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Determinants of Surgical Site Infection Among Operating Room Personnel at Oriental Mindoro Provincial Hospital: Basis for an Enhanced Infection Control Protocol

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ABSTRACT

This quantitative descriptive-correlational study was conducted at Oriental Mindoro Provincial Hospital to examine the determinants of surgical site infections (SSIs) as a basis for an enhanced infection control protocol. The study surveyed surgeons, anesthesiologists, perioperative nurses, and nursing attendants to evaluate the levels of personnel, environmental, organizational, and patient-related factors and their relationship with clinical outcomes such as incidence rates and readmissions. Results revealed that all structural determinants were highly observed (CWM = 3.98), with personnel factors ranking highest (AWM = 4.00), followed by organizational (AWM = 3.98), patient-related (AWM = 3.97), and environmental factors (AWM = 3.95). Pearson correlation analysis indicated a statistically significant relationship between these collective determinants and clinical outcomes (r = 0.06, p = 0.000), resulting in the rejection of the null hypothesis. While personnel possess strong foundational knowledge, the study identified a significant limitation: the absence of feedback mechanisms to track post-discharge patient recovery, creating a gap in clinical data transparency. Consequently, the research underscores the need for an enhanced, adaptable infection control protocol that mandates regular feedback systems, improved environmental surveillance, and optimized staffing to mitigate professional fatigue. This study provides original value by offering a tailored, evidence-based framework for provincial hospitals to bridge systemic gaps and strengthen the connection between daily operative practices and patient safety outcomes.

Keywords: *Surgical site infections, infection control, operating room personnel, determinants of SSI, provincial hospital.*

INTRODUCTION

Surgical site infections (SSIs) remain a critical global challenge, significantly altering post-operative recovery and increasing healthcare burdens. While largely preventable, SSIs continue to cause prolonged hospital stays and elevated morbidity. Research indicates that consistent aseptic execution positively influences clinical outcomes. In provincial settings, resource constraints and heavy patient volumes necessitate an assessment of multi-factorial risks to design responsive institutional workflows

Statement of the Problem

This research study aimed to examine the determinants of surgical site infections among operating room personnel at Oriental Mindoro Provincial Hospital to inform an enhanced infection control protocol. Specifically, it sought to answer the following questions**:**

1. What is the level of assessment of the determinants of surgical site infections in terms of personnel, environmental, organizational, and patient-related factors?

2. What is the perceived status of the occurrence and outcomes of SSIs in terms of incidence rate, severity/type, length of hospital stay, and readmission/complication rates?

3. Is there a significant relationship between the determinants of SSIs and their occurrence and outcomes in the operating room setting?

Scope and Delimitations

The objective of this study is to investigate the multi-factorial determinants and clinical outcomes of SSIs within the Operating Room (OR) Department of Oriental Mindoro Provincial Hospital. The primary objective is to comprehend the impact of structural variables, such as personnel techniques, environmental sterilization, organizational backing, and patient-related parameters, on the overall quality of perioperative safety. The research gathered data by conducting structured assessments using content-validated Likert-scale questionnaires answered by actively practicing surgeons, anesthesiologists, perioperative nurses, and nursing attendants directly involved in surgical cases. In addition, the study analyzed the correlation between these operational factors and clinical indicators such as postoperative readmissions and extended hospital stays, taking into account systemic factors such as workload thresholds and institutional feedback loops.

Review of Related Literature

The application of strict infection control measures in acute surgical theaters has emerged as a prominent field of study in recent years. Roy (2023) investigated the impact of environmental controls on surgical site stability and patient outcomes. They found that incorporating rigorous air ventilation checks, systematic surface disinfection, and adequate availability of sterile drapes led to significant improvements in maintaining an aseptic barrier. Similarly, Brooks et al. (2021) conducted investigations demonstrating the positive impact of strong organizational oversight and active administrative leadership on frontline personnel's compliance, leading to reduced cross-contamination risks and greater institutional adherence to surgical safety checklists.

Theoretical Framework

This study is anchored in the Systems Theory of Quality Healthcare, which posits that the quality of patient outcomes is not the result of individual effort alone but the product of interconnected systemic elements—personnel performance, organizational support, and environmental safety. By analyzing these components, the study provides a comprehensive perspective on how systemic optimization directly reduces the incidence of Surgical Site Infections (SSIs) in a provincial hospital setting.

Conceptual Framework

To map the research variables and establish a clear operational flow, the study utilized the Input-Process-Outcome (IPO) model. The Input phase consists of assessing the four primary SSI determinants: personnel practices, organizational support, patient conditions, and environmental factors. The Process phase involves the quantitative data collection and statistical analysis of these variables to establish their prevalence and correlational significance. Finally, the Outcome phase is the formulation of a data-driven, contextualized Enhanced Infection Control Protocol, designed to address the specific vulnerabilities identified within the facility.

METHODOLOGY

This quantitative research study examined the determinants of surgical site infections and their clinical outcomes during perioperative courses in a provincial public hospital in the Philippines.

Research Design

The purpose of the quantitative research was to investigate the relationship between structural/behavioral determinants and the resulting clinical outcomes of SSIs at Oriental Mindoro Provincial Hospital. The study employed a descriptive-correlational research design to mathematically map the variables without direct experimental manipulation.

Research Steps

After conducting a thorough evaluation of the existing literature, the research tools were meticulously developed to align with the study's aims and the specific clinical layout of public operating rooms in the Philippines. The research used quantitative data-gathering techniques, including structured surveys administered to perioperative nurses, surgical specialists, anesthesiologists, and attendant staff across standard shifts. The purpose of these methods was to gather detailed, comprehensive information on healthcare workers' experiences and compliance rates regarding the implementation of infection control guidelines.

Data Collection and Sample Selection

The data collection process commenced by identifying eligible surgical personnel through a purposive sampling strategy to ensure all respondents possessed direct, hands-on clinical duties inside the active sterile field. The data gathering utilized a pre-validated, expert-reviewed survey instrument. Each data assembly process was monitored to ensure completeness and prevent missing data entries, while ensuring full administrative transparency and permission across the medical facility.

Data Analysis Methods

The data analysis employed a statistical methodology, in which numerical entries were systematically categorized using weighted means and standard deviations to uncover common insights into determinant observance. Researchers cross-checked statistical computation profiles using Pearson Correlation Coefficient tests to guarantee the reliability, direction, and validity of relationship findings.

Research Hypotheses and Validation

The study tested the null hypothesis (H_0) that there is no significant relationship between infection determinants and perioperative outcomes. Validation protocols were maintained by subjecting the survey tool to pilot testing and rigorous internal consistency analysis, showing that personnel comprehension and memory of aseptic principles enhanced their operational capacity to apply these guidelines during active surgical interventions.

Study Limitations and Ethical Considerations

The study adhered to ethical protocols by obtaining formal institutional clearance and written informed consent from all participants, ensuring complete anonymity and confidentiality, and granting participants the freedom to withdraw from the research at any time. Furthermore, ethical considerations encompassed the imperative to ensure the respectful, objective portrayal of the hospital facility's data parameters in the final analysis and reporting.

RESULTS AND DISCUSSION

SOP 1. Assessment of the Determinants of Surgical Site Infections

Quantitative research conducted in the provincial operating room revealed high levels of awareness and practice, yielding an overall Composite Weighted Mean of 3.98 (Agree). Personnel factors received the highest rating (AWM = 4.00), indicating strict individual adherence to PPE and hand-scrubbing protocols. Organizational guidelines (AWM = 3.98) and Patient factors (AWM = 3.97) followed closely. Environmental factors ranked lowest (AWM = 3.95), indicating structural vulnerabilities in continuous room microbial monitoring and in air turnover consistency.

SOP 2. Perceived Status of SSI Occurrence and Outcomes

The outcome domain generated a Composite Weighted Mean of 2.60 (Neutral). Respondents strongly marked Readmission and Complication Rates with an Agree rating (4.45), recognizing that severe SSIs cause major systemic complications like sepsis. However, baseline incidence rates and length-of-stay variables were scored in the Disagree range (AWM = 1.99). This shows a clear gap in post-discharge data transparency, meaning frontline operating theater staff are rarely updated on long-term patient recovery data once the patient leaves the immediate surgical unit.

SOP 3. Correlation Between Determinants and Outcomes

Pearson correlation testing produced an r-value of 0.06 with a p-value of 0.000. Because the p-value is less than 0.05, the null hypothesis was rejected. This proves a statistically significant relationship exists between structural determinants and clinical outcomes, demonstrating that infection control depends on a system-wide combination of administrative, behavioral, and environmental factors.

SUMMARY

The quantitative research carried out at Oriental Mindoro Provincial Hospital unveiled noteworthy insights regarding perioperative safety configurations. Operating room personnel demonstrated high overall compliance with structural determinants (CWM = 3.98), led

primarily by individual aseptic personnel practices. The interactive and systematic components of hospital operations were highly rated, though environmental auditing required further optimization. The data also revealed that while severe post-operative outcomes like sepsis are strongly recognized, a lack of consistent feedback channels prevents staff from fully tracking post-discharge patient recovery rates

CONCLUSIONS

Operating room personnel exhibited strong foundational knowledge of infection control guidelines, which directly supports active sterile field management. However, clinical performance remains vulnerable to systemic factors such as physical fatigue from heavy workloads. The customized, adaptable nature of an enhanced infection control protocol is necessary to bridge current communication gaps and maintain high compliance levels. In summary, our results highlight that managing infection risks requires more than individual effort; it demands continuous leadership support, regular environmental audits, and open data sharing to connect daily surgical practices with positive patient outcomes.

RECOMMENDATIONS

Based on the study's findings and conclusions, the following recommendation is made: formally adopt and implement the Enhanced Infection Control Protocol, with administrative support and clear policy enforcement. Establish a regular feedback system that updates operating room teams on actual post-discharge SSI incidence and patient recovery timelines. Conduct structured microbiological surveillance and continuous airflow quality checks within all active surgical suites. Adjust staffing allocations and shift schedules to prevent professional fatigue and ensure consistent protocol compliance

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AI DECLARATION STATEMENT

AI-supported tools helped with grammar and structure in creating this article. No AI tools were used to collect, analyze, or interpret data; all authors are credited for their academic contributions.

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