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Original Article

Knowledge and Practices of Nurses Regarding Aseptic Techniques for Infection Prevention in Operating Room at Tertiary Care Hospital

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ABSTRACT

Background: Surgical site infections (SSIs) remain a significant concern in operating rooms, largely influenced by the adherence to aseptic techniques by healthcare professionals. Despite the critical role of operating room nurses in preventing these infections, gaps in knowledge and practice persist, affecting the overall quality of patient care in tertiary healthcare settings.

Objective: This study aimed to assess the knowledge and practices of operating room nurses regarding aseptic techniques for infection prevention in tertiary care hospitals.

Methods: A descriptive cross-sectional study was conducted at a tertiary care hospital in Lahore, involving 130 operating room nurses with over a year of service. The study employed purposive sampling to administer a validated questionnaire assessing demographic data, knowledge, and practices related to aseptic techniques. Data were collected from January to March 2023 and analyzed using SPSS version 25, employing descriptive and inferential statistics to explore the relationship between demographic factors and knowledge/practices of aseptic techniques.

Results: The study found that 60% of nurses were aware that a gown is considered sterile in specified areas, and 54.6% understood the contamination risks of dropped sterile packages. Approximately 62.3% recognized the importance of maintaining a safe distance during procedures. Despite these knowledge indicators, 94% of nurses routinely practiced sterile techniques, and 91% adhered to proper handwashing protocols. However, the overall level of knowledge concerning aseptic techniques was low, with significant gaps that could potentially impact patient safety.

Conclusion: The study highlights a discrepancy between the knowledge and practices of operating room nurses regarding aseptic techniques, indicating a critical need for enhanced training and continuous education to bridge these gaps and improve infection control measures in surgical settings.

Keywords: Aseptic Techniques, Surgical Site Infections, Operating Room Nurses, Infection Control, Tertiary Healthcare, Nurse Education, Sterile Practices.

INTRODUCTION

Surgical site infections (SSIs) pose a significant challenge within perioperative care, often manifesting either superficially, affecting only the skin, or more severely impacting organs, tissues beneath the skin, or implanted materials. These infections are a major cause of prolonged hospital stays and increased patient mortality, with almost 1.7 million individuals admitted annually for treatment related to healthcare-associated infections, which result in over 98,000 deaths (1). The primary source of these infections is typically poor sterilization practices in hospital settings. Sterilization, a critical process in healthcare facilities, involves the use of physical or chemical means to eliminate all microbial life, and healthcare providers, especially nurses, play a crucial role in the effective application of these sterilization procedures (2).

The importance of maintaining sterile environments in operating rooms cannot be overstated, with the cleanliness of the surroundings and surgical instruments being paramount. The Association of Surgical Technologies (AST) emphasizes the sterile field's

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purity as the most crucial factor during pre-, intra-, and postoperative phases (3). Operating room (OR) nurses are instrumental in this process, responsible for a variety of tasks including managing the temperature, airflow, and movement within the OR, as well as preparing and positioning surgical trays and back tables. These activities are essential for preventing SSIs and ensuring patient safety (3, 4).

Aseptic techniques are vital for reducing unnecessary surgical complications. The World Health Organization estimated that inadequate aseptic practices contribute to between 4.5 to 5.7 billion cases of SSIs globally each year (5). OR nurses are at the forefront of infection control, tasked with the interpretation and implementation of advanced professional standards to maintain aseptic conditions. Despite their training and educational background, there are still ongoing challenges in consistently applying aseptic techniques in clinical settings, leading to persistent SSIs (6). Moreover, a lack of familiarity with Centers for Disease Control and Prevention (CDC) guidelines, inadequate understanding of preventive indications, and the risks of germ transmission are significant barriers that OR nurses face in their practice (7).

Florence Nightingale's foundational work during the Crimean War highlighted the crucial link between nursing practices and infection control, demonstrating that improved sanitary conditions significantly reduced death rates. Today, the use of proper gowns, masks, and gloves during pre-operative procedures continues to be a critical step in SSI prevention (8). The CDC estimates that annually, SSIs occur in 500,000 cases, contributing to 3% of surgical mortalities, with the costs of extended hospital stays and medical interventions further burdening the healthcare system (8). European and American studies indicate high rates of SSIs and significant antibiotic resistance among pathogens isolated from infected surgical wounds (9, 10).

In light of these challenges, this study aims to assess the knowledge and practices of OR nurses regarding aseptic techniques to prevent infections in surgical settings. The findings are expected to provide critical insights into the effectiveness of current practices and identify potential areas for improvement in nurse training and procedural compliance, thus contributing to the broader goals of reducing SSIs and enhancing patient care outcomes.

MATERIAL AND METHODS

The study employed a descriptive cross-sectional design to evaluate the knowledge and practices of operating room nurses regarding aseptic techniques at a tertiary care hospital. The target population consisted of nurses who had been working in operating rooms for more than one year. A sample size of 130 was determined using the Slovin formula to ensure the representativeness of the sample.

Purposive sampling was utilized to select participants, focusing on nurses who met the inclusion criteria. Data collection was conducted over a period of three months, from January to March 2023. An adopted questionnaire, previously validated by experts in infection control and nursing practices, was used to gather data. The questionnaire was divided into three sections: demographic data, knowledge about aseptic techniques, and practices related to aseptic techniques. Ethical approval for the study was granted by the Institutional Review Board in accordance with the Declaration of Helsinki, ensuring that all participants were fully informed about the study's purpose and procedures and provided written informed consent before participation (11-13).

Data was collected by distributing the questionnaire to eligible nurses within the operating rooms. The completed questionnaires were then collected and coded for analysis. Statistical analysis was conducted using SPSS version 25. Descriptive statistics were used to summarize demographic data and responses to knowledge and practice questions. Inferential statistics, including chi-square tests, were applied to explore the relationships between demographic variables and levels of knowledge and practice regarding aseptic techniques (6, 14).

RESULTS

The demographic breakdown of the participants in the study revealed a varied age distribution among the 130 operating room nurses who took part. Most of the nurses fell within the younger age brackets, with 51 individuals (39.2%) aged between 27 and 31 years and 47 (36.2%) between the ages of 22 and 26 (Table 1). Those aged 32 to 36 years and above 36 years accounted for smaller proportions, 13.1% and 11.5% respectively. In terms of gender, the majority of participants were female, making up 73.8% of the sample, while males represented 26.2%. Marital status was almost evenly split with 53.8% married and 46.2% single.

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Table 1: Demographic Characteristics

Variable	Frequency (%)
Age	
22-26	47 (36.2%)
27-31	51 (39.2%)
32-36	17 (13.1%)
Above 36	15 (11.5%)
Gender	
Male	34 (26.2%)
Female	96 (73.8%)
Marital Status	
Single	60 (46.2%)
Married	70 (53.8%)
Qualification	
Diploma in General Nursing	41 (31.5%)
Post RN	47 (36.2%)
BSN Generic	42 (32.3%)
Duration of Working Experience	
1-5 years	47 (36.2%)
6-10 years	49 (37.7%)
11-15 years	25 (19.2%)
Above 15 years	9 (6.9%)
Formal Training on Sterilize Technique	
Yes	80 (61.5%)
No	50 (38.5%)

Table 2: Percentile Score Reflecting Nurses' Knowledge on Aseptic Techniques

Level of Knowledge	Frequency	Percentage
Low knowledge	48	36.9%
Moderate knowledge	41	31.5%
High knowledge	41	31.5%

Table 3: Percentile Score Reflecting Nurses' Practice on Aseptic Techniques

Level of Practice	Frequency	Percentage
Good	86	66.2%
Bad	44	33.8%

Educational qualifications among the nurses varied: 41 participants (31.5%) held a Diploma in General Nursing, 47 (36.2%) had completed a Post RN program, and 42 (32.3%) had a BSN Generic degree. The experience levels in the operating room also showed a diverse range, with 47 nurses (36.2%) having 1-5 years of experience, 49 (37.7%) with 6-10 years, 25 (19.2%) with 11-15 years, and a smaller group of 9 (6.9%) possessing over 15 years of experience. Notably, 61.5% of the nurses had formal training in sterilization techniques, while 38.5% did not receive such training (Table 1).

Regarding the nurses' knowledge about aseptic techniques, the results indicated a relatively even distribution across different knowledge levels. The study found that 48 nurses (36.9%) had low knowledge, while 41 (31.5%) displayed moderate knowledge, and another 41 (31.5%) demonstrated high knowledge of aseptic techniques (Table 2). This suggests that there is a significant portion of the staff that could benefit from enhanced training and education on these critical practices.

The practice levels of aseptic techniques among the nurses showed more positive results, with a majority, 86 nurses (66.2%), classified as having good practice levels. However, there remains a considerable number, 44 (33.8%), whose practices were deemed inadequate (Table 3). This underscores the ongoing need for regular training and assessments to ensure that all operating room nurses adhere to the best practices for infection prevention and control.

The cross-referenced data from Tables 1, 2, and 3 provides a comprehensive picture of the current state of knowledge and practices among operating room nurses at the tertiary care hospital, highlighting areas where targeted interventions could improve outcomes related to aseptic techniques and ultimately reduce the incidence of surgical site infections.

DISCUSSION

The study aimed to assess the knowledge and practices of operating room nurses regarding aseptic techniques for infection prevention at tertiary healthcare hospitals in Lahore. Employing a descriptive cross-sectional design, the research utilized descriptive statistics and frequency distribution, checking data normality due to its nominal nature. Findings revealed that 60% of the participants were aware that a gown is considered sterile from the chest to the level of the sterile field and from 5 cm above the elbows to the cuffs of the sleeves. Additionally, 54.6% of the nurses understood that a sterile package is considered contaminated if dropped from the woven surface. Notably, nearly half of the respondents knew that during a surgical procedure, turning back-to-back (360 degrees) while passing another sterile team member reduces the risk of gown contamination, as the back of the gown is considered unsterile. Furthermore, 62.3% of the nurses recognized that maintaining a minimum distance of 30 cm between sterile and unsterile personnel is crucial to prevent contamination (15).

These findings align with a previous study, which highlighted poor knowledge among nurses concerning asepsis principles (16). Despite this, the practical application of sterile techniques was commendably high, with 94% of respondents practicing sterile techniques during every procedure and 82.2% checking the material before use. A significant 91% maintained hand hygiene by keeping their hands above the elbow during surgical hand washing to prevent contamination—a practice supported by Nsekambabaye's 2017 study, which found a 61.3% adherence rate to high-level sterile techniques among nurses (13).

The study concluded that while the majority of nurses demonstrated good practical application of sterile techniques, their knowledge level was relatively low. This disparity underscores the need for enhanced educational and training programs to elevate nurses' understanding of aseptic techniques, thereby ensuring safer surgical environments and reducing post-operative wound infections (17). The limitations of the study include its cross-sectional design and the small sample size, which may restrict the generalizability of the findings. Additionally, focusing solely on operating room nurses might overlook the contributions of other theatre staff, who also play crucial roles in maintaining aseptic conditions (18-20).

Recommendations for future research include conducting empirical studies to further explore the knowledge and practices of aseptic techniques among broader healthcare teams within surgical settings. Such studies should aim to include a variety of theatre staff to comprehensively address the challenges and opportunities in preventing surgical site infections. These efforts could lead to more targeted and effective interventions, enhancing overall patient safety and care quality in operating rooms (4, 13).

CONCLUSION

The study revealed that while operating room nurses generally practice good sterile techniques, there is a notable gap in their knowledge about aseptic procedures, emphasizing the need for improved educational and training programs. Enhancing nurses' understanding of these techniques is crucial for ensuring the safety of surgical patients and reducing the incidence of post-operative infections. Addressing this educational gap could lead to more effective infection control practices in healthcare settings, ultimately improving patient outcomes and minimizing healthcare-associated costs and complications.

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