

An Examination of Hand Hygiene Compliance during Bundle of Care Interventions among Healthcare Professionals in the ICU of a Tertiary Care Hospital

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Abstract:

Background: Ensuring the highest standards of patient care within an Intensive Care Unit (ICU) is of paramount importance in modern healthcare. Hand hygiene plays a pivotal role in preventing infections, making it crucial to understand healthcare professionals' compliance with hand hygiene protocols during bundle of care interventions. The aim of this research is to investigate and evaluate the extent to which healthcare professionals are adhering to the prescribed hand hygiene protocols as part of their bundle of care interventions.

Methods: This study assessed compliance with the ventilator-associated bundle, with a focus on hand hygiene, among 110 ICU nursing professionals in a tertiary care hospital. A quantitative evaluative approach was used, employing a pre-experimental research design with a one-group pre- and post-test design. Data were collected through observations and analyzed using descriptive statistics.

Results: The majority of participants were female (89.3%) and held senior staff nurse positions (77.1%), with 88.6% having over 5 years of professional experience. Compliance with hand hygiene during clean and sterile procedures was 100%, but hand washing after specific patient contacts showed room for improvement. Compliance with endotracheal tube suctioning practices was generally positive, with some areas needing enhancement. Monitoring cuff pressure demonstrated potential areas for improvement.

Conclusion: This study examines ICU nurses' hand hygiene and endotracheal tube suctioning compliance. Positive practices were seen, however patient safety requires ongoing education and support. These findings influence hospital policies and global initiatives to improve ICU care and infection control.

Recommendations: Healthcare providers should prioritise critical care professional training. Hand cleanliness, aseptic procedures, and separate suction catheters should be prioritized. Compliance monitoring and feedback methods should be implemented to maintain excellent patient care standards.

Keywords: Compliance, Hand Hygiene, Critical Care, Ventilator-Associated Bundle, Healthcare-Associated Infections.

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Introduction

Ensuring the highest standards of patient care within an Intensive Care Unit (ICU) is of paramount importance in modern healthcare. In the quest to minimize healthcare-associated infections and improve patient outcomes, the concept of care bundles has gained significant attention. One such bundle, the ventilator-associated bundle, consists of a set of evidence-based practices aimed at reducing the risk of ventilator-associated pneumonia (VAP) among critically ill patients [1]. A crucial component of

these bundles is strict adherence to hand hygiene protocols, which has been proven to play a pivotal role in preventing infections. Understanding the compliance of healthcare professionals with hand hygiene practices during bundle of care interventions is critical, as it directly impacts patient safety and the prevention of VAP [2]. This study aims to provide valuable insights into the current state of compliance among ICU nursing professionals, identifying potential areas for improvement, and

ultimately contributing to the enhancement of patient care standards. The findings of this research will not only inform hospital policies but also serve as a reference point for healthcare institutions worldwide striving to enhance their infection prevention measures and elevate the quality of care provided to critically ill patients in the ICU. This study focuses on the assessment of nursing professionals' compliance with the ventilator-associated bundle, particularly emphasizing hand hygiene practices, within the challenging and high-stress environment of the ICU in a tertiary care hospital. The aim of this research is to investigate and evaluate the extent to which healthcare professionals are adhering to the prescribed hand hygiene protocols as part of their bundle of care interventions.

Methodology

Study Design: The study adopts a quantitative evaluative approach, specifically using a pre-experimental research design with a one-group pre- and post-test design.

Study Setting: The research was conducted at Lord Buddha Koshi Medical College & Hospital during 2023.

Participant: The study sample comprises 110 registered staff nurses employed in the Medical ICU who met the predetermined inclusion and exclusion criteria.

Inclusion Criteria: Participants in the study were healthcare professionals actively working in a Medical ICU and possessing either a degree or diploma in nursing.

Exclusion Criteria: Excluded from the study were healthcare professionals with less than 6 months of clinical experience and those who declined to participate.

Limitations

Several limitations are acknowledged in this study:

- The sample size is limited to 110 subjects, which may affect generalizability to the entire critical care unit staff.
- Data collection is confined solely to the Medical ICU, excluding other specialized ICUs.
- The focus is exclusively on the Ventilator-Associated Pneumonia (VAP) bundle, omitting consideration of the Central Line-Associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), and Surgical Site Infection (SSI) bundles.

Development of Data Collection Instrument: The research tool was devised by the investigator in accordance with the study's objectives and after consulting with experts in the fields of nursing and medicine. It was also informed by a comprehensive review of relevant literature.

Reliability: To ensure the reliability of the instrument, a pilot study was conducted across all three shifts. The intra-class correlation coefficient for consistency was computed as follows:

- Handwashing: 0.85
- Endotracheal suctioning: 0.90
- Cuff pressure monitoring: 0.96

These results indicate a high degree of consistency in the practices of staff nurses working in the critical care unit.

Data Collection Procedure: Prior to data collection, informed written consent was obtained from all participating individuals. Baseline demographic and professional data were collected, and observations were conducted using checklists developed by the investigator. These observations took place during the morning (7 am to 12pm), afternoon (1 pm to 4 pm), and night (8 pm to 11 pm) shifts, with the participation of both the researcher and an experienced respiratory therapist.

Statistical Analysis: The data analysis involved several key components: descriptive statistics, including frequency, mean, and standard deviation, were used for basic data summarization.

Ethical Considerations: The research proposal underwent review by the Institutional Ethical Committee, obtaining ethical clearance before proceeding with data collection. Informed consent was obtained from all study participants, emphasizing the voluntary nature of participation and ensuring the anonymity and confidentiality of their responses.

Result

The study included a total of 110 participants, among whom the majority was female (89.3%). Furthermore, 77.1% of the participants held senior staff nurse positions, and 88.6% had more than 5 years of professional experience. In terms of experience in the critical care unit, 67.1% had less than 3 years of experience, and 65.7% were assigned to care for two patients per shift.

In terms of handwashing compliance, throughout clean and sterile procedures across all three shifts, all 110 participants (100%) followed the recommended handwashing practices. But during the morning shift, only 35.7% of workers cleaned their hands after coming into contact with arterial lines, catheters, or wound care. 67.1% of participants throughout all shifts reported using alcohol rub before to, during, and following procedures. In 24.3% of cases across all shifts, handwashing was observed following interaction with inanimate objects surrounding the patient, such as bed rails or ventilators. Handwashing after glove removal was performed by 24.3% during the morning shift and 27.1% during the evening and night shifts.

In terms of compliance with endotracheal tube suctioning, 50% of participants adhered to handwashing and wearing gloves before suctioning, while 42.9% prepared the required sterile equipment during all three shifts. For every shift, 42.9% of participants kept the endotracheal tube cuff at a suitable pressure. 40% of participants throughout all shifts carefully inserted the catheter into the ET tube using aseptic methods before suctioning. 37% of subjects reported using different suction catheters for oral suctioning over all shifts. All 110 participants (100%) documented their procedures and washed

their hands after suctioning. Merely 5.7% of participants ensured that their cuff pressure was monitored prior to suctioning during night and evening shifts. During all three shifts, 90% of participants monitored the cuff pressure within the range of 20 to 30 cm H₂O. 8.6% of workers checked the cuff pressure after suctioning in the morning, and 10% in the evening and at night. During the evening and night shifts, 25.7% of the workers checked the cuff pressure every six hours. After suctioning, all 110 participants (100%) cleaned their hands and recorded the process.

Table 1: Result summary

Variables	Categories/Statistics
Demographic and Professional Variables	
Female	89.3%
Senior Staff Nurse	77.1%
Years of Professional Experience	> 5 years (88.6%)
Years of Experience in Critical Care Unit	< 3 years (67.1%)
Number of Patients per Shift	Two Patients (65.7%)
Compliance with Handwashing	
Handwashing during Clean and Sterile Procedures	100%
Handwashing after Contact with Arterial Line, Catheters, or Wound Care (Morning Shift)	35.7%
Alcohol Rub Usage before, during, and after Procedures	67.1% (All Shifts)
Handwashing after Contact with Inanimate Objects near the Patient (Ventilator, Bed Rail)	24.3% (All Shifts)
Handwashing after Glove Removal (Morning Shift)	24.3%
Handwashing after Glove Removal (Evening and Night Shifts)	27.1%
Compliance with Endotracheal Tube Suctioning	
Handwashing and Wearing Gloves before Suctioning	50%
Preparation of Sterile Equipment before Suctioning	42.9% (All Shifts)
Maintenance of Adequate Pressure in Endotracheal Tube Cuff	42.9% (All Shifts)
Aseptic Technique for Catheter Insertion before Suctioning	40% (All Shifts)
Use of Separate Suction Catheters for Oral Suctioning	37% (All Shifts)
Documentation and Handwashing after Suctioning	100%

The mean and standard deviation for endotracheal suctioning, cuff pressure monitoring, and handwashing were calculated for each of the three shifts throughout the statistical analysis. The mean and standard deviation for handwashing were 0.32 and 0.19 in the morning, 0.31 and 0.12 in the evening, and 0.31 and 0.15 in the night shift, respectively.

Discussion

The study aimed to assess compliance with critical care procedures, specifically handwashing and endotracheal tube suctioning, among healthcare professionals in a critical care unit. The results revealed several key findings. Firstly, the majority of participants were female, and a significant percentage held senior staff nurse positions. Moreover, most participants had extensive professional experience, with over five years in the field [3]. In terms of handwashing compliance, all participants exhibited adherence to proper handwashing techniques during clean and sterile procedures, which is a

positive outcome. However, during the morning shift, there was less compliance with handwashing after coming into touch with arterial lines, catheters, or wound care, which emphasizes the need for improvement in this area. Across all shifts, the usage of alcohol rub before, during, and after procedures was comparatively high [4]. However, there was still potential for improvement when it came to handwashing following contact with inanimate objects close to the patient, like bed rails or ventilators, as well as following glove removal.

For endotracheal tube suctioning, participants generally followed recommended practices, with notable compliance rates in terms of handwashing and wearing gloves before suctioning, preparation of sterile equipment, and maintaining adequate pressure in the endotracheal tube cuff. However, there was room for improvement in the aseptic technique for catheter insertion and the use of separate suction catheters for oral suctioning [5]. Overall, doc-

umentation and handwashing after suctioning were consistently followed.

The high compliance observed in handwashing during clean and sterile procedures indicates the awareness and commitment of healthcare professionals to patient safety. However, the lower compliance rates in certain aspects of hand hygiene, such as handwashing after contact with specific medical devices and inanimate objects, suggest potential areas for focused training and reinforcement [6]. Factors like heavy workload and time constraints may influence these compliance rates, highlighting the importance of continued education and support for healthcare professionals.

In the case of endotracheal tube suctioning, compliance was generally positive, indicating that critical care professionals understand the significance of maintaining aseptic conditions during this procedure. Nevertheless, the need for improved aseptic techniques and the use of separate suction catheters for oral suctioning should not be overlooked, as they contribute to reducing the risk of infections, particularly ventilator-associated pneumonia (VAP) [7].

Similar studies have reported findings consistent with the results. For example, compliance rates with hand hygiene practices among healthcare professionals have been shown to vary based on the specific aspect of handwashing observed [8]. Factors such as workload, staff education, and the availability of resources have been cited as influential in compliance levels, echoing the findings of this study [9].

Moreover, studies examining compliance with endotracheal tube suctioning procedures have also revealed variable adherence to recommended practices [10]. These findings emphasize the importance of ongoing education and monitoring to maintain high compliance rates and reduce the risk of healthcare-associated infections.

Conclusion

This study sheds light on the compliance of healthcare professionals with critical care procedures related to hand hygiene and endotracheal tube suctioning. While several positive practices were observed, areas for improvement were identified, highlighting the need for continued education, training, and support to enhance patient safety in critical care units. These findings contribute to the body of knowledge in infection prevention and patient care and provide valuable insights for healthcare institutions aiming to improve compliance with essential procedures.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore,

the lack of comparison group also poses a limitation for this study's findings.

Recommendations: Healthcare institutions should prioritize ongoing education and training for healthcare professionals in critical care units. Emphasis should be placed on hand hygiene protocols, aseptic techniques, and the use of separate suction catheters.

Regular monitoring of compliance and feedback mechanisms should be established to sustain high standards of patient care.

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List of abbreviations

ICU - Intensive Care Unit

VAP - Ventilator-Associated Pneumonia

CLABSI - Central Line-Associated Bloodstream Infection

CAUTI - Catheter-Associated Urinary Tract Infection

SSI - Surgical Site Infection

GEE - Generalized Estimating Equation

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