KNOWLEDGE AND PRACTICES OF NURSES REGARDING PREVENTION OF SURGICAL SITE INFECTIONS IN MEDICAL TEACHING INSTITUTES

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Abstract:

Objective: 1.To assesses the level of knowledge towards prevention of surgical site infection among Peshawar nurses. 2. To evaluate the level of practices towards prevention of surgical site prevention among Peshawar nurses.

Methods: A cross-sectional study was carried out in August 2024 which include nurses. A self-constructed questionnaire comprising 20 questions about nurses' knowledge and practices about the prevention of surgical site infections was disseminated to 84 nurses selected by convenience sampling. Data were inputted and analysed utilizing SPSS version 22. In descriptive statistics, frequencies and percentages were computed for categorical variables, whereas means and standard deviations were determined for continuous variables. The chi-square test was utilized to ascertain any significant relationship between the variables.

Results: The study included 84 nurses from surgical wards, with a 95% response rate. most were female (58%) and aged 20-30 years. Regarding infection control, 66% had never attended training. knowledge assessment revealed that 42.8% had poor knowledge (below 60%), 29.76% had average knowledge, 15.47% had good knowledge, and only 6.66% had excellent knowledge (above 80%). in practice, 61% had poor or average levels, 30% had good, and 9% had excellent practices. Hand hygiene compliance was moderate (57% always washed hands before and after touching the surgical site). only 57% knew about preoperative shaving, 48% correctly answered

dressing change frequency, and 25% identified the best disinfectant. a significant association (p = 0.002) was found between knowledge, practice, professional qualification, experience.

Conclusion: Based on the results of the survey, it was found that nurses had insufficient awareness regarding the risk of infections related with surgical procedures and the utilization of preventative measures. Despite this, a significant number of the participants were found to possess either strong or average competence in clinical practice. Moreover, the investigation discovered the fact that the vast majority of nurses had never participated in any infection control program or supplementary courses.

Introduction:

Health care workers (HCW) provide direct patient care within health care settings. They are essential in preventing surgical site infections. Surgical Site Infection (SSI) is directly associated with surgical procedures and represents a significant preventable healthcare-associated infection (HCAI). SSI indicates significant repercussions, potentially encompassing loss of a body part, septicaemia, elevated treatment costs, and prolonged hospital stays. The mortality rate of patients with SSIs is higher than that of those without SSIs.[1, 2] In general surgery, an infection at the surgical site is considered to have occurred within the 30 days after the procedure if no implant was placed, or within the 1 year after the procedure if an implant was placed and the infection appears to be associated with the operation.[3]

Globally, the occurrence of SSI is not easy to assess, because the diagnostic standardized criteria may not be fallowed everywhere. It was claimed in the conclusions of a survey that was supported by the World Health Organization that the prevalence of infections connected with health care was between 3 and 21 percent, and the prevalence of wound infections was between 5 and 34 percent. An investigation into the knowledge and practices of nurses in Ethiopia with regard to surgical site infections (SSIs) was carried out within the month of August in the year 2024. The study revealed that those nurses who have attended any infection control program and

having an experience of more than 5 years were more knowledgeable as compared to less experience and never attended any infection control training program. The study also identified that only 48% of the professional nurses have good practices of infection control.4 Another study in Ethiopia among obstetric patients revealed that the overall SSI rate was 11.4% among 770 post-operative women[5] .

Literature has pointed out that some intrinsic factors such as old age, metabolic diseases, malnutrition, cigarette smoking, overweight; immune-suppression, hypoxia and the time of hospitalization augment SSIs[2]. Furthermore, some extrinsic factors, such as skin antiseptic use, antibiotic prophylaxis, preoperative shaving and skin preparation, insufficient sterilization of surgical instruments, surgical hand scrubbing, surgical drain care, and wound dressing practices, were among the most frequently reported risk factors. A study conducted in August 2024 in various surgical units of Khyber Teaching Hospital found that the total SSI rate was 9.29%. The rate of SSIs was 4.88% in clean cases, 8.39% in contaminated cases, and much higher in unclean cases (20.45%). The greatest computed rate of SSI was in gastrointestinal surgery (13.51%), followed by hepatobiliary surgeries (12.28%) and genitourinary procedures (9.30%). The rate of infections was substantially related with combined morbidity compared to those without co-morbidities [6].

Nurses are closely engaged with providing care around the clock. They are in a good position for taking initiatives for providing quality care to the patients and ensuring their safety. The provision of quality care enhances the patients' safety and prevents the SSIs.[7] Many studies indicate that a significant number of nurses involved in patient care lack adequate education regarding surgical site infections (SSIs) and do not adhere to evidence-based guidelines and recommendations in their practice[8,9].

Problem Statement:

Different studies are conducted on Knowledge and Practices of Health Care Workers regarding SSIs. Almost all of the conducted studies have shown that either one or more factors among knowledge and practice towards SSIs are not up to the recommended quality. Therefore, there is a consistent risk of acquiring serious infections for all post-surgical. According to our review of articles about SSIs, limited studies has explored the knowledge and practice of nurses in Pakistan especially in KPK. So, there is an immense need to explore the knowledge and practices of nurses regarding SSIs in Pakistan.

Purpose and Research Questions:

The aim of this study was to investigate nurses' knowledge and practices about surgical site infections in two tertiary care hospitals in Peshawar, Khyber Pakhtunkhwa. The research questions developed for this study are:

1) What is the knowledge level of nurses regarding surgical site infections?

2) What is the practice level of nurses regarding the prevention of surgical site infections?

Objectives of the Study:

1. To evaluate the knowledge level regarding the prevention of surgical site infections among nurses in Peshawar.

2. To assess the practices related to the prevention of surgical site infections among nurses in Peshawar.

Significance of the Study:

This study seems to propose recommendations for hospital infection control management to implement necessary actions in the event of insufficient information or deficiencies in nurses' practices about the prevention of surgical site infections. Enhancing their knowledge and practices on the prevention and post-operative management of patients would minimise the risk of post-operative infections.

Rationale of the Study:

Multiple studies showed that nurses had insufficient knowledge of surgical site infections. There is a limited body of published research in the Pakistani context, particularly in Khyber Pakhtunkhwa, concerning nurses' knowledge and practices related to surgical site infections. Previous studies concentrated on the overall population of health care workers. There is a significant necessity to investigate the knowledge and practices of nurses concerning SSIs in Peshawar, Khyber Pakhtunkhwa.

Operational Definition:

Knowledge: It is a way of achieving novel information or practices.

Practice: The use of knowledge along with psychomotor skills resulting in an action is termed as Practice.

Nurse: A person who is registered with Pakistan Nursing Council (PNC) and working in a tertiary care hospital to care for the patient with surgical wounds.

Surgical Site Infection: Infection in the surgical wounds within 30 post operative days.

Literature Review:

Surgical site infection is a healthcare-associated infection characterised by the emergence of a wound infection within 7 to 10 days post-operation, potentially ranging from spontaneous wound discharge to serious postoperative complications such as sternal sepsis following open-heart surgery. Surgical site infections mostly result from contamination of an incision by healthcare personnel or the patient's own flora in the operating theatre during surgery.[1] About 500,000 individuals each year are affected by surgical site infections, which is 3% of the total number of patients affected by healthcare-associated illnesses. It has the potential to greatly impact the quality of life for those affected. They pose a significant threat of morbidity, which can lengthen hospital stays and add to financial strain.[2]

Surgical site infections constitute a significant risk factor for surgical patients. The incidence of surgical site infections (SSIs) among surgical patients is estimated to be between 2% and 5%, affecting over 30 million individuals undergoing surgical operations, and representing 14% to 16% of all hospital-acquired infections annually in the United States. The rate of readmission is fivefold greater in patients who acquire surgical site infections, with 60% of these individuals necessitating care in Intensive Care Units. Furthermore, evidence indicates that individuals with multidrug-resistant illnesses experience poorer outcomes.[3]

Despite the significant detriment to surgical patients, most healthcare workers (HCWs) are inadequately informed on the transmission of surgical site infections. A study conducted at Fuji Foundation Hospital in Rawalpindi, involving 300 healthcare workers, predominantly nurses, revealed inadequate practices concerning healthcare-associated infections. Specifically, 47% of participants wore gloves while attending to patients, and 133 (44%) did not adhere strictly to aseptic techniques when managing post-operative surgical wounds, indicating substandard practices among healthcare workers.[4]

Good understanding and practices of nurses on SSIs prevention and management might help to lower the spread of contagious diseases. Preventing surgical site infections depends much on the

expertise and techniques of nurses. More over half of the survey participants in August 2024 in many surgical departments of the public hospital Ethiopia showed had a poor level of practice. Regarding the prevention of SSI, significant correlation was discovered with the educational levels, experience, and application of the accessible infection prevention strategies by nurses. Furthermore noted as influencing the nurses' practice for prevention of SSIs were inadequate knowledge, limited resources to apply surgical safety checklists, poor performance monitoring systems, absence of surgical site preparation before surgical procedure.[10]

A main concern in Pakistan, infectious diseases cause morbidity and early death for many different reasons. In August 2024 Ethiopia, a cross-sectional study was conducted to assess the policies and related elements about surgery site infections among nurses. According to the poll, more than half of the nurses showed insufficient SSIs. Moreover, the results of the study link the growing frequency of SSIs with insufficient knowledge, limited resources, ineffective regular monitoring systems, and staff shortage.[11]

METHODOLOGY:

Research Design and Study Population

This research was conducted in August 2024 among nurses at two public tertiary care hospitals with a total number of 120 nurses. The descriptive cross sectional design was used for the study. The selection of this design also helped to be carried out in a limited time.12 Moreover, the purpose of the study is only exploration of selected variables. The study participants was those nurses who are directly involved in direct care of pre and post-operative surgical patients.

Sampling:

A non-probability convenience sampling method was employed to recruit study participants. Subjects are chosen based on their convenient accessibility to the researcher. Four A sample size of n=84 was determined using Raosoft software, with a margin of error of 5% and a confidence interval of 95%, based on a population size of 120. Nurses who met the inclusion criteria were included in the study. The study included registered nurses with a minimum of one year of experience, employed in surgical units of the selected hospital, who were available during data collection and consented to participate voluntarily. The study population excluded nurses who were not directly involved in patient care, such as managerial staff.

Data Collection Tool:

A validated, adopted closed-ended questionnaire was disseminated to nurses (copy attached in Appendix 1). The enquiries are categorised into three principal sections. Part A comprises the general section of the questionnaire, encompassing demographic information, training courses, and workplace experience. Part B focused on the knowledge segment. The questions were to assess the respondents' understanding of SSI prevention. Section C pertained to practice questions. The data were gathered from all participants who met the inclusion criteria. Approval was secured from the hospital authority, including the Nursing Directors and Head Nurses of the relevant wards (see attachment 2 for copy). Informed consent was obtained from each participant in various surgical wards after a brief explanation of the study's goal and their rights. SPSS version 22.0 was utilised for data analysis. The findings were presented through bar and pie charts, along with a detailed discussion. Descriptive statistics and charts were employed to present the study's results. In the descriptive analysis, the mean and standard deviation were calculated for numerical variables, while frequencies and percentages were determined for categorical variables. Associations evaluated by independent samples t-test.

Results:

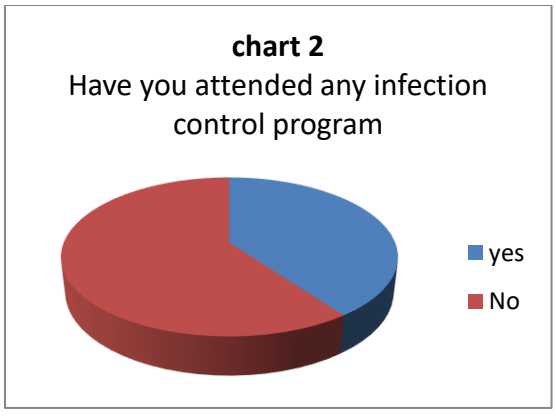
The chosen hospitals employed a total of 122 nurses in surgical wards, with 84 nurses actively participating in this study, resulting in a response rate of 95%. 58% of the participants identified as female, while 42% identified as male. The predominant age group of the nurses was between 20 and 30 years. Of the participants, 59% held a three-year nursing diploma, 37% possessed a BSN or post-RN degree, and 6% had obtained a master's degree, as illustrated in Table 1.

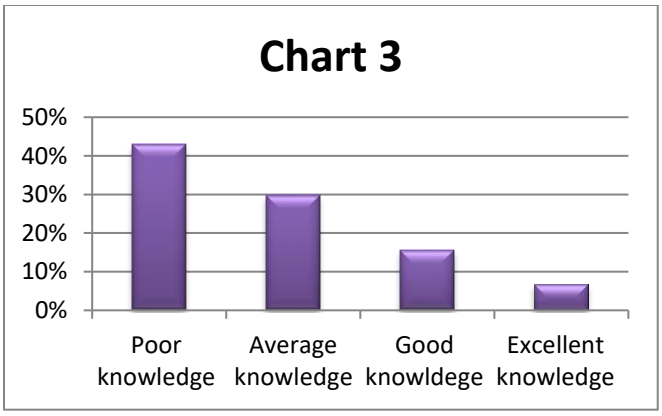
Table 1

Qualification Professional				
	Frequency	Percent	Valid Percent	Cumulative Percent
Diploma	48	55.8	55.8	36.0
BSN or Post RN	31	36.0	36.0	91.9
Master	6	7.0	7.0	98.8
Total	86	100.0	100.0	

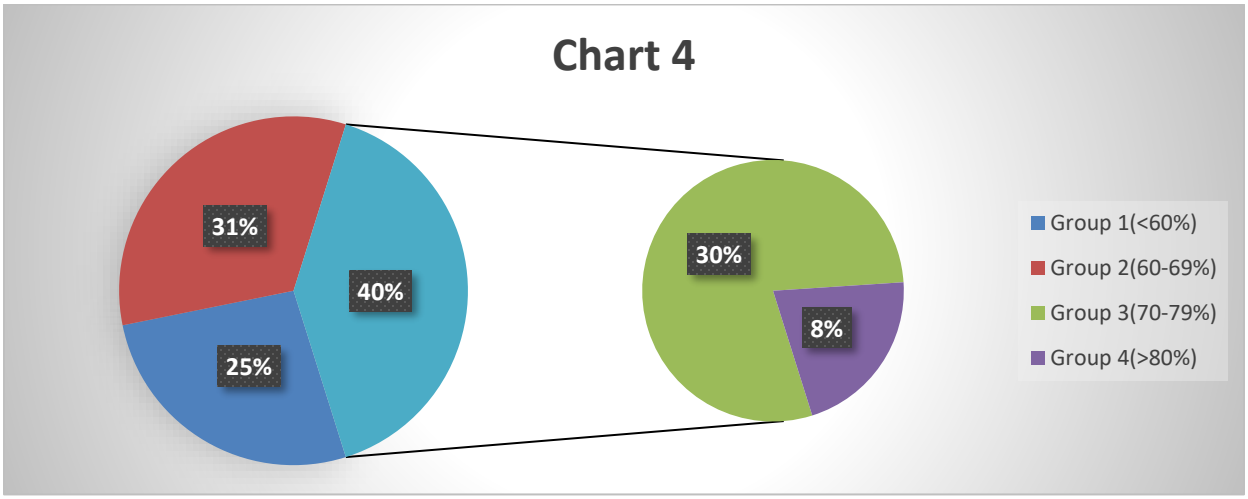
The participants were from different surgical departments like general surgeries wards, orthopedic surgeries, and ENT wards. By inquiring about total professional experience in nursing field, 18% have experience of more than 5 years, 22% of the participants have experience of 1 to 2 years and 38% have experience 2 to 3 years while 23% of the participants have experience of 3 to 5 years as shown in chart 1.

Both hospitals maintained appropriate infection control manuals and offered refresher courses; however, a significant percentage of nurses (66%) had not attended any infection control training, as illustrated in chart 2. This study indicated that a significant portion of the nurses (42.8%) demonstrated a poor level of knowledge, with total knowledge scores falling below 60%. The study's findings indicated that 29.76% of the nurses possessed average knowledge, while 15.47% demonstrated good knowledge, and only 6.66% of the participants achieved excellent knowledge regarding surgical site infection, as reflected by scores above 80% on the questionnaire's arbitrary scale, illustrated in chart 3.





While 30% had well and only 9% of the investigated participants had excellent practices regarding surgical site infections management which was above 80% score according to arbitrary scale on a questionnaire, the practices of Nurses regarding SSI (61%) had poor or average practice levels regarding SSI.



When asked if they regularly cleaned their hands before and after coming into contact with the surgical site, 57% of respondents said they did so, while 43% said they did so occasionally. In the knowledge section, 33% of nurses said they did not understand shaving techniques, while 57% of respondents said they were familiar with pre-operative shaving. Furthermore, only 48% of nurses correctly answered a question about how frequently they change surgical dressings. Only 21 out of 84 participants correctly answered the question about the best disinfectant solution to reduce the incidence of SSIs; the other participants did not. 52% of respondents correctly assessed the surgical site infection, whereas 48% gave incorrect answers. According to the participants' answers to knowledge questions, their comprehension of surgical site infections was mediocre. In addition, the participants' answers to a number of questions in the questionnaire's practical section. Most participants agreed that handwashing is essential before putting on surgical gloves; 48 (58%) said they wash their hands before putting on gloves, compared to 42% who said they don't. According to participant responses, only 43 people

regularly shaved their heads before surgery, while 41% did not. According to the study, nurses' knowledge of SSI was average, and their practice was judged good based on an arbitrary scale. As the figure shows, their total knowledge fell between 60% and 80%. The association between nurses' knowledge and practices and their gender, training status, work experience, and professional qualifications was investigated using an independent t-test. With a p-value of 0.002, it was concluded that only the connection was significant.

Discussion

Among the several complications in the health care system, one of the worst ones is surgical site infection; common type of nosocomial infection comes second.[13] Using evidence-based guidelines has been calculated to prevent around 60% of SSIs.[13,14]

As frontline carers using a multi-disciplinary approach, health care system nurses significantly help to prevent surgical site infection.By applying surgical safety and infection control checklists both pre- and intra-operatively as well as correct post-operative surgical wound care techniques, nurses can prevent SSIs.[15] Around-the-clock patient care is given by nurses, who also closely contact surgical patients and handle their wounds. Should the nurses possess the necessary knowledge and skills about surgical site infections, they can enhance discharge planning and help to lower patient and healthcare cost.[12,16, 16] .Therefore, the prevention of SSIs by the healthcare professional is entirely dependent on two main components: knowledge and practice of the infection control strategies.[4]

According to the results of the current study, most of the nurses—42%—had inadequate knowledge about SSIs. The study also revealed that just 16.6% of the nurses had well and only 7% of the investigated participants had excellent knowledge; 29% of the nurses had an average

knowledge level. In the scale, the outstanding knowledge cut point was above 80%. Comparably, two public hospitals in Buraidah City, Saudi Arabia, King Fahad Specialist Hospital (KFSH) and Buraidah Central Hospital (BCH) carried out studies in August 2024. The study findings exposed inadequate HCA knowledge and practices in both of the hospitals. Furthermore, a strong correlation was found between master's degree holders and being more experienced by matching infection control knowledge with education level. On the other hand, in both hospitals, participants' knowledge practices proved to be excellent.[17] .Regarding knowledge and practices degrees, the study result is consistent with present ones.

In August 2024, Fuji Foundation Hospital conducted another study to evaluate the knowledge and practices gap among medical professionals. According to the study's results, 64% of respondents said their knowledge came from books instead of appropriate refresher control training. Given their approaches to infection control, the general degree of knowledge was reasonable. Furthermore enquiring about standard infection control procedures, only 47% of the participants visited the patients wearing surgical gloves.Eighteen In present research, 68% of the participants were washing hands before and after contacting a patient while 58% of them always wore gloves during surgical operations. Unlike the present study, which revealed that 66% of study participants never received any refresher courses or training regarding infection control which may also indicate that the chosen hospitals have poor clinical nursing education system, they also noted that 87% of the respondent denied the availability of infection control guidelines and refresher courses for SSIs. This discrepancy could be related to the nature of the participants—more than one type of health care professionals were used in the August 2024 Fauji Foundation Hospital; in the current study the participants were only nurses. This suggests that, in the current study, nurses are rather more practice orientated, but they also deal with

issues of resource constraints and the absence of appropriate training programs in the chosen hospital particularly for nurse on surgical site infections..

Furthermore another correlation cross-sectional study on nurses in Mayo Hospital and Lady Willington Hospital Lahore in 2017 was carried out in August 2024. Of the 87% of nurses who knew nothing about the pre-operative shaving technique, 78% responded incorrectly, and a question about skin pre-operative skin preparation 65.65% of the nurses knew agents. Of the nurses, 74.815% knew nothing about the recommended antiseptic solution for cleaning dressing trolley.19 Comparatively, knowledge component 57% of the current study was aware about the pre-operative shaving; 33% of nurses answered they do not know about shaving techniques. 48% of the nurses responded appropriately to a question on the changing of surgical dressing. Reaming participants responded don't know about the solutions; correspondingly, the response of the participants to another statement that what is the best disinfection solution to clean the surface of dressing trolley to reduce the incidence of SSIs in which only 21 out of 84 participants marked right answer. The results of our August 2024 research at Mayo Hospital almost match those of both hospitals since both lack a suitable training system and may be the result of education and experience rather than any other factor in resemblance of both study outcomes.

It is recommended that all healthcare professionals should be aware of risk associated with SSIs and its impacts on patient's health as a result of pre and post exposure to infections. A study was conducted in August 2024 in two tertiary care hospitals in Iran on knowledge, attitude and practices of nurses. The founded poor knowledge of 43%, 42% poor practice while 37% of the study participants had a moderate level of attitude toward surgical site infections. The study concluded low level of awareness in the hospital staff regarding hospital related infections and

the researcher's recommended training session to prevent surgical site infections.20 Nurses play an important role in the health care setup, especially in the preventions of SSIs, they need sufficient knowledge on infections control. Thus all nurses who are involved in care of surgical patients need improvements in their knowledge to reduce cost and length of stay after surgery in the hospital[21]. It is clearly understood that infection control guarantees patient within the hospital setting as well as on the community level. Searching the published literature in Pakistani hospitals accreditations and certifications on infection control is not yet recognized. It needs proper communicable diseases center, standard laboratory system and well organized pathogenic surveillance of infections. There are no standard institutional diploma or certification courses in nursing and even in medical colleges on infection control. As per the author knowledge, no course has been conducted in August 2024 by Pakistan nursing council and has yet to start such an opportunity for nurse[22,23] .

Limitation of the Study:

Major limitation of the study is the use of the self-administered questionnaire for assessing the knowledge and practices of nurses regarding SSIs. Beside the lack of direct observation, convenient sampling was also a limitation of the study.

Conclusion:

The survey revealed that knowledge of nurses about the risk of infections associated with surgeries and use of preventive measures was inadequate. But still high proportion of the participants has good or average skills in clinical practice. The study further highlighted that the majority of nurses never attended any infection control program or refresher course.

Recommendations:

Encouraging the implementation of safety measures and providing appropriate in-service training are crucial. To properly handle surgical wound care, a standing order procedure should be implemented in surgical wards and intensive care units. When treating post-operative patients' wounds, a sterile technique ought to be used. To effectively reduce the incidence of SSIs in hospitals, it is advised to establish mandatory reporting, guarantee appropriate follow-up, and maintain ongoing reinforcement. It is necessary to set up a standard procedure and preventative measure. Surgical site infections (SSIs) can be decreased by implementing safe disposal practices, aseptic techniques and devices, universal precautions, and the elimination of unsafe practices. To improve nurses' comprehension of the relevant issue, it is recommended that a relevant subject be added to the undergraduate nursing curriculum. Every hospital will have an infection control program in place to efficiently inform and guarantee the standard of care, patient safety, and healthcare worker safety.

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