

Original Research Article

Awareness among the nursing staff regarding the administrative indicators to prevent the ventilator associated pneumonia - a prospective analysis

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ABSTRACT

Background: Intensive care units is the heart of the hospital, ventilator associated pneumonia is a very common complication occurs patient with mechanical ventilators. Present study aimed to assess the awareness among nursing staff regarding the administrative indicators for the prevention of ventilator-associated pneumonia (VAP).

Methods: A descriptive cross-sectional study was conducted in the Intensive care unit. Data was collected by 40 staff nurses posted in intensive care unit (ICU) by using a structured and validated questionnaire. The study was carried out over a period of two months, from September 2022 to October 2022. which included all eligible ICU nurses available during the study period. Nurses who were on leave, posted temporarily, or unwilling to participate were excluded from the study.

Results: Result revealed that a majority of the participants (58.97%) were in the age group of 20–24 years, most respondents (71.80%) had completed B.Sc. Nursing and 56.41% of the nurses had between 1–3 years of experience. 92.31% of the nursing staff demonstrated good knowledge, 7.69% had an average level of knowledge on prevention of ventilator associated pneumonia.

Conclusions: Although most staff demonstrated good knowledge about ventilator-associated pneumonia, the study's limited sample size and scope to specific hospital areas restrict the generalizability of the findings. Future longitudinal studies could investigate the relationship between staff knowledge and clinical practice, as well as the impact of administrative factors on VAP prevention strategies.

Keywords: Awareness, Nursing staff, Prevention, Ventilator associated pneumonia

INTRODUCTION

The intensive care unit (ICU) is a specialized hospital unit focused on delivering constant, high-level care to patients with life-threatening conditions. These patients have compromised immune systems as a result of their severe diseases, making them more susceptible to infection and hospital-acquired diseases.¹ the use of mechanical ventilators has significantly decreased mortality and improved health outcomes. Mechanical ventilators can help patients breathe.²

In medical technology, mechanical ventilation is the form of life support that is most frequently utilized.³ One of the most frequent side effects of the mechanical ventilator is ventilator-associated pneumonia.⁴⁻⁹ Long-term use of endo-tracheal tubes can develop in tracheal necrosis or stenosis, glottis oedema, and ventilator-associated pneumonia.^{10,11}

Ventilator-associated pneumonia (VAP) is defined as pneumonia that occurs 48 hours or more after endotracheal intubation and initiation of mechanical ventilation. It

significantly contributes to increased morbidity, length of ICU stays, healthcare costs, and mortality. VAP risk raises 1–3% every day of mechanical ventilation.⁹ In India VAP affects 9% to 24% of ICU patients.¹² VAP affects 9% to 24% of ICU patients in India. VAP has a global mortality rate that varies between 24% and 50%. According to data from the International nosocomial infection control consortium (INICC), 13.6 out of every 1000 days spent on a mechanical ventilator are accounted for by VAP. Patients in the critical care unit who were mechanically ventilated had a high rate of VAP, with 37.5 percent contracting the infection and 40.1 percent dying.¹³

A prospective study at the Mahatma Gandhi Medical College and Research Institute in Mumbai found that 18 of the 76 patients (23.7%) developed ventilator-associated pneumonia (VAP) during their stay in the ICU. 53.25 VAP events per 1,000 ventilator days were recorded.¹⁴ It was discovered that 68 (82.9%) of the 82 patients in the critical care unit at KLE's Jawaharlal Nehru Medical College and Research Centre in Belgaum, Karnataka, had ventilator-associated pneumonia.¹⁵

The VAP bundle consists of a series of evidence-based practices aimed at minimizing the risk of ventilator-associated pneumonia. Cleaning the inside of an intubated patient's mouth with a sponge, toothbrush, and oral antiseptic is known as oral care or hygiene and is one of the key factors that causes VAP and head of bed elevation ranges from 30 to 45 degrees.^{16,17} A basic function that could be included in the VAP bundle is subglottic suctioning. The VAP bundle's individual parts are all built to stop bacteria-filled secretions from being inhaled into the sterile lower respiratory tract.¹⁸

According to studies, ventilator-associated pneumonia was 43.4 percent less likely to occur in intubated patients who had their subglottic secretions aspirated consistently.¹⁹ The guidelines for preventing VAP from the American Association of critical-care nurses (AACN), American Thoracic Society (ATS), and Centers for Disease Control and Prevention (CDC) all stress the importance of removing secretions from the subglottic region.^{20,21}

The amount of fluids collected above the cuff of an endotracheal tube can be decreased by continuously aspirating secretions or intermittently aspirating secretions, which inhibits micro aspiration. The suction port is intended to remove secretions that have accumulated in the subglottic area using continuous or intermittent suction. It is situated directly above the inflated cuff.²²

A method for lowering the amount of secretions that can leak around the cuff and into the lungs is subglottic suction drainage (SSD). On numerous occasions, it has been demonstrated that subglottic suction drainage lowers the frequency of ventilator-associated pneumonia. 23 Implementation of SSD postponed the initial onset of VAP by four days following the initiation of mechanical

ventilation. With the use of subglottic suction drainage endotracheal tubes (ETTs), VAP was reduced by 45 percent, the length of time spent in the intensive care unit was cut by 1.5 days, and the need for mechanical ventilation was reduced by 1.1 days.^{24,25}

Despite the availability of guidelines and preventive strategies, the effectiveness of VAP prevention largely depends on the awareness, knowledge, and adherence of the nursing staff to these administrative indicators. Lack of knowledge or inconsistent implementation can increase the incidence of VAP and affect patient outcomes. Additionally, using low pressure to remove heavy secretions makes the suction port more prone to blockage. For brief periods, intermittent suctioning increases the suction pressure. Continuous suctioning was linked to reduced suction volume and more frequent aspirational difficulties. It has been demonstrated that subglottic secretory drainage reduces the risk of ventilator-associated pneumonia by around 50%.²⁶ Continuous subglottic suction is helpful in cases of established VAP. It prevents further contamination of the airways, speeds up recovery, and reduces the length of the ICU stay. It should ideally be started as soon as possible in the case of prolonged mechanical breathing because it is one of the most effective prophylactic measures. The critical care nurse should be aware of how the body often fights off the growth of pneumonia in order to take precautions against ventilator-associated pneumonia and other complications with mechanical ventilation.

The primary objective of this study is to evaluate the level of awareness among nursing staff regarding administrative measures for the prevention of VAP.

METHODS

A descriptive cross-sectional study was conducted to assess the awareness among nursing staff regarding the administrative indicators for the prevention of VAP. The study was carried out over a period of two months, from September 2022 to October 2022, in the ICU of A. J. Hospital and Research Centre a super specialty hospital located in Mangalore.

The study population consisted of 40 staff nurses working in the ICU, selected through the universal sampling method, which included all eligible ICU nurses available during the study period. Nurses who were on leave, posted temporarily, or unwilling to participate were excluded from the study.

Data was collected using a structured and validated questionnaire that consisted of two parts. The first part gathered demographic data including age, gender, residence, educational qualification, and years of ICU and overall professional experience. The second part consisted of 12 multiple-choice questions aimed at evaluating the participants' knowledge regarding ventilator-associated pneumonia and administrative indicators such as VAP

bundles, oral care practices, subglottic suctioning, head-of-bed elevation, and adherence to infection control protocols.

The collected data were checked for completeness and entered into a computerized database. Statistical analysis was performed using statistical package for the social sciences (SPSS) version 23. Descriptive statistics such as frequency, percentage, mean, median, and standard deviation were used to summarize the data. To explore associations between demographic variables and levels of knowledge, inferential statistics, specifically the Chi-square test, was applied. A p value of less than 0.05 was considered statistically significant.

RESULTS

The present study assessed the awareness levels among ICU nursing staff regarding administrative indicators for the prevention of VAP. A total of 40 nursing professionals working in the ICU of a super specialty hospital in Mangalore participated in the study. The analysis of demographic data revealed that a majority of the participants (58.97%) were in the age group of 20–24 years, followed by 33.33% in the 25–29 years group and 7.70% in the 30–34 years group as shown in Figure 1. All participants were female, indicating a female-dominated ICU nursing workforce in the study setting.

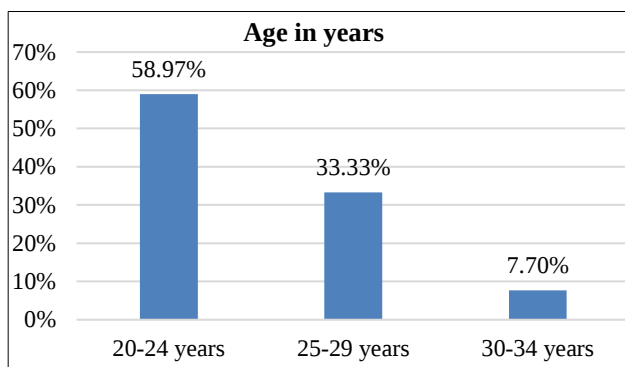


Figure 1: Age in years.

Regarding residential background, 58.97% of the nurses were from urban areas, while 41.03% were from rural areas as shown in the Figure 2.

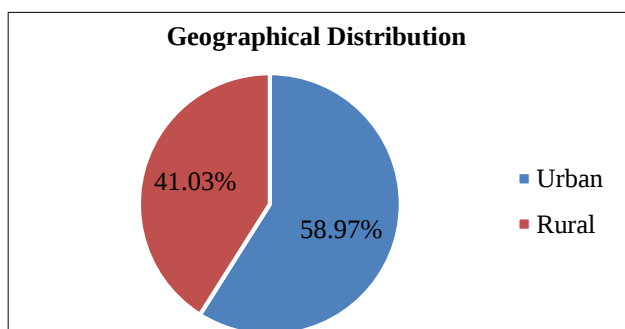


Figure 2: Geographical distribution.

Educational qualification analysis showed that most respondents (71.80%) had completed B.Sc. nursing, 15.38% had pursued post basic B.Sc. nursing, and 12.82% had completed general nursing and midwifery (GNM) as shown in the Figure 3.

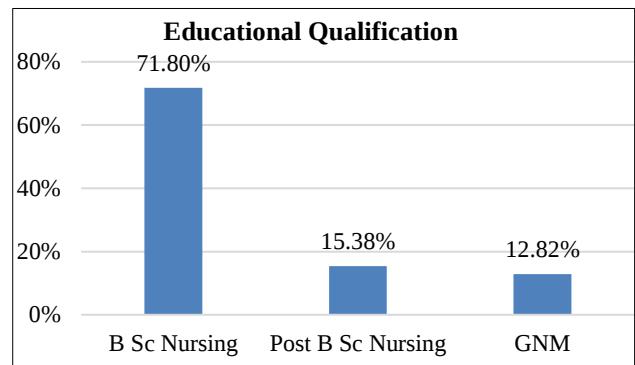


Figure 3: Educational qualification.

In terms of professional experience, 56.41% of the nurses had between 1–3 years of experience, followed by 30.77% with less than one year, 7.69% with more than five years, and 5.13% with 3–5 years of experience as shown in the Figure 4.

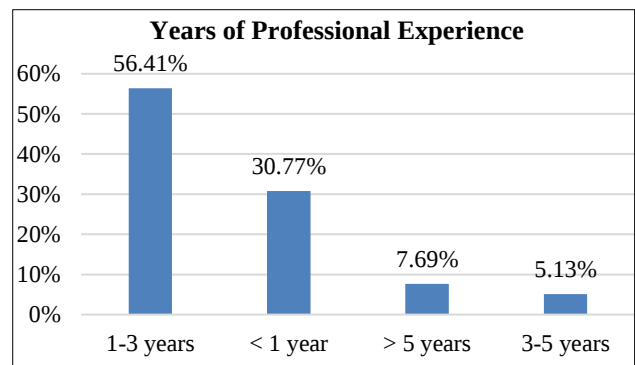


Figure 4: Years of professional experience.

When asked specifically about ICU experience, 56.41% had 1–3 years, 33.33% had less than a year, 7.69% had more than five years, and 2.57% had between 3–5 years as shown in the Figure 5.

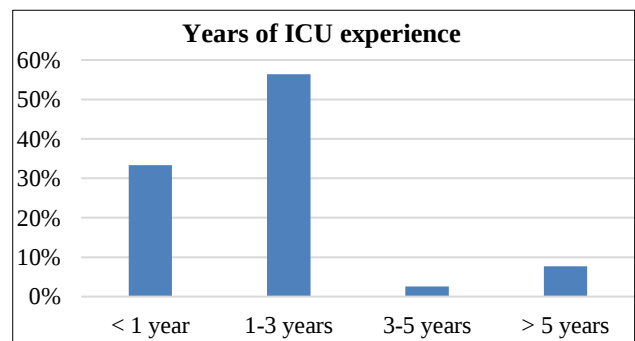


Figure 5: Years of ICU experience.

The level of knowledge among the respondents regarding VAP and its administrative indicators was found to be encouraging. As shown in the Figure 6, 92.31% of the nursing staff demonstrated good knowledge, while only 7.69% had an average level of knowledge. This reflects a strong foundational understanding among the majority of ICU nurses about the preventive measures and institutional protocols related to VAP.

The descriptive statistics further supported this observation. The mean knowledge score was 10.62 out of a maximum score of 12, with a median of 11 and a standard deviation of 1.37. The overall mean percentage score was 88.50%, indicating a high level of awareness. Specifically, knowledge related to administrative indicators for VAP prevention yielded an even higher average score of 91.80%.

While inferential statistics such as the Chi-square test were used to explore associations between knowledge levels and demographic variables, the results did not show statistically significant differences. However, trends suggested that nurses with higher educational qualifications and greater ICU experience tended to score better on knowledge assessments. This highlights the importance of continuous training and targeted education, particularly for nurses with lesser experience.

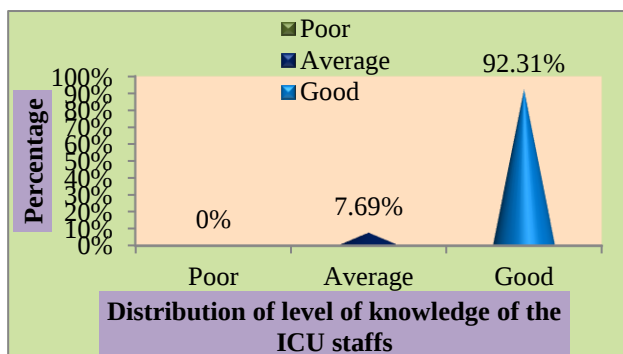


Figure 6: Knowledge levels of ICU nursing staff regarding VAP prevention.

DISCUSSION

The findings of this study reveal a high level of awareness among nursing staff regarding administrative indicators for the prevention of VAP, with 92.31% demonstrating good knowledge. This is a promising outcome, indicating that educational initiatives, institutional protocols, and on-the-job exposure have positively impacted nursing practices in the ICU of the hospital.

The results are in concordance with the study conducted by Pravin et al at the Mahatma Gandhi Medical College, which reported that effective implementation of administrative strategies led to a measurable reduction in VAP incidence.¹⁴ In our study, the mean knowledge score of 10.62 out of 12 (88.5%) further underscores that most

staff were well-informed, especially about key bundle elements like oral care, subglottic suctioning, and head-of-bed elevation.

Administrative indicators such as consistent documentation, adherence to VAP bundles, and surveillance protocols play a critical role in VAP prevention. Our findings align with those of Coppadoro et al and Papazian et al, who emphasize the importance of preventive bundles and multidisciplinary teamwork in minimizing infection rates.^{13,24} The high awareness seen among nurses may also reflect the influence of institutional emphasis on quality and infection control standards, as recommended by organizations such as the CDC, AACN, and American Thoracic Society.

Interestingly, despite the encouraging knowledge levels, the study also identified variation based on experience and qualification, though statistical associations with demographic factors were not deeply explored. Similar to the findings by Gunaratne et al, newer staff with fewer years of ICU experience may benefit from continued education and hands-on training regarding advanced interventions such as subglottic secretion drainage (SSD), which has been shown to reduce VAP incidence by up to 50%.¹⁵

The results also reflect current literature highlighting the significance of early and continuous suctioning techniques, especially in high-risk patients. As described by Mao et al and Pozuelo-Carrascosa et al, SSD not only delays the onset of VAP but also reduces ICU stay and ventilator dependency.^{23,25} This reinforces the idea that administrative awareness among frontline caregivers must be consistently updated to reflect evolving best practices.

Overall, this study confirms that a well-informed and trained nursing workforce is essential for preventing VAP. While the high awareness levels are commendable, ongoing reinforcement through in-service training, audits, and feedback mechanisms is essential to maintain and improve these standards. It is recommended that hospital administration supports continuous professional development and encourages the implementation of standard VAP bundles as part of daily ICU practice.

CONCLUSION

In present study, almost staffs were had good knowledge regarding ventilator associated pneumonia. Since the sample was limited to only a few areas of hospital, generalization of findings is limited. On the basis of the findings A longitudinal study can be conducted to find out the impact of knowledge on practice and impact of administrative indicators on prevention of VAP.

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