic about their application of VAP bundles, many of them also shared a sense of uncertainness or lack of enthusiasm. Training employment and institutional support was reported as intermittent.

REFERENCES

Chastre J, Fagon JY. Ventilator-associated pneumonia. Am J Respir Crit Care Med. 2002;165(7):867–903.

Kollef MH. Ventilator-associated pneumonia: A multivariate analysis. JAMA. 1993;270(16):1965– 70.

Khan R, Baig MA, Mehboob A, et al. Frequency and microbiological profile of VAP in ICU of tertiary care hospital in Pakistan. Pak J Med Sci. 2017;33(6):1362–7.

Blot SI, Labeau SO, Vandijck DM, et al. Evidence-based guidelines for the prevention of ventilator- associated pneumonia: results of a knowledge test among intensive care nurses. Intensive Care Med. 2007;33(8):1463–7.

Ali M, Ahmed S, Lohana H. Knowledge and practices of ICU staff about ventilator-associated pneumonia. Pak J Chest Med. 2016;22(3):130–5.

Ilyas F, Baig MA, Khan R, et al. Microbiological profile and outcome of ventilator-associated pneumonia in a tertiary care hospital. Cureus. 2021;13(5):e14998.

Institute for Healthcare Improvement. How-to Guide: Prevent Ventilator-Associated Pneumonia. IHI; 2012.

Klompas M. Prevention of ventilator-associated pneumonia. Expert Rev Anti Infect Ther. 2010;8(7):791–800.

Talpaert MJ, Gopal Rao G, Cooper BS, et al. Impact of guidelines and education on reducing catheter-related bloodstream infections: a systematic review. J Hosp Infect. 2011;79(1):1–13.

Mahmoodpoor A, Hamishehkar H, Shadvar K, et al. Knowledge of ICU nurses and effect of an educational program on prevention of ventilator-associated pneumonia. J Caring Sci. 2014;3(2):67– 73.

Qasmi SA, Khan RA, Raza A. Knowledge and compliance with VAP bundles among healthcare providers in ICU settings. J Coll Physicians Surg Pak. 2018;28(5):337–40.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Shajahan S, Samavedam S, Ramakrishnan N. ICU care in India—challenges and opportunities. Crit Care. 2018;22(1):1–4.

Al-Sayaghi KM. Nurses' knowledge and practice for preventing ventilator-associated pneumonia in intensive care units. Egypt Nurs J. 2019;16(3):132–8.

Farooqi BJ, Khan E, Kazmi SU, et al. Infections in intensive care unit: a surveillance report. J Pak Med Assoc. 2013;63(6):799–804.

Arif N, Khan M, Mirza A. Knowledge and practices of ICU staff regarding ventilator-associated pneumonia. Pak J Med Health Sci. 2019;13(2):476–9.

Abubakar U, Amir O, Maimuna M. Role of nurses in prevention of ventilator-associated pneumonia. Int J Nurs Educ. 2019;11(3):15–9.

Patel SB, Kress JP. Sedation and analgesia in the mechanically ventilated patient. Am J Respir Crit Care Med. 2012;185(5):486–97.

Sole ML, Byers JF, Ludy JE, et al. A multisite survey of suctioning techniques and airway management practices. Am J Crit Care. 2003;12(3):220–30.

Butt T, Ahmed RN, Salman M, et al. Knowledge gaps in the management of VAP in Pakistan: A cross-sectional study. J Infect Dev Ctries. 2021;15(9):1298–304.

Oliveira AC, Borges LHS, Silva MDM, et al. Knowledge, attitudes and practices of nurses on the prevention of ventilator-associated pneumonia. Rev Esc Enferm USP. 2015;49(Spec No):64–71.

1.