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A Study To Assess The Effectiveness Of Structured Teaching Programme On Knowledge Regarding Prevention Of Ventilator-Associated Pneumonia Among Staff Nurses In Selected Hospitals, Bikaner, Rajasthan

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Abstract

Background:

Ventilator-Associated Pneumonia (VAP) is one of the most common hospital-acquired infections among mechanically ventilated patients and significantly increases morbidity, mortality, and healthcare costs. Nurses play a vital role in preventing VAP through evidence-based nursing interventions. Adequate knowledge and adherence to preventive guidelines are essential for reducing complications.

Objective:

To assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding prevention of ventilator-associated pneumonia among staff nurses.

Methods:

A quantitative pre-experimental one-group pretest–posttest research design was used. The study included **100 staff nurses** selected by non-probability convenient sampling from selected hospitals in Bikaner, Rajasthan. A structured knowledge questionnaire was used for data collection before and after implementation of the STP. Data were analyzed using descriptive and inferential statistics.

Results:

The mean pre-test knowledge score was 11.8 ± 3.4, which increased to 22.1 ± 2.6 after intervention. The paired *t*-test value (19.12) showed statistically significant improvement ($p < 0.05$). Significant association was observed between knowledge and educational qualification and ICU experience.

Conclusion:

The Structured Teaching Programme significantly improved nurses' knowledge regarding prevention of ventilator-associated pneumonia. Regular in-service education programmes are recommended to improve patient safety and nursing care quality.

Keywords: Ventilator-associated pneumonia, structured teaching programme, staff nurses, infection prevention, nursing education.

Introduction

Ventilator-Associated Pneumonia (VAP) is one of the most common and serious healthcare-associated infections occurring among patients receiving mechanical ventilation in intensive care units (ICUs). It is defined as pneumonia that develops after 48 hours or more of endotracheal intubation and mechanical ventilation. VAP significantly contributes to increased morbidity, mortality, prolonged hospital stay, higher treatment costs, and extensive use of antibiotics. The occurrence of VAP not only affects patient outcomes but also places additional burden on healthcare systems and critical care services.

Several risk factors are associated with the development of VAP, including prolonged duration of mechanical ventilation, inadequate oral hygiene, improper airway suctioning techniques, aspiration of secretions, and poor infection control practices. Evidence-based guidelines emphasize the importance of preventive strategies such as maintaining head-end elevation, providing regular oral care, practicing strict hand hygiene, performing aseptic suctioning, and encouraging early mobilization when possible. Proper implementation of these interventions has been shown to significantly reduce the incidence of VAP and improve patient safety.

Nurses play a central role in preventing Ventilator-Associated Pneumonia because they provide continuous bedside care and are responsible for implementing ventilator care bundles and infection control practices. Their knowledge and competency directly influence adherence to clinical guidelines and the quality of patient care. However, variations in clinical practice, limited exposure to updated protocols, and lack of continuing education may result in inadequate knowledge among nursing personnel, thereby increasing the risk of infection.

Structured Teaching Programmes (STPs) are effective educational interventions designed to enhance knowledge, improve clinical skills, and promote evidence-based nursing practice. These programmes provide systematic and organized information through lectures, discussions, demonstrations, and visual aids, thereby helping nurses understand current standards and preventive strategies. Regular educational programmes are essential to update nursing knowledge and ensure consistent implementation of VAP prevention measures.

Considering the serious consequences of Ventilator-Associated Pneumonia and the crucial role of nurses in its prevention, it becomes important to evaluate the effectiveness of educational interventions aimed at improving nursing knowledge. Hence, the present study was undertaken to assess the effectiveness of a structured teaching programme on knowledge regarding prevention of Ventilator-Associated Pneumonia among staff nurses working in selected hospitals.

Need of the Study

Ventilator-Associated Pneumonia (VAP) is one of the most common and serious hospital-acquired infections among patients receiving mechanical ventilation in intensive care units. It significantly increases patient morbidity and mortality, prolongs hospital stay, raises treatment costs, and contributes to excessive use of antibiotics. Despite advancements in critical care management and infection control practices, the incidence of VAP remains a major challenge in healthcare settings, especially in intensive care units where mechanically ventilated patients require continuous monitoring and skilled nursing care.

Prevention of Ventilator-Associated Pneumonia largely depends on strict adherence to evidence-based preventive measures such as maintaining proper head-end elevation, performing regular oral care, following aseptic suctioning techniques, ensuring hand hygiene, and implementing ventilator care bundles. Nurses play a key role in executing these interventions because they provide direct and continuous bedside care. Therefore, their level of knowledge and understanding regarding VAP prevention directly influences the quality of care and patient outcomes.

In clinical practice, variations in knowledge and adherence to standard protocols are frequently observed among staff nurses. Factors such as differences in educational background, clinical experience, workload, and limited exposure to continuing education programmes may result in inconsistent practices related to infection prevention. Lack of updated knowledge regarding current guidelines can increase the risk of VAP occurrence and compromise patient safety.

Structured Teaching Programmes (STPs) are recognized as effective educational strategies that enhance nursing knowledge, promote evidence-based practices, and standardize clinical care. These

programmes provide systematic and organized learning opportunities that help nurses understand preventive measures and apply them effectively in clinical settings. Regular educational interventions are essential to bridge the gap between theoretical knowledge and clinical practice.

Although several studies have emphasized the importance of educational interventions in preventing hospital-acquired infections, limited research has been conducted in selected hospitals of Bikaner, Rajasthan, focusing on nurses' knowledge regarding prevention of Ventilator-Associated Pneumonia. Therefore, there is a strong need to assess existing knowledge levels and evaluate the effectiveness of a structured teaching programme among staff nurses.

Hence, the present study was undertaken to assess the effectiveness of a structured teaching programme on knowledge regarding prevention of Ventilator-Associated Pneumonia among staff nurses. The findings of this study may help improve nursing competency, promote adherence to infection control guidelines, and ultimately reduce the incidence of VAP in hospital settings.

Objectives of the Study

1. To assess pre-test knowledge regarding prevention of ventilator-associated pneumonia among staff nurses.
2. To evaluate the effectiveness of Structured Teaching Programme.
3. To compare pre-test and post-test knowledge scores.
4. To find association between knowledge scores and selected demographic variables.

Hypotheses

The following hypotheses were formulated for the study:

Research Hypothesis (H_1)

There will be a statistically significant difference between the pre-test and post-test knowledge scores regarding prevention of Ventilator-Associated Pneumonia among staff nurses after administration of the Structured Teaching Programme.

Research Hypothesis (H_2)

There will be a statistically significant association between pre-test knowledge scores regarding prevention of Ventilator-Associated Pneumonia and selected demographic variables among staff nurses.

Research Methodology

Research Approach

The study adopted a **quantitative research approach** to assess the effectiveness of a Structured Teaching Programme on knowledge regarding prevention of Ventilator-Associated Pneumonia among staff nurses.

Research Design

A **pre-experimental one-group pretest–posttest research design** was used to evaluate the effectiveness of the intervention.

Schematic Representation of Research Design

Pre-test	Intervention	Post-test
O_1	X (Structured Teaching Programme)	O_2

- **O_1:** Assessment of pre-test knowledge
- **X:** Structured Teaching Programme (Intervention)
- **O_2:** Assessment of post-test knowledge

Setting of the Study

The study was conducted in **selected hospitals of Bikaner, Rajasthan**.

Population

The target population comprised **staff nurses working in Intensive Care Units (ICU) and medical-surgical units**.

Sample Size

The study included **100 staff nurses**.

Sampling Technique

A **non-probability convenient sampling technique** was used to select participants who met the inclusion criteria and were available during data collection.

Data Collection Tool

The tool used for data collection consisted of two sections:

- **Section A:** Demographic variables (age, gender, qualification, clinical experience, work area, previous training, etc.)
- **Section B:** Structured knowledge questionnaire regarding prevention of Ventilator-Associated Pneumonia (VAP)

Content of Structured Teaching Programme

The Structured Teaching Programme was developed based on standard infection control guidelines and evidence-based nursing practices. The content included:

- Definition and causes of Ventilator-Associated Pneumonia
- Risk factors associated with VAP
- VAP prevention bundle
- Hand hygiene and infection control measures
- Oral care and aseptic suctioning techniques
- Positioning and airway care
- Monitoring, assessment, and documentation

Teaching methods used:

Lecture method, group discussion, and visual aids were used to facilitate effective learning and participation.

Data Collection Procedure

Pre-test knowledge was assessed using a structured questionnaire before the intervention. The Structured Teaching Programme was then administered to the participants. Post-test assessment was conducted after completion of the programme to evaluate improvement in knowledge.

Data Analysis Plan

Data were analyzed using descriptive and inferential statistics:

Descriptive Statistics

- Frequency and percentage

- Mean and standard deviation

Inferential Statistics

- **Paired t-test:** To compare pre-test and post-test knowledge scores
- **Chi-square test:** To determine association between pre-test knowledge scores and selected demographic variables

Ethical Considerations

- Permission obtained from hospital authorities.
- Informed consent obtained from participants.
- Confidentiality and anonymity maintained throughout the study.

Results

Data obtained from 100 staff nurses were analyzed using descriptive and inferential statistics to evaluate the effectiveness of the Structured Teaching Programme (STP) on knowledge regarding prevention of Ventilator-Associated Pneumonia (VAP).

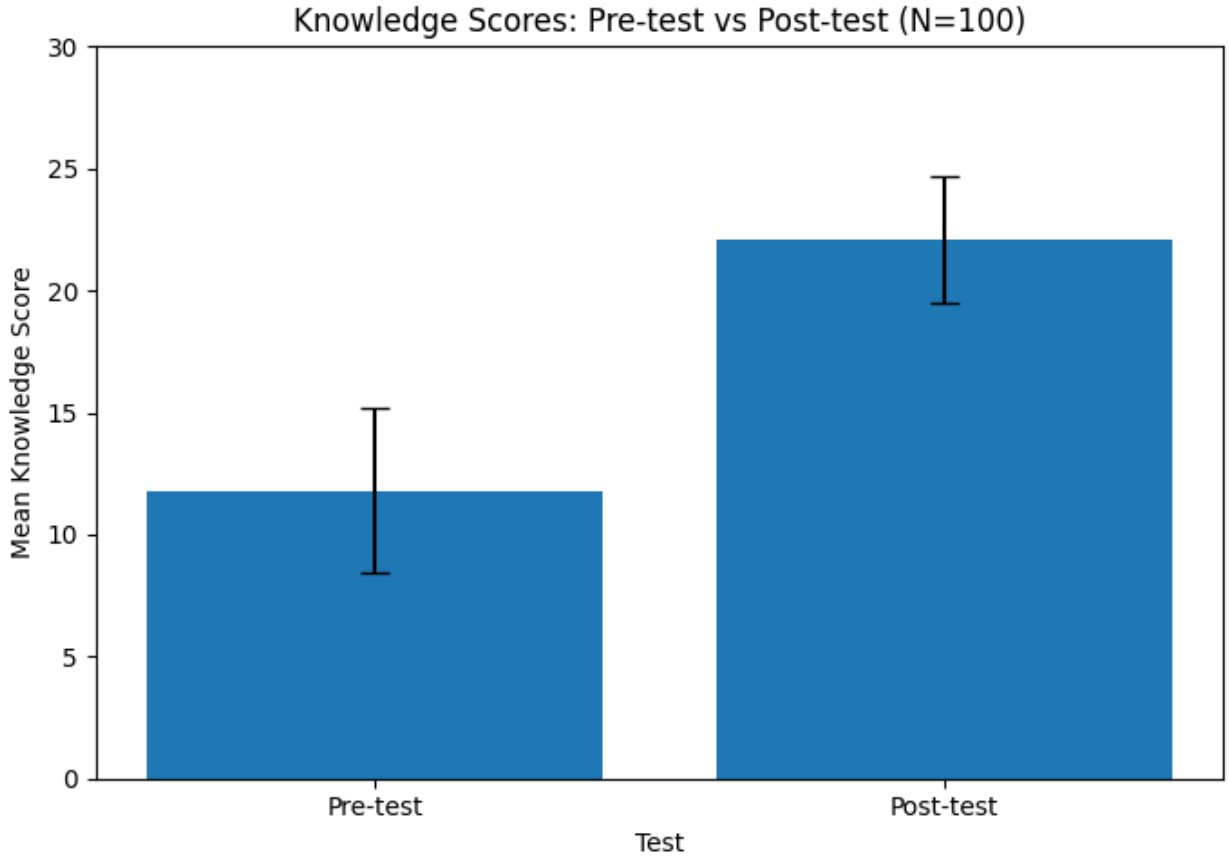
1. Knowledge Scores (Pre-test and Post-test)

The comparison of mean knowledge scores showed improvement after administration of the Structured Teaching Programme.

Table 1: Comparison of Pre-test and Post-test Knowledge Scores (N = 100)

Knowledge Score	Mean	Standard Deviation (SD)
Pre-test	11.8	3.4
Post-test	22.1	2.6

Interpretation:
The post-test mean score (22.1 ± 2.6) was higher than the pre-test mean score (11.8 ± 3.4), indicating improvement in knowledge regarding prevention of Ventilator-Associated Pneumonia among staff nurses after the intervention.



2. Effectiveness of Structured Teaching Programme

The effectiveness of the Structured Teaching Programme was assessed using the paired *t*-test.

Table 2: Effectiveness of Structured Teaching Programme (Paired t-test) (N = 100)

Mean Difference	Paired t-value	p-value	Interpretation
10.3	19.12	<0.05	Significant

Interpretation:
The calculated paired *t*-value (19.12) was statistically significant at $p < 0.05$, indicating that the Structured Teaching Programme was effective in improving nurses' knowledge regarding prevention of Ventilator-Associated Pneumonia.

3. Association Between Knowledge Scores and Demographic Variables

Chi-square analysis was used to determine the association between pre-test knowledge scores and selected demographic variables.

Table 3: Association Between Pre-test Knowledge Scores and Demographic Variables

Demographic Variable	Significance
Educational Qualification	Significant
ICU Clinical Experience	Significant
Age	Not Significant
Gender	Not Significant

Interpretation:'
Significant association was found between knowledge scores and educational qualification and ICU clinical experience. No significant association was found with age or gender.

Summary of Results

- Knowledge scores improved significantly after administration of the Structured Teaching Programme.
- The intervention showed statistical effectiveness ($p < 0.05$).
- Educational qualification and ICU clinical experience influenced knowledge levels.
- Age and gender showed no significant association with knowledge.

Conclusion

The study concluded that structured teaching significantly improved knowledge regarding prevention of ventilator-associated pneumonia among staff nurses. Regular educational programmes can enhance nursing competency and reduce hospital-acquired infections.

Implications for Nursing Practice

- Adoption of VAP prevention protocols in ICUs.
- Regular in-service training programmes.
- Monitoring of infection control practices.

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