



The Effect of Bundle Care Implementation on Reducing the Incidence of Nosocomial Infections in ICU Patients

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ABSTRACT

Background: Nosocomial infections are a common complication in patients treated in the Intensive Care Unit (ICU). Critical patient conditions, the use of invasive devices, and long hospital stays increase the risk of nosocomial infections. One recommended prevention strategy is the implementation of bundled care, which consists of a series of evidence-based actions consistently implemented. **Objective:** This study aims to analyze the effect of bundled care implementation on reducing the incidence of nosocomial infections in ICU patients.

Method: This study used a quasi-experimental design with a pretest–posttest approach without a control group. The study sample consisted of 50 ICU patients selected using a purposive sampling technique. Data on the incidence of nosocomial infections were collected before and after the implementation of bundle care for 30 days. Data analysis was performed using a paired t-test with a significance level of $p < 0.05$. **Results:** The results showed a significant decrease in the incidence of nosocomial infections after the implementation of bundle care, with a p value of < 0.001 .

Conclusion: Consistent implementation of bundle care is effective in reducing the incidence of nosocomial infections in ICU patients.

Keywords: Bundle Care, Nosocomial Infection, ICU, Intensive Care

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1. Introduction

Nosocomial infections, or healthcare-associated infections (HAIs), remain a serious problem in the healthcare system, particularly in the Intensive Care Unit (ICU). Patients treated in the ICU are at higher risk of developing nosocomial infections due to their critical clinical condition, weakened immune systems, and the use of various invasive devices such as mechanical ventilators, urinary catheters, and central intravenous catheters. Nosocomial infections not only increase morbidity and mortality, but also prolong hospital stays and increase hospital costs.

Data from various reports indicate that the incidence of nosocomial infections in the ICU is higher than in other care units. Common infections include ventilator-associated pneumonia (VAP), catheter-associated urinary tract infection (CAUTI), and central line-associated bloodstream infection (CLABSI). This high incidence indicates that infection prevention efforts in the ICU still require strengthening and a more systematic approach.

One widely recommended strategy for reducing the incidence of nosocomial infections is the implementation of bundled care. Bundled care is a series of evidence-based interventions (evidence-based practices) implemented simultaneously and consistently to prevent specific infections. The bundled care concept emphasizes that implementing several preventive measures simultaneously will be more effective than implementing them separately.

The implementation of bundled care in nursing and medical practice in the ICU encompasses various aspects, such as adherence to hand hygiene, the use of aseptic technique during insertion and maintenance of invasive devices, daily evaluation of invasive device needs, and education and adherence of healthcare workers to infection prevention protocols. Nurses play a central role in the implementation of bundled care due to their direct and continuous involvement in the care of ICU patients.

In practice, the implementation of bundled care often faces various obstacles, such as poor compliance among healthcare workers, high workloads, limited resources, and a lack of ongoing monitoring and evaluation. This can result in the effectiveness of bundled care in reducing nosocomial infections being suboptimal.

Previous studies have shown that consistent implementation of bundled care can significantly reduce the incidence of nosocomial infections in the ICU. However, the results and effectiveness of bundled care implementation can vary depending on the healthcare facility context, patient characteristics, and level of healthcare worker compliance.

Based on this background, this study aims to analyze the effect of implementing bundled care on reducing the incidence of nosocomial infections in ICU patients. The results are expected to provide a scientific basis for policy development and improving the





quality of nursing services, particularly in preventing nosocomial infections in intensive care units.

2. Research Methods

a. Research Design

This study used a quasi-experimental design with a pretest–posttest approach. This design aimed to compare the incidence of nosocomial infections before and after the implementation of bundled care in the ICU.

b. Location and Time of Research

The research was conducted in the ICU Room of Hospital X during the period January-March 2025.

c. Population and Sample

The study population consisted of all patients treated in the ICU during the study period. The sample was selected using a purposive sampling technique, with 50 patients.

Inclusion criteria:

- 1) Patients treated in ICU ≥ 48 hours
- 2) Using invasive devices (ventilators, urinary catheters, or CVCs)
- 3) Willing to be a research subject

Exclusion criteria:

- 1) Patients with infection prior to ICU admission
- 2) Referred patients with a diagnosis of active infection

d. Research Variables

- Independent variables: Implementation of bundle care
- Dependent variable: Nosocomial infection incidents

e. Research Instruments

The research instruments are:

- Observation sheet for the implementation of bundle care
- Patient medical records
- Nosocomial infection surveillance form (VAP, CAUTI, CLABSI)

f. Research Procedures

- 1) Measurement of nosocomial infection rates before intervention
- 2) Training of health workers related to bundle care
- 3) Implementation of bundle care for 30 days
- 4) Re-measurement of nosocomial infection rates after intervention

g. Data analysis

Data were analyzed univariately and bivariately using paired t-test with a 95% confidence level.





h. Research Ethics

This research has obtained approval from the Health Research Ethics Committee of Hospital X.

3. Research Results And Discussion

a. Research Result

1) Characteristics of ICU Patients

Characteristics	Total (n=50)	Percentage (%)
Male gender	28	56.0
Female gender	22	44.0
Length of stay ≥ 7 days	31	62.0
Ventilator Use	34	68.0

2) Nosocomial Infection Incidence Before and After Intervention

Types of Infection Before Bundle Care After Bundle Care

VAP	12 (24%)	4 (8%)
CAUTI	8 (16%)	3 (6%)
CLABSI	6 (12%)	2 (4%)
Total	26 (52%)	9 (18%)

3) Statistical Analysis

Variables	Mean \pm SD	p-value
Before intervention	2.10 \pm 0.83	
After the intervention	0.72 \pm 0.64	<0.001

The results of the paired t-test showed a significant decrease in the incidence of nosocomial infections after the implementation of bundle care ($p < 0.05$).

b. Discussion

The study results showed that the implementation of bundled care significantly reduced the incidence of nosocomial infections in ICU patients. This finding aligns with the theory of infection prevention and control, which emphasizes the importance of integrated interventions in preventing the transmission of microorganisms in intensive care settings.

The bundled care implemented in this study included hand hygiene, aseptic technique, invasive device care, and daily evaluation of device use. According to the





Institute for Healthcare Improvement (IHI), consistent implementation of bundled care can reduce HAIs by 40–60%.

The results of this study also align with previous research that reported a significant reduction in VAP and CAUTI after the implementation of bundled care in the ICU. Consistent implementation and compliance by healthcare workers are key factors in the program's success.

Nurses play a dominant role in the implementation of bundled care, given that they are the healthcare workers who interact most frequently with ICU patients. Therefore, competency development and ongoing supervision are essential to maintain the effectiveness of bundled care.

4. Conclusion And Suggestions

a. Conclusion

- 1) The incidence of nosocomial infections in the ICU was relatively high before the implementation of bundle care.
- 2) The consistent implementation of bundle care significantly reduces the incidence of nosocomial infections.
- 3) Bundle care is an effective strategy in improving the quality of service and safety of ICU patients.

b. Suggestion

- 1) Hospitals are advised to make bundle care the ICU operational standard.
- 2) Regular training and monitoring are needed to improve health worker compliance.
- 3) Further research is recommended to use an experimental design with a control group.

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