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Knowledge And Practice Of Nurses Regarding Prevention Of Surgical Site Infection

Mona Shawer, Sarah Abdullah, Shatha Daradkeh, Rola Alasri, Mohamed Elgack

Technical Institution Of Nursing, Mansoura, Egypt, Head Of Nursing Education And Training Development, King's College Hospital, London- Jeddah, Saudi Arabia
Tissue Viability Nurse At King's College Hospital, London- Jeddah, Saudi Arabia
Wound Care Nurse, King's College Hospital, London- Jeddah, Saudi Arabia
Dm Foot Specialist King's College Hospital, London- Jeddah, Saudi Arabia
Orthopedic Resident Physician, King's College Hospital, London- Jeddah, Saudi Arabia

Abstract
Background: *Surgical operations are vital procedures in the health care delivery system. Advancements in surgery have played a pivotal role in managing and treating complex health challenges that require surgical intervention. However, the processes and procedures involved in surgical operations could significantly endanger the patient's life. Healthcare-associated infections (HAIs) pose a grave danger to patients and health care workers alike. Empirically establishing the level of knowledge and actual practices regarding surgical site infection (SSI) prevention among nurses is therefore a research priority if the alarming rate of SSIs in developing countries is to be reduced.*
Purpose: *The present study aimed to assess the knowledge and practice of nurses regarding the prevention of surgical site infection. A descriptive correlational research design was used in this study.*
Methods: *A descriptive correlational research design was adopted for this study. The population comprised nurses working at the surgical wards and operating theatres of the tertiary Hospital, Saudia Ariba. A convenience sampling was used to select 136 nurses who were willing to participate in the study at the time of collecting data. Data was collected using a questionnaire. developed by researchers based on a literature review with a reliability of 0.88 estimated on the Cronbach alpha scale. Participants' knowledge was assessed by 1 7 questions; 1 point was awarded for each correct answer, and zero points for incorrect answers. Practices were assessed using an observation evaluation sheet constructed along met and not met.*
Results*: Findings showed that the majority of nurses (81.6%) demonstrated a high level of knowledge regarding surgical site infection prevention, while only 18.4% had a low level of knowledge. Regarding practice, 73.4% of nurses met the required standards based on the observation checklist, whereas 26.6% didn't meet the expected practice standards. There was no statistically significant relationship between nurses' knowledge and practice regarding surgical site infection prevention ($\chi^2 = 0.04$, $p > 0.05$). Although a high proportion of nurses demonstrated adequate knowledge and acceptable practice levels, the findings suggest that knowledge alone did not significantly influence clinical practice.*
Conclusion: *There was no statistically significant relationship between knowledge and practice among nurses*
Keywords: *Surgical site infections, knowledge, attitude, practices, prevention, nurses*

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I. Introduction

One of the common public health issues, Surgical Site Infections (SSIs), has become a concern for both health care providers and patients, because of the risk that the patient may become seriously ill, which in turn may lead to increased morbidity and mortality, prolonged hospital stay, and increased cost of care. SSIs can occur on the skin, in organs or tissues that were surgically altered, or at any anatomical site newly exposed during surgery (Centers for Disease Control and Prevention, 2025).

Damage or disruption of the living tissue's cellular, anatomical, and/or functional continuum defines a wound. Before treatment, the exact cause, location, and type of wound must be assessed to provide appropriate care. Non-healing wounds affect millions of people; minimizing wound complications is essential in the current healthcare environment. This activity addresses the protocol for wound assessment for the interprofessional team during initial and subsequent wound assessments to best classify and treat a wound to enhance outcomes (Nagle SM et al.2023)

The various steps associated with surgery, both before and after the actual surgical procedure, are designed to minimize risk and protect patients. However, they can still endanger the life of a patient. Health care-

associated infections (HAIs) are quite harmful to patients, and the increased burden on healthcare workers may negatively impact the quality of nursing care provided. Surgical site infection (SSI) is a very common type of HAI and has serious implications for a patient's health and survival, even after successful surgery. SSIs may be classified as superficial incisional, deep incisional, or organ space infections (Oluwakemi et al. 2017).

As per the Centers for Disease Control and Prevention (CDC) and the National Healthcare Safety Network (NHSN), there are three major types of Surgical Site Infections (SSIs). These are classified by the affected layers. These layers may include the skin and subcutaneous (Superficial), deeper layers like fascia and muscle (Deep), or any organ/space layers of the body that were opened or manipulated during the surgery (Russo et al., 2022). These classifications help determine the course of action in the diagnosis, surveillance, and management of SSIs in the clinical setting.

Numerous factors determine the prevalence of SSIs, and these causes can be split into intrinsic and extrinsic factors. Within intrinsic factors, which are mostly patient-centric, there are advanced age, malnutrition, obesity, smoking, hypoxia, metabolic disorders, immunosuppression, or prolonged preoperative hospital stay. Associated with these are extrinsic factors, which are unsatisfactory healthcare practices. This may include inadequate preoperative skin preparation, incorrect and inadequate preoperative antibiotic prophylaxis, unsatisfactory sterilization of surgical instruments, ineffective surgical hand hygiene, inappropriate use of surgical drains, and unsatisfactory postoperative wound care (Famakinwa et al., 2014). These factors should be addressed to improve patient outcomes by minimizing the occurrence of SSIs.

To avoid infection and for the wound to heal properly, it is important to assess the skin and the wound after the operation. Proper management of wounds includes all of the following: keeping them clean, keeping it at a good moisture level to allow tissues to regenerate, and preventing necrosis or any other complications. For a wound to be optimally healed, the right dressing should be chosen and changed frequently. (Hampton et al., 2023). Dressing should be based on infection prevention, maintaining appropriate temperature, and allowing the top skin layer to regenerate, so it is optimal for dressing to be changed frequently. The World Health Organization states that it is important for the dressing to be changed based on the state of the wound to allow the appropriate stage of healing. (Norman et al, 2016).

Another example of an important technique in surgical aftercare is the process of wound debridement. Debridement is the process of removing dead tissue so that the tissue can begin healing by developing granulation tissue. Enzymatic agents can be used if mechanical debridement is impossible. Cleaning the wound regularly should continue until all tissues are no longer viable. In the process of healing a wound, it is paramount that any and all infected foreign substances, including possible implanted items, be removed (WHO, 2016).

The last few years have seen the advent of more effective technologies for the treatment of wounds, like vacuum-assisted wound therapy. This technique helps with healing and lowers the rates of infection. It involves the use of negative pressure to remove excess fluid and reduce swelling. It also helps to promote the formation of granulation tissue. Numerous studies and meta-analyses illustrate the efficacy of vacuum-assisted wound therapy in lowering rates of surgical site infections (SSIs) and post-operative complications and in decreasing lengths of hospital stays. This use of therapy is especially the case for major surgeries such as orthopedic surgery, spinal surgeries, and cesarean sections (Webster & Liu, 2019).

The Significant effect surgical infections (SSIs) have on patient outcomes, and the healthcare system places a burden on the nursing profession to fill the gaps. Nurses manage the post-operative process, including wound care and infection control, as well as patient information. This makes it important to assess the knowledge, attitudes, and practices of nurses in relation to the prevention of surgical site infections to identify the knowledge gaps and improve the standard of care. Understanding these factors assists in the formulation of more focused educational efforts and the application of best practices aimed at decreasing the incidence of SSIs and enhancing the safety of the patient.

II. Aim Of Study:

The objective of this study is to assess the knowledge and practice of nurses regarding the prevention of surgical site infection

III. Subject And Methods:

A descriptive correlational research design was adopted for this study. The population is comprised of nurses working at the surgical wards and operating theatres of the tertiary Hospital, Saudia Ariba. A convenience sampling was used to select 151 nurses who were willing to participate in the study. 10% was excluded as they were part of a pilot study, so the total number of the study sample was 136. Data was collected using a questionnaire with a reliability of 0.88 estimated on the Cronbach alpha scale. Participants' knowledge was assessed by 17 questions; 1 point was awarded for each correct answer, and zero points for incorrect answers. Practices were assessed using an observation evaluation sheet constructed along met and not met.

Tools:
Two tools were used in the study; they are as follows:

Tool I:
This includes two parts.
Part (1): This part includes personal and job characteristics, including gender, age, educational background, previous wound care training, and years of experience, etc.
Part (2): Participants' knowledge was assessed by 17 questions, with total scores ranging from 0 to 17. Higher scores indicate greater knowledge of wound care among nurses. The Wound Care Knowledge Assessment Tool: This tool was developed by researchers based on an extensive review of the literature and research from various sources (Barakat-Johnson et al., 2022; Falcone et al., 2021; Kanakaris et al., 2022; Obilor et al., 2021). This part covered topics related to basic wound assessment, best Practices in wound management, infection identification, and dressing management

Tool II:
An observation sheet constructed along the met and not met was developed by researchers based on an extensive review of the literature. It covered nurses' practices in wound assessment, infection identification, and dressing management.

Pilot study:
Fifteen staff nurses representing 10 % of the study sample who underwent random selection for participation in a pilot study before starting the collection of data to evaluate the feasibility, applicability, and clarity of the tool, and to allocate the time required for its completion. Exclusion of the 15 participants from the pilot study from the current study was done to ensure stability.

Ethical consideration:
This study was conducted in accordance with ethical guidelines for research involving human participants. Prior to the commencement of the study, approval was obtained from the hospital participating. All participants were provided with detailed information about the study's purpose, procedures, and potential risks and benefits. Participation in the study was voluntary, and all participants gave informed consent before enrolling. They were assured that their participation was confidential and that they could withdraw from the study at any time without any repercussions. Data collected from participants was anonymized to ensure confidentiality, and no identifying information was included in the analysis or reporting of the results. Furthermore, the educational intervention posed minimal risk to participants, as it consisted of standard training in wound assessment and management. The rights and dignity of all participants were upheld throughout the study, and any concerns raised by the participants during the process were addressed promptly.

Statistical Design:
The data gathered were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive as well as inferential statistics were applied to investigate the results obtained from this analysis thoroughly. This study utilized frequency and percentage data to analyze the sociodemographic profile of the nurses, such as gender, age, years of experience, educational level, and previously attend wound care training The weighted mean with standard deviation (SD) was also applied for further statistical analysis to gain insight regarding their role and knowledge, including their actual practice towards prevention of surgical site infection and management. Additionally, the relationship between the knowledge and actual practice of nurses towards the prevention of surgical site infection was analyzed to assess a potential link using the Pearson correlation coefficient.

IV. Results

Table 1 presents the demographic characteristics of the 136 nurses included in the study. The average age of the participants was between 30 and 40 years (SD = 6.3). The majority of participants were female (61.7%), whereas 38.2% were male. Regarding the academic qualifications, most of the nurses (94.2 %) held a bachelor's degree, while only 5.8 % had a master's degree. The mean years of experience in wound management was 7.5 years. Regarding prior wound care training, 82.4% of participants reported having received wound care training, whereas 17.6% indicated they had not received any prior wound care training. **Table 2** shows that the majority of nurses (81.6%) demonstrated a high level of knowledge regarding surgical site infection prevention, while only 18.4% had a low level of knowledge. **Table 3:** Regarding practice, 73.4% of nurses met the required standards based on the observation checklist, whereas 26.6% did not meet the expected practice standards. **Table 4** showed that there was no statistically significant relationship between nurses' knowledge and practice regarding surgical

site infection prevention ($\chi^2 = 0.04$, $p > 0.05$). Although a high proportion of nurses demonstrated adequate knowledge and acceptable practice levels, the findings suggest that knowledge alone did not significantly influence clinical practice.

Table (1): Personal and job characteristics of study sample n=136

Personal and job characteristics	Study sample (n=136)	
	No.	%
Age (years)		
25-	54	39.7
30- 40	70	51.4
40+	12	8.8
Mean±SD	31.9 ± 6.3	
Gender		
Male	52	38.2
Female	84	61.7
Level of education		
Bachelor of Nursing	128	94.2
Master's degree	8	5.8
Unit of work		
Operating theater	38	27.9
Post surgical	98	72.05
Years of experience		
less than 5	76	
5-	30	
10+	30	
Mean±SD	7.5 ± 7.0	
Previous wound care training		
Yes	112	82.4
No	24	17.6

Table (2): Distribution of Nurses According to Knowledge Level (n = 136).

Knowledge Level	No.	%
High Performance	111	81.6
Low Level	25	18.4

Table (3): Distribution of Nurses According to Practice Level (Observation Tool) (n = 136)

Practice Level	No.	%
Met Standard	100	73.4%
Not Met	36	26.6%

Table (4): Correlation between Level of Knowledge and Practice Level.

	Practice Met	Practice Not Met
High Knowledge	82	29
Low Knowledge	18	7

($\chi^2 = 0.04$, $p > 0.05$).

V. Discussion

The current research indicates that the majority of participants (81.6%) have high levels of knowledge regarding surgical site infection (SSI) prevention. This also means that a smaller proportion (18.4%) has a low level of knowledge. This gap shows that most nurses have sufficient knowledge of infection prevention theory. This proves that the earlier studies are true, as studies show that, due to ongoing educational efforts, nurses' knowledge levels continue to rise under institutional control of infection policies.

Compared to the knowledge gained, the study shows that only 73.4% of nurses reached the required standards of practice, where 26.6% did not achieve the expected standard of practice according to the observational checklist. This gap shows that knowledge does not equal clinical practice. It is the opposite where there is knowledge, there should also be practice. This is also the finding of the study of Hua et al (2023).

Evidence-based practice is a requirement that many nurses are not able to achieve due to a variety of issues, ranging from too much work, time shortages, not enough staff, and poor management. These factors create a hostile working environment. These issues exist from the management side, a lack of resources to manage an adequate and already provided supply, and a lack of control, which acts to eliminate the nurses' ability to work rationally.

The findings also support the view that knowledge and practice are generally linked, but not in a straightforward manner. Barriers in the clinical setting can prevent the practice of an otherwise informed nurse. Therefore, the need for educational interventions, organizational backing, ongoing support, and repeated evaluations of competencies becomes prominent. Similar sentiments were voiced by Totty et al. (2021), who noted that knowledge was insufficient for compliance to be observed in wound care practice.

The current study's findings, resulting in no significant relationship between knowledge and practice, are consistent with the results of Famakinwa et al. (2014). A detailed study concluded that the knowledge alone was inadequate for compliance to be observed in wound care practice. Behavioral and attitudinal, let alone the support of the institution, are needed to close the gap between knowledge and practice

Having a high level of knowledge is commendable, but a significant gap in practice indicates that the SSI prevention guidelines need more focus to be observed. Improvement in the individual and the organization is needed to address the nursing personnel's performance gap and minimize the incidence of surgical site infection.

VI. Conclusion

There is no statistically significant relationship between nurses' knowledge and practice regarding surgical site infection prevention.

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