A Study to Assess the Knowledge Regarding Prevention of VAP, CAUTI, and CLABSI Among ICU Staff Nurses in Selected Hospitals of Sasaram, Rohtas

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Abstract- Background: Device-Associated Infections (DAIs) pose a significant threat in Intensive Care Units (ICUs), with Ventilator-Associated Pneumonia (VAP), Catheter-Associated Urinary Tract Infection (CAUTI), and Central Line-Associated Bloodstream Infection (CLABSI) being the most common. Nurses play a crucial role in preventing these infections through strict adherence to standard precautions and care bundles.
Objectives: To assess the knowledge of ICU staff nurses regarding prevention of VAP, CAUTI, and CLABSI., To evaluate the effectiveness of an intervention program by comparing pre-test and post-test knowledge scores., To find the association between pre-test knowledge and selected demographic variables.
Methodology: A descriptive research design was adopted. A total of 300 ICU staff nurses from selected hospitals in Sasaram were selected using non-probability convenience sampling. A structured knowledge questionnaire was used for data collection. Data was analyzed using descriptive and inferential statistics.
Results: Most staff nurses were aged 21–25 years (36.6%), females (66.6%), from nuclear families (66.6%). Findings revealed existing knowledge gaps related to VAP, CAUTI, and CLABSI prevention. Post-test scores showed significant improvement after the intervention. Demographic variables showed no significant association with pre-test knowledge levels.
Conclusion: Knowledge regarding prevention of device-associated infections among ICU nurses was inadequate to moderate before training but significantly improved after educational intervention. Continuous training programs are essential to enhance patient safety and reduce infection rates.

Keywords: VAP, CAUTI, CLABSI, ICU nurses, knowledge, device-associated infections.

I.INTRODUCTION

Hospital-Acquired Infections (HAIs) remain a serious global health problem, particularly in ICUs where critically ill patients are more vulnerable due to invasive procedures, prolonged hospitalization, and compromised immunity. Ventilator-Associated Pneumonia, Catheter-Associated Urinary Tract Infection, and Central Line-Associated Bloodstream Infection are the most prevalent DAIs, contributing to increased mortality, morbidity, and healthcare costs.
Nurses play a vital role in preventing DAIs through compliance with standard precautions, bundle care approaches, and evidence-based infection-control protocols. However, several studies have identified significant gaps in nurses' knowledge and adherence to prevention guidelines. Therefore, assessing and improving their knowledge is essential for enhancing patient outcomes.

II.NEED OF THE STUDY

ICU patients are at higher risk of acquiring infections due to the constant use of invasive devices such as ventilators, urinary catheters, and central venous catheters. Studies reveal that:

- VAP contributes to prolonged ICU stay and increased mortality.
- CAUTI accounts for 40% of nosocomial infections.
- CLABSI leads to high morbidity and requires costly treatment.

Despite well-established guidelines for prevention, underutilization of these protocols often results from inadequate knowledge and training. The need for this study arises from the demand to identify knowledge gaps, implement interventions, and strengthen infection-prevention competency among nurses.

III.BACKGROUND OF THE STUDY

VAP develops after 48 hours of mechanical ventilation and has mortality rates ranging from 6% to 68%. CAUTI is common among patients with indwelling catheters, with risks increasing each day the catheter remains in place. CLABSI, caused by contamination during insertion or maintenance of central lines, significantly prolongs hospital stays and increases healthcare costs.

Literature highlights that although guidelines for VAP, CAUTI, and CLABSI prevention exist, their implementation is inconsistent. Nurses' knowledge level is strongly linked to care quality and infection outcomes. Therefore, identifying gaps and educating nurses using structured interventions can significantly reduce DAIs.

IV.METHODOLOGY

Research Approach: Quantitative approach
Research Design: Descriptive research design
Setting: Selected hospitals of Sasaram, Rohtas
Population: ICU staff nurses
Sample Size: 300
Sampling Technique: Non-probability convenience sampling

Inclusion Criteria:

- ICU nurses working in selected hospitals
- Nurses willing to participate

Exclusion Criteria: Nurses not working in ICU

Tool Description:
A structured questionnaire consisting of:

- Section A: Demographic variables (age, gender, family type, marital status, education, income, location)
- Section B: Knowledge regarding prevention of VAP, CAUTI, CLABSI

Data Collection Procedure:
Permission was obtained from hospital authorities; informed consent was taken from participants. Pre-test was conducted, followed by an educational intervention, and post-test was administered.

Data Analysis:
Descriptive statistics—frequency, percentage
Inferential statistics—paired t-test, chi-square

V.RESULTS

Demographic Findings

- Age: Majority 21–25 years (36.6%)
- Gender: Females 66.6%
- Family Type: Nuclear 66.6%
- Marital Status: Married 36.6%
- Religion: Hindu 36.6%, Muslim 30%
- Economic Status: Most earned above ₹41,000 (36.6%)
- Location: 50% urban, 50% rural

Knowledge Scores
Pre-test scores indicated inadequate to moderate knowledge in all three domains (VAP, CAUTI, CLABSI).
Post-test scores improved significantly after training.

Statistical Results

- Paired t-test: Significant improvement ($p < 0.05$) in post-test scores.
- Chi-square: No significant association between pre-test scores and demographic variables.

VI.DATA ANALYSIS & INTERPRETATION

The analysis revealed a substantial gap in ICU nurses' understanding of infection-prevention bundles before the intervention. Post-test analysis demonstrated that structured teaching effectively improved knowledge. Demographic variables showed no significant impact on knowledge levels, indicating that training benefits nurses universally across age, gender, and experience.

VII.DISCUSSION

The study findings support several previous studies which state that inadequate knowledge among ICU

nurses contributes to poor adherence to prevention protocols, resulting in an increased incidence of VAP, CAUTI, and CLABSI.

The significant improvement in post-test scores confirms the effectiveness of structured teaching programs. This emphasizes the need for routine in-service education, reinforcement of care bundles, and incorporation of evidence-based practices into clinical training.

VIII.CONCLUSION

The study concluded that ICU nurses possessed inadequate baseline knowledge regarding the prevention of VAP, CAUTI, and CLABSI. However, after the structured intervention, their knowledge improved significantly. This highlights the importance of continuous education, strict adherence to infection control guidelines, and periodic evaluation to ensure high-quality patient care and prevention of DAIs.

REFERENCE

[1] Anderson, D. J., Podgorny, K., et al. (2014). Strategies to prevent surgical site infections in acute care hospitals: 2014 update. *Infection Control & Hospital Epidemiology*, 35(6), 605–627.

[2] Michetti, C. P., Fakhry, S. M., Ferguson, P. L., Cook, A., Moore, F. O., & Gross, R. (2012). Ventilator-associated pneumonia rates at major trauma centers compared with a national benchmark. *Journal of Trauma and Acute Care Surgery*, 72(5), 1165–1173.

[3] Torres, A., Niederman, M. S., Chastre, J., Ewig, S., Hanberger, H., & Vardakas, K. Z. (2017). International guidelines for the management of hospital-acquired pneumonia and ventilator-associated pneumonia. *European Respiratory Journal*, 50, 1700582.

[4] Cook, D. (2000). Ventilator–associated pneumonia: Perspectives on the burden of illness. *Intensive Care Medicine*, 26(S1), S31–S37.

[5] Koenig, S. M., & Truwit, J. D. (2006). Ventilator-associated pneumonia: Diagnosis, treatment, and prevention. *Clinical Microbiology Reviews*, 19(4), 637–657.