

Assessment of Nurses' Knowledge and Practice Regarding Surgical Site Infection Prevention and Influencing Factors

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Abstract: Surgical site infections (SSIs) are among the most common healthcare-associated infections and are largely preventable. Nurses play a crucial role in perioperative care, and their knowledge and practices significantly influence SSI prevention. However, in developing countries like Pakistan, compliance with evidence-based infection control measures remains a challenge. **Objective:** To assess the knowledge and practices of nurses regarding surgical site infection (SSI) prevention and identify factors affecting their compliance. **Methods:** This cross-sectional study was conducted in the Department of Nursing at Nishtar Hospital, Multan, from March 2024 to March 2025. A total of 100 nurses involved in postoperative patient care in surgical wards and outpatient departments were selected through non-probability sampling. Data were collected using a structured questionnaire consisting of 12 multiple-choice knowledge questions based on international infection control guidelines, and 12 practice-based Likert-scale items (1 = never, 3 = always). Data were analyzed using SPSS version 25. Logistic regression was applied to identify factors associated with good knowledge and practice, with odds ratios (OR) and 95% confidence intervals (CI) calculated. A p-value < 0.05 was considered statistically significant. **Results:** The mean knowledge score among participants was 6.23 ± 1.5 . Overall, 40 nurses (40%) demonstrated good knowledge (95% CI: 35.2–44.5). Male nurses were significantly more likely to have good knowledge (OR: 3.18; 95% CI: 2.12–5.01), as were nurses with ≥ 5 years of experience and prior SSI training (OR: 1.89; 95% CI: 1.33–3.01). Conversely, lack of training was associated with reduced knowledge (OR: 1.76; 95% CI: 1.08–2.88). Regarding practice, 47 nurses (47%) demonstrated good compliance with SSI prevention measures (95% CI: 42.5–52.3). Female nurses (OR: 2.42; 95% CI: 1.61–3.47), those aged ≥ 30 years (OR: 1.81; 95% CI: 1.12–3.03), and diploma holders (OR: 2.30; 95% CI: 1.12–4.83) were significantly more likely to exhibit good practices compared to their counterparts. **Conclusion:** The findings reveal suboptimal knowledge and practices among nurses regarding SSI prevention. Structured training programs, continuous professional development, and reinforcement of updated evidence-based guidelines are essential to improve infection control practices and surgical outcomes in Pakistani hospitals.

Keywords: Infection, SSIs, Surgical Site Infection

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Introduction

Hospital-borne infections are a global health hazard that expose millions of patients to risk of morbidity and mortality annually. The risk of infection is 5% in developed countries, which is significantly increased in developing countries, like Pakistan (1, 2). Surgical site infections, accounting for more than 30% hospital associated infections, is the most common infections in admitted patients (3).

The incidence of surgical site infection is associated with immunocompromised systems, age, smoking, malnutrition, hypoxia, length of hospital stays, and metabolic diseases. According to research, the rate of SSIs in Pakistan is 9.3%-33.6% (4). Secondary factors including surgical scrubs and drains, antiseptics, prophylactic antibiotics, improper sterilization, preoperative shaving and skin preparation and dressings can also be a reason for SSIs.

Studies show that the knowledge and practices of nurses heavily affect the patient safety and the prevalence of surgical site infections. Nurses' work experience, qualification, training, workload and ignorance towards standard guidelines impact their knowledge and practices (5, 6). This study aimed to assess the knowledge and practices for surgical site infection prevention and factors affecting compliance.

Methodology

A cross-sectional evaluation was conducted in the Department of Nursing of Nishtar Hospital, Multan from March 2024 to March 2025. A total of 100 nurses involved in postoperative care of patients in surgical and

outpatient departments were included in the study. Nurses with less than 1 year's experience at the hospital were excluded. Informed consent was obtained from all participants. The Ethical Review Board approved the study.

The primary outcomes were knowledge and practice of nurses for mitigation risk of SSIs in patients. Sociodemographic factors including age, gender, qualification, work experience, relevant training and marital status, and work place factors including use of antiseptics, prophylactic antibiotics and personal safety equipment, were independent parameters. Data was collected through questionnaire for knowledge and practice. Knowledge was assessed by 12 open-ended questions among which only one answer could be selected. The statements were standard guidelines and recommendation about infection control including the correct way of preoperative skin preparation, time of antibiotic administration, dressing techniques etc. Practice was assessed by 12 statements that could be answered on a Likert scale from 1 to 3 with 1 being never and 3 being always.

Data was evaluated by Epi Info 3.5.3 and SPSS 20. Descriptive analysis was done to present data. Bivariate analysis was performed, and factors with $p \leq 0.2$ were further analysis in multivariate logistic analysis. The correlation between dependent and independent factors was expressed by odds ratio and a 95% confidence interval. Statistical significance was set at $p \leq 0.05$.



Results

A total of 100 nurses were included in the study among which 82 (92%) were females. The mean age was 26 years, with the most participants (80%) were younger than 30 years. 88 (88%) had a bachelor's degree and 3 (3%) had a master's degree. 55 (55%) were unmarried, and 70 (70%) had a work experience of 5 years or more. The sociodemographic information of nurses is shown in Table I.

The mean knowledge score was 6.23 ± 1.5 with 40 (40%) nurses with a good knowledge level (95% CI: 35.2-44.5). It was significantly associated with age, experience, gender and training of SSIs prevention in the bivariate analysis but only age did not remain a significant predictor in multivariate analysis. Male nurses (OR: 3.18 (95% CI: 2.12-5.01) and nurses with 5 years or more experience and SSI prevention training (OR: 1.89 (95% CI:1.33-3.01)) were twice more knowledge as compared to females, nurses with less experience and nurses with no prior training (OR: 1.76 (95% CI:1.08-2.88)). Table II shows factors impacting the knowledge score of nurses.

47 (47%) nurses had good practices to prevent the risk of surgical site infections(95% CI: 42.5-52.3). It was significantly associated with age, experience, gender, qualification and training of SSIs prevention in the bivariate analysis but only age, gender, and qualification remained significant in multivariate analysis. Female nurses (OR: 2.42 (95% CI:1.61-3.47)), nurses aged 30 years or older (OR: 1.81 (1.12-3.03)) and those with diploma (OR:2.30 (95% CI: 1.12-4.83)) were twice more likely to have good practices as compared to males, younger nurses and nurses with bachelor's degree or higher (Table III).

Table 1: Sociodemographic data of Participants

Characteristics	N (%)
Age	
20-29	80 (80%)
≥30	20 (20%)
Gender	
Male	18 (18%)
Female	82 (82%)
Marital status	
Single	55 (55%)
Married	45 (45%)
Qualification	
Diploma	9 (9%)
Bachelors	88 (88%)
Masters	3 (3%)
Work experience	
<5 years	30 (30%)
≥ 5 years	70 (70%)
Department	
Surgical	38 (38%)
OBGYN	19 (19%)
Medical	20 (20%)
Pediatrics	12 (12%)
OPD	11 (11%)
Received infection prevention training	45 (45%)

Table 2: Predictors of Good Knowledge for Surgical Site Infection Prevention

	Good knowledge N (%)	Adjusted OR (95% CI)
Gender		
Male	9 (50%)	3.18 (2.12-5.01)
Female	22 (26.9%)	1
Age		
<30	31 (38.8%)	1
≥30	10 (50%)	1.81 (1.12-2.93)
Experience		
<5 years	11 (37%)	1
≥5 years	37 (52.9%)	1.76 (1.08-2.88)
Received infection training		
Yes	23 (51.2%)	1.89 (1.33-3.01)
No	18 (32.8%)	1

Table 3: Predictors of Good Practice for Surgical Site Infection Prevention

	Good practice N (%)	Adjusted OR (95% CI)
Gender		
Male	7 (39%)	1
Female	49 (59.8%)	2.42 (1.61-3.47)
Age		
<30	36 (45%)	1
≥30	12 (60%)	1.81 (1.12-3.03)
Experience		
<5 years	14 (46.7%)	
≥5 years	38 (54.3%)	NS
Received infection training		
Yes	24 (53.5%)	NS
No	25 (45.5%)	
Qualification		
Diploma	6 (66.7%)	2.30 (1.12-4.83)
Bachelors and above	43 (47.3%)	1

Discussion

This study was conducted to assess the knowledge and practice of nurses regarding prevention of surgical site infection and associated factors. The

results showed a poor rate of knowledge and practices. It is a cause of alarm for health care institutes as it is hazardous for patient safety. Our findings are, however similar to studies from developed countries (7, 8).

The mean knowledge score was 6.23 ± 1.5 with 40 (40%) nurses with good knowledge level which indicated below average knowledge in more than half nurses. Other studies have agreed with these results (9, 10). Sodhi et al also reported a 40% knowledge rate in nurses towards SSI prevention among which more than half of participants (66%) were most knowledgeable about general infections than surgical site infections (11). This implies that there is limited evidence-based knowledge specific about SSIs and related training.

The gender of nurses was significantly related to knowledge, where good knowledge score were two times more likely to have good knowledge score. The reason for that may be the higher educational level of male nurses i.e., bachelors and masters which indicates that higher education can lead to more knowledge than nurses with a diploma. Years of experience and training was also a strong predictor of knowledge, i.e. 5 years or more experience and infection prevention training had the twice likelihood of being knowledgeable. These results are in line with previous literature (12, 13).

47 (47%) nurses had good practices to prevent risk of surgical site infections (95% CI: 42.5-52.3). This is significantly lower than a study reporting 57% compliance rate; however, it is higher than a study reporting 38% infection control practices (14, 15). Age was an important determinant of practice, where older nurses had twice better practice than young nurses. Similarly, more year of practice also lead to perfection and compliance. Female nurses were better than males in practical knowledge, as compared basic knowledge where males were superior. Qualification specifically diploma holders were twice more likely to have good practices which may be due to the fact that this education is solely based on practice (16).

Conclusion

The knowledge and practice of nurses regarding surgical site infection prevention was low. There is a need to encourage nurses to gain additional training and stay updated on recent guidelines to improve outcomes.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMNCS-0388-24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

BI (Charge Nurse)

Manuscript drafting, Study Design,

Review of Literature, Data entry, Data analysis, and drafting article.

AA (Charge Nurse)

Conception of Study, Development of Research Methodology Design,

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Maki G, Zervos M. Health care-acquired infections in low-and middle-income countries and the role of infection prevention and control. Infectious disease clinics of North America. 2021;35(3):827.

2. Mustafa ZU, Khan AH, Salman M, Harun SN, Meyer JC, Godman B, et al. Healthcare-associated infections among neonates and children in Pakistan: findings and the implications from a point prevalence survey. Journal of Hospital Infection. 2023;141:142-151.
3. Gillespie BM, Harbeck E, Rattray M, Liang R, Walker R, Latimer S, et al. Worldwide incidence of surgical site infections in general surgical patients: a systematic review and meta-analysis of 488,594 patients. International Journal of Surgery. 2021;95:106136.
4. Collaborative P. PakSurg 1: Determining the epidemiology and risk factors of surgical site infections in Pakistan—a multicentre, prospective cohort study. BMJ open. 2023;13(7):e070831.
5. Wubneh CA, Mekonnen BD, Alemu TG, Techane MA, Assimamaw NT, Belay GM, et al. Knowledge, attitude, and practice of healthcare workers on infection prevention and control in Ethiopia: A systematic review and meta-analysis. Plos one. 2024;19(9):e0308348.
6. Tafere TZ, Belachew TB, Feleke DG, Adal GM. Assessment of knowledge and practice of nurses regarding infection prevention and associated factors at Debre Tabor Comprehensive Specialized Hospital, Northwest Ethiopia. Frontiers in Public Health. 2024;11:1225570.
7. Habtie TE, Feleke SF, Terefe AB, Alamaw AW, Abate MD. Nurses' knowledge and its determinants in surgical site infection prevention: A comprehensive systematic review and meta-analysis. PloS one. 2025;20(1):e0317887.
8. Sham F, Abdul Raji NA, Omar MF, Hasan Z, Patahorahman MK, Mohamed Sihat H, et al. Nurses' knowledge and practice towards the prevention of surgical site infection. International Journal of Service Management and Sustainability (IJSMS). 2021;6(1):1-20.
9. Ayamba EVE, Namondo LA, Ngeek ESN, Ngala E. Nurses' Knowledge and Practices on Surgical Site Infections in Sub-Saharan Africa: The Case of Buea Regional Hospital, South West Region in Cameroon. American Journal of Humanities and Social Sciences Research (AJHSSR). 2022;6(1):105-111.
10. Jaleta P, Adimasu M, Amentie M. Nurses knowledge, practice, and associated factors toward prevention of surgical site infection in Benishangul Gumuz hospitals Northwest Ethiopia 2021. Am J Lab Med. 2021;6(4):58-65.
11. Sodhi K, Arya M, Chanchalani G, Sinha V, Savio RD, Ak AK, et al. Comparison of knowledge and awareness of infection control practices among nurses in India: A cross-sectional survey. American Journal of Infection Control. 2022;50(12):1368-1373.
12. Shaheen SR, Hawash MAH. Assessment of Nurses' Knowledge and Practices Regarding Prevention of Surgical Site Infection. Egyptian Journal of Nursing and Health Sciences. 2021;2(2):176-197.
13. Samer EA, Ibrahim MM. Nurses' knowledge and practice regarding Bundle of care for prevention of Surgical site infection. Journal of Health Care Research. 2025;2(1):119-136.
14. Hassan AH, Masror-Roudsary D. Nurses' knowledge and practice regarding prevention of surgical site infection at governmental hospitals in Wasit City, Iraq 2022. Pakistan Journal of Medical & Health Sciences. 2023;17(01):581-581.
15. Naji Msc BA, Moussa AM. Nurses' Knowledge Regarding Prevention of Surgical Site Infections at Baghdad Cardiac Centers and Hospitals. Indian Journal of Forensic Medicine & Toxicology. 2020;14(2).
16. Mohammed Alsaadi I, Elfeshawy R. Nurse's Knowledge Regarding Prevention of Post-Operative Surgical Site Infection at AL-Hilla Teaching Hospital. Egyptian Journal of Health Care. 2024;15(2):1038-1047.



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