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AN APPRAISAL REGARDING THE KNOWLEDGE AND PRACTICE OF HEALTH CARE WORKERS ON INFECTION CONTROL IN OPREATION THEATERS AT TERTIARY CARE HOSPITALS, PESHAWAR

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Article Details

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ABSTRACT

Background: Surgical site infections (SSIs) are a common health care-associated issue, leading to a significant risk to patient safety and financial burdens on health systems. Improving healthcare workers' knowledge and practices in infection control is critical in reducing SSIs and ensuring better post-operative outcomes.

Methodology: A descriptive cross-sectional study was conducted among 196 healthcare workers, including surgeons (25%), nurses (30%), surgical technicians (20%), and technologists (25%), at Hayatabad Medical Complex, Peshawar. Data was collected through self-administered questionnaires and analyzed using statistical software.

Result: The study discloses that 97.4% of healthcare workers demonstrated good knowledge, and 78.8% reported good practices regarding SSI control. Workers in the operation theater had higher levels of knowledge, but only 78.8% demonstrated good practice. The gap is attributed to resource constraints, workload pressures, and weak support systems. Addressing these barriers through better resource availability, accountability, and education is crucial. Effective strategies include structured guidelines, education programs, support systems, and regular supply availability to enhance infection control in surgical settings.

INTRODUCTION:

The operating room is a high-risk work environment with a potential for infection transmission due to the invasive nature of surgery and the presence of multiple healthcare professionals.(1) Infection control procedures are a critical part of surgical care, aimed at preventing the occurrence of surgical site infections (SSIs), which can cause serious complications and lengthen hospital stays, increased medical costs, and even mortality.(2) Healthcare professionals' knowledge and strict adherence to infection control practices are essential to prevent SSI, one of the most common complications after surgery. Their understanding of these protocols directly impacts patient outcomes, as well- achieved infection control measures can crucially reduce the risk of SSIs. This includes proper hand hygiene, sterilization techniques, appropriate use of personal protective equipment (PPE), and maintaining a sterile surgical environment.(3) Additionally, ongoing education and training are pivotal for healthcare workers to stay updated on the latest infection prevention strategies. Consistent audits and augmentation of these practices help ensure compliance. (4) SSIs affect approximately 0.5% to 3% of all surgeries, significantly impacting patient outcomes. These infections were defined as those that develop at or near the surgical incision site within 30 days of infection or after surgery following the procedure. (5) The consequences of SSIs are not only limited to patient discomfort and delayed recovery but can also lead to severe complications, such as wound infection, sepsis, or the need for re-admission and additional surgeries. (4) One of the most concerning aspects of SSIs is their ability to substantially prolong hospital stays, often extending patient hospitalization by 7 to 11 days. This results in increased healthcare costs, placing additional burdens on healthcare systems. SSIs also elevate the risk of morbidity and, in severe cases, can contribute to mortality. (6)

According to the WHO the hospital-acquired infection (HAI) also known as a hospital-acquired infection, is any infection that develops during a patient's stay in a hospital or health care facility and that was not present or incubated at the time of admission. (7) These infections usually develop more than 48 hours after admission. Surgical site infection (SSI) is any postoperative infection that develops within 30 days in the epidermis, dermis, hypodermis layers of skin followed by minimally or open surgical procedure (after one year if an implant is inserted) are called surgical site infections (SSIs). The incidence of postoperative infections is significantly higher in developing countries, ranging from (10-25%) compared to (5-6%) in developed countries. highlighting the need for strong infection control among healthcare workers.(8) Surgical site infections (SSIs) are the most common and most expensive type of hospital-acquired infections (HAIs) globally.(9) According to the U.S. Centers for Disease Control and Prevention (CDC), SSIs account for approximately 20% of all healthcare-associated infections (HAIs). This statistic underscores the significance of SSIs in the broader context of infection control within hospitals and surgical centers. (6)(7) Surgical site infections (SSIs) rank as the second most common type of hospital-associated infection, accounting for a significant percentage of infections in healthcare settings. They occur in approximately 14% to 16% of all admitted hospital patients and affect up to 38% of patients undergoing surgery. This high prevalence highlights the critical need for stringent infection control measures in hospitals, particularly in surgical environments. (10)(11) In the United States, the term "surgical wound infection" was changed to "surgical site infection" (SSI) in 1992. This change was made by the Centers for Disease Control and Prevention (CDC) to better represent these infections. According to CDC, surgical site infections are classified into three categories. (12)

The first category involves superficial surgical site infections, which affect the skin and subcutaneous tissue. These infections usually occur within 30 days after surgery and may present with redness, swelling, and drainage. (13) The second category includes deep surgical site infections, affecting deeper tissues such as muscles and fascia. These can develop within 30 days or up to a year if a prosthetic device is used. Symptoms include increased pain, swelling, and fever. The third category is organ/space surgical site

infections, which impact any body organ or cavity. (14) These infections can arise from the surgery or complications and may present fever, pain, and other systemic signs. These classifications help healthcare providers diagnose and manage surgical site infections effectively, leading to better patient outcomes. (15)Approximately 160,000–300,000 SSIs are diagnosed and treated each year. These place a significant burden on the healthcare system as they can lead to reoperation, increased postoperative pain, poor wound healing, increased hospital stays, cosmetic problems, and reduced quality of life. (16)

A comprehensive review outlined various strategies for preventing healthcare-associated infections, including SSIs. Key recommendations include active screening for multidrug-resistant organisms (MDROs), environmental hygiene practices, and isolation measures for infected or colonized patients. The review stresses that knowledge gaps among healthcare workers regarding infection prevention protocols remain a significant barrier to effective SSI management. (17) The incidence of any kind of postoperative infection after abdominal surgery can reach up to 14% of all hospital-acquired infections. The most common form is a superficial postoperative infection, which often occurs first and is easy to diagnose (18). SI occurs in 1% to 3% of patients undergoing inpatient surgery, but this varies depending on the type of surgical procedure performed. (19) In 2021, a total of 21,186 SSIs were reported to the CDC National Healthcare Safety Network (NHSN) out of a total of 2,759,027 surgical procedures. (20) According to the existing literature, there are gaps in nurses' knowledge and practice regarding the prevention of hospital-acquired infections. Various studies have shown that the knowledge and practice of most healthcare providers is inadequate. (21)A study conducted in Pakistan showed that a significant number of participants had poor HAI prevention practices. (22) A similar study conducted in Iran found that 43% of nurses had insufficient knowledge to prevent HAIs, and 42% were aware of traditional prevention methods. (23)

AIM AND OBJECTIVE

A study to an appraisal regarding the knowledge and practice of health care workers on infection control in operation theaters in tertiary care hospital, Peshawar

To find out the understanding of infection control protocols among health care workers in the operating theater.

To know the practice protocols employed by healthcare workers to ensure their effectiveness and adherence to standards of infection prevention and control

MATERIALMETHODOLOGY

Study design: This study was conducted using a descriptive cross-sectional design at Hayat Abad medical complex's Peshawar

Participants: The study involved healthcare workers who were actively engaged in the dynamic environments of operating theaters and hospital wards, focusing on surgical patient care.

Inclusion criteria: The healthcare workers (surgeon, nurses, surgical technologists and surgical technicians are the study participants.

Exclusion criteria: The staff members that are not actively involved in any operation theaters.

Study Duration: This study has taken approximately 04 months to complete.

Sample Size: $\mathbf{n} = \frac{z^2pq}{E2}$ about 196 healthcare workers. The sample size was calculated using the "Cochran formula "The margin of error was set as 7.5 % based on the common formula for a single proportion with a 95% CI. By using "Cochran formula" $\mathbf{n} = \frac{z^2pq}{e^2}$

Where z = confidence interval from z score table.
e=is the margin of error.
Where p and q are the prevalence of population
By putting all values in given" Cochran formula.

$n = \frac{(1.96)^2 \times (0.5)(1-0.5)}{(7\%)2}$

$n = \frac{3.8416^2 (0.5)(1-0.5)}{(0.07)2}$

$n = \frac{(3.8416)(0.5)(0.5)}{0.0019}$

$n = 196$

According to statistical formula the simple size was calculated 191.

Recruitment and Informed Consent:
Participants were recruited through the non-probability convenient sampling techniques. Informed consent was obtained from all participants.

Data Collection:

Demographic and Occupational Data:
Ethical approval was obtained from the hospital ethical committee for data collection of the healthcare workers in operation theaters (doc no; HMC-QAD-F-00) approval no: 2223). The Structured informed consent was obtained from health care workers prior to collect questionnaire. The questionnaire used was comprised of socio-demographic and 20 multiple choice questions were used to assess the knowledge and practice of health care workers on infection control in operation theaters.

DATA ANALYSIS:
All the collected data were analyzed using SPSS. Descriptive statistical was used to analyze demographic data, knowledge, and practice toward infection control in operation theaters, while Pearson chi square was used to determine the association between the respondents' characteristics, knowledge and practice

RESULTS
Table 1:- Demographic distribution of health care workers.

Age Group				
		Frequency	**Percent**	**Valid Percent**
Valid	**18-25**	**51**	**26.0**	**26.0**
	26-45	**100**	**51.0**	**51.0**

	46-60	**45**	**23.0**	**23.0**
	Total	**196**	**100.0**	**100.0**

Table 1: - Demographic distribution of health care workers.
The majority of the study participants (51%) were aged between 26–45 years, followed by age group 18–25 years (26%) and 46–60 years age group(23%), indicating the predominantly middle-aged group sample.

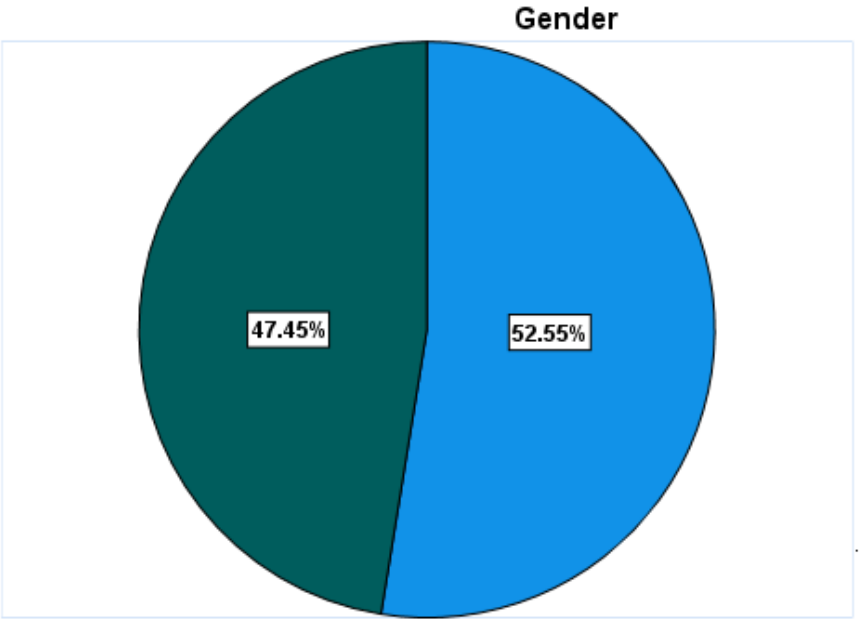

Figure 1: - **Gender of health care workers**
The pie chart represents the gender distribution of healthcare workers who participated in this study. It shows that **52.55%** of the participants are **male**, while **47.45%** are **female**, reflecting a relatively balanced gender representation.

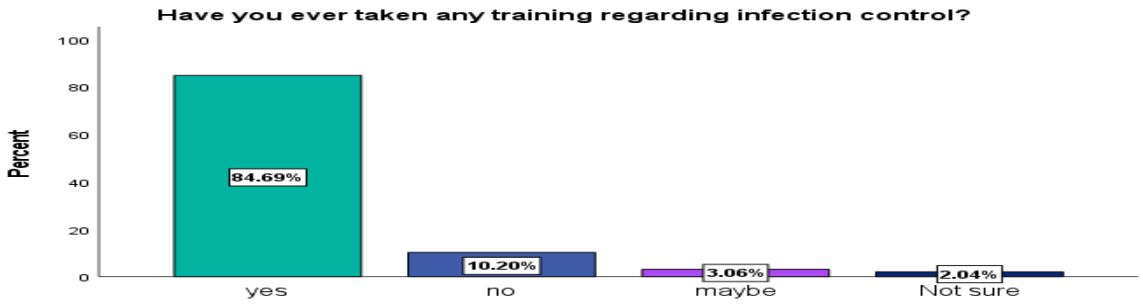

Figure 2: - Have you ever taken any training regarding the infection control:

Major portion of the respondents (84.69%) reported that they received training in the infection control, while 10.20% did not, 3.06% were unsure if they had, and 2.04% were not certain.

Table 2 : Health care workers knowledge on infection control.

		Frequency	Percent	Valid Percent
Valid	Yes	191	97.4	97.4
	No	5	2.6	2.6
	Total	196	100.0	100.0

Table 4: - Should wounds be regularly inspected for signs of infection.
The 191 (97.4%) respondents have good knowledge of infection control while only 5 (2.6%) have poor knowledge of infection control.

Table 3:- "Do you regularly clean or wash OT dresses, nurse uniforms, and other attire after duty?"

		Frequency	Percent	Valid Percent
Valid	Yes	141	71.9	71.9
	No	16	8.2	8.2
	Maybe	26	13.3	13.3
	Not sure	13	6.6	6.6
	Total	196	100.0	100.0

Table 5: - Do you regularly clean or wash OT dresses, nurse uniforms, and other attire after duty?"
The 141 (71.9%) respondents reported regularly cleaning or washing their OT attire, nurse uniforms, and other attire. Meanwhile, the 16 (8.2%) reported that they are bit cleaning their attire, the 26 (13.3%) said “Maybe,” and the 13 (6.6%) were “Not sure of cleaning their attire, it indicates that while most of the staff follow hygiene practice sops.

Table 4:- "Do you always follow the surgical safety checklist before beginning a procedure?"

		Frequency	Percent	Valid Percent
Valid	yes	154	78.6	78.6
	no	10	5.1	5.1
	maybe	23	11.7	11.7
	Not sure	9	4.6	4.6
	Total	196	100.0	100.0

Table 6: The 154 (78.6%) respondents reported that they always follow the surgical safety checklist before

beginning a procedure. The 10 (5.1%) said “No,” 23 (11.7%) said “Maybe,” and 9 (4.6%) were Not sure of using the checklist before starting the procedure. This indicates high compliance, while small proportions remain non-compliant with SOPs and checklists.

The knowledge and practice of health care workers on infection control in operation theaters in tertiary care hospitals, Peshawar

The study reported that healthcare workers (HCWs) demonstrated good practice of SSI prevention, with 166 respondents (84.5%) showing strong awareness of SSI prevention measures. In terms of practice, 154 respondents (78.6%) consistently adhered to the surgical safety checklist, an essential component of SSI prevention. However, there is a noticeable gap between knowledge and practice, as not all HCWs with good knowledge translate it into consistent application. This strongly supports the fact that HCWs possess good knowledge of SSI prevention, though efforts are needed to bridge the gap between knowledge and practice to enhance the prevention of SSIs.

DISCUSSION

The findings of this study reveal that healthcare workers (HCWs) at HMC Peshawar demonstrate commendable knowledge and practice in preventing SSIs, with an overall good knowledge rate of 97.08% and a practice adherence rate of 78.8%. These results highlight the effectiveness of the institution's infection prevention and control measures. However, despite these positive outcomes, some challenges remain in achieving higher adherence levels. A key strength of this study is the high level of awareness among HCWs regarding critical aspects of SSI prevention, such as preoperative skin preparation, the surgical scrub's purpose, and the importance of antibiotic prophylaxis. Governance and structured supervision play a vital role in fostering compliance with SSI prevention protocols. Multi-level committees overseeing infection control measures ensure accountability and effective communication across departments. Additionally, initiatives such as the "Safe Surgery Saves Lives" program in operating theaters have enhanced HCWs' knowledge and practices in these high-risk areas.

Despite these successes, the 78.8% adherence rate indicates room for improvement. While this figure is encouraging, 21.4% of participants who either do not consistently follow the checklist or are uncertain are concerned, given the strong evidence that checklist use reduces surgical complications and mortality. (15) Comparatively, the observed adherence rates align with previous studies from the other low- and middle-income countries, where the infection prevention awareness is high, but compliance to SOPs sometimes falls short due to resource constraints or systemic issues. (16)

Differences in knowledge levels across units were also observed, with nurses in operating theaters and surgical wards demonstrating superior knowledge compared to those in other areas. To bridge this gap, targeted interventions and equal training opportunities are needed. Enhancing hands-on training, providing supervision across all units, and implementing motivational strategies, such as recognition programs, can further encourage HCWs to consistently follow best practices. The high rates of knowledge and practice among HCWs at HMC Peshawar reflect the institution's strong infection control measures. Continued efforts in governance, education, and resource allocation, coupled with practical interventions to address barriers, will enhance HCWs' adherence to SSI prevention practices. These steps are crucial for minimizing SSIs, ensuring patient safety, and maintaining high standards of care.

CONCLUSION

The results indicate that the healthcare workers had sufficient level of knowledge and practices to prevent

SSIs. Specifically, those working in the operating theatre (OT) and surgical departments were more likely to have good knowledge and practices than healthcare workers in other wards and departments. This finding highlights the importance of specialized training and expertise in infection control, especially in surgical settings where the risk of SSIs is high. The expertise and ongoing training of healthcare workers in these areas plays a key role in maintaining high standards of infection prevention and patient safety. The main strategies identified included a well-structured ongoing training program for healthcare workers, adequate supervision and support, and regular provision of necessary consumables and medical supplies. It is important to ensure that necessary resources and supplies are always available within the hospital environment so that healthcare workers can effectively implement infection control. One major limitation is the lack of local studies that could serve as benchmarks. A field survey might have provided more contextual insight into the challenges and successes of infection prevention practices in the area. Although questionnaires are useful for collecting information, self-reports may be subject to social desirability bias and may not always correspond to observed practices, so they may not accurately reflect healthcare workers' actual behaviors and perceptions regarding SSI prevention.

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