



**Patient knowledge and care of surgical site infections
at a selected regional hospital in
KwaZulu-Natal Province, South Africa**

Submitted in fulfilment of the requirements for the degree of Master of
Health Sciences

By
Niroshni Naidoo (19951100)

Faculty of Health Sciences

Durban University of Technology, Durban, South Africa

Supervisor: Prof. J.K. Adam

Co-supervisor: Prof. Y. Moodley

Collaborator: Mr. S.S. Kader

ABSTRACT

Background: Surgical site infection (SSI) is a common post-operative complication and can develop after a patient has been discharged from the surgical ward. Being comfortable with their SSI knowledge can empower patients and encourage them to engage in healthy behaviours that could lower the risk of this complication. Poor knowledge of wound care practice (WCP) among surgical patients could place them at risk of SSI, particularly once they have been discharged from hospital and are expected to care for their own surgical wounds. The study aimed to establish South African surgical patient's knowledge and awareness of surgical site infections and wound care practices at a regional hospital in KwaZulu-Natal Province, South Africa.

Methods: This prospective cross-sectional study involved two quantitative questionnaire surveys of general surgery patients at a regional hospital in Durban, South Africa (7 January 2025 - 24 April 2025). Each survey consisted of a socio-demographic questionnaire, and an adaption of a pre-existing questionnaire assessing comfort with SSI knowledge or assessing WCP. Univariate and multivariate data analyses, namely chi-squared tests and logistic regression, was used to test potential associations between patient characteristics and comfort with SSI knowledge or poor WCP knowledge.

Results: Of the 255 survey participants included in the analysis, 48.2% did not feel comfortable with their SSI knowledge. Comfort with their SSI knowledge was predicted by: healthcare workers discussing SSI with them on two or more occasions (Odds Ratio, OR: 8.93), receipt of an informational flyer on SSI while in hospital (OR: 11.40), learning about SSI outside hospital via another clinic/healthcare worker (OR: 7.37), and learning about SSI outside hospital via another non-healthcare source (OR: 5.18). Of the 255 participants, 23.92% had poor WCP knowledge, the univariate analysis finding two potentially important patient characteristics being associated with poor knowledge: Black African race ($p=0.153$), and completion of high school education ($p=0.001$). When they were entered into a multivariate logistic regression model, only completion of high school was found to be a statistically significant predictor of poor WCP knowledge (OR: 0.34, $p=0.001$).

Conclusion: Patients' knowledge of SSI requires improvement, as it has implications for their wound care knowledge and practices, improving their quality of life and preventing avoidable illness and premature deaths. Measures to improve both should focus on providing verbal and hard copy messages while patients are still in hospital to enable them to ask questions and take information home.

Keywords: Surgical site infection, Knowledge, Survey, Wound Care Practice, Surgery, South Africa.

DECLARATION

I, Niroshni Naidoo, hereby declare that the contents of the work presented in this research document have not been submitted to any other tertiary institution. The work presented is the original work of the author and where the mention of work by others has been used, it is duly acknowledged.

Signed:

N. Naidoo

The research described in this dissertation has been under the supervision of the candidate's supervisor, Prof. J.K Adam and co-supervisor Prof. Y. Moodley.

DEDICATION

I dedicate this work to my daughter, Verona Naidoo, who has been my greatest inspiration, strength and source of motivation. She has given me the confidence to believe in my abilities even when I did not.

ACKNOWLEDGEMENTS

I would first like to acknowledge Divinity in the various forms and manifestations. My prayer has seen me through this journey, given me hope and strength during the storms of this thesis. To my husband, I am grateful for your quietness and allowing me the space to spend weekends and evenings sitting at our dining room table hours at a time working on my studies. Thank you for your unwavering support.

My daughter, my everything, thank you for always listening to me and sending me funny memes on the days when I felt low and wanted to give up. Your support and constant encouragement have inspired me in ways you will not know.

To my supervisor Prof. Adam, thank you for always being available to take my call and for always instilling positivity in me. I am thankful for your support during this journey.

To my co-supervisor, Prof. Moodley, your unwavering support, mentorship, patience and availability has made this journey bearable. Your immense knowledge, wisdom and advice have guided me through this journey. I sincerely acknowledge you and express my sincere gratitude to you.

To Mr Kader, my collaborator, you have been most helpful in aiding me during the data collection process. I thank you for your assistance and helpfulness during this journey.

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LIST OF PUBLICATIONS

This dissertation is based on the following papers that have been accepted or are under consideration for publication.

1. Accepted manuscript:

Assessing comfort levels around surgical site infection knowledge amongst general surgery patients from KwaZulu-Natal, South Africa (Appendix H).

Submitted and accepted by: Surgical Chronicles

Date accepted: 14 September 2025

2. Manuscript under review:

Assessing wound care practice knowledge in general surgery patients from KwaZulu-Natal, South Africa (Appendix I).

Submitted to South African Journal of Public Health

Date accepted for review: 23 February 2026

LIST OF ACRONYMS

ASOS	African Surgical Outcomes Study
CDC	Centre for Disease Control
CI	Confidence Interval
HAI	Health Associated Infection
HBM	Health Beliefs Model
HCW	Healthcare Worker
HIV	Human Immunodeficiency Virus
HOD	Head of Department
IPC	Infection Prevention and Control
LMICs	Low-and-middle income countries
LoS	Length of stay
NCD	Non-communicable disease
SA	South Africa
SASOS	South African Surgical Outcomes Study
SSA	Sub-Saharan Africa
TB	Tuberculosis

KEY CONCEPTS

Knowledge: Refers to how an individual is able to process, understand and apply information. This information encompasses factual concepts and procedural knowledge as well as personal experiences.

Care: This term refers in general to actions to heal, protect and preserve patient health. In this thesis care is divided into wound care practices, post-operative care and preventative care focusing on patient knowledge and understanding of their health conditions.

Wound: In the context of surgery, surgical incision or wound can be used to describe the surgical cut while in the process of healing.

Multi-morbidity is the presence of two or more long-term health conditions in the same individual without either condition taking preference.

CHAPTER 1: INTRODUCTION

1.1 Preamble

This section presents the study background, problem statement, and aims and objectives, as well as an overview of the dissertation outline.

1.2 South Africa's surgical care needs

The increasing demand for surgery in South Africa (SA) is fueled by the quadruple burden of disease that the country is experiencing, that being human immunodeficiency virus (HIV) and tuberculosis (TB), non-communicable disease (NCD) (e.g. hypertension and diabetes), injury/trauma and maternal/child health (Biccard and Madiba, 2015). These conditions are fueled by poverty, inadequate infrastructure, changes in lifestyle as well as historical inequalities (Achoki *et al.*, 2022). As a result of these, a wide range of surgical interventions may be required to address the wide range of disease conditions observed in SA (Biccard and Madiba, 2015) .

As shown in Figure 1, the South African public healthcare sector comprises four levels of hospital care, these being district (level 1), regional (level 2), tertiary/quaternary, (level 3) and central/academic (level 4). Surgical procedures of varying complexity are performed at these different facilities, ranging from basic procedures at district facilities, to complex and more complex procedures at regional and central/academic facilities (Figure 1). At all facility levels, surgical patients face some risk of SSI, which poses significant resource and financial burdens on the constrained South African healthcare system. The cost of care escalates with the complexity of the surgery and the level of the hospital, with central/academic hospitals being the most resource intensive. Moreover, SSIs increase healthcare costs through extended hospital stays, additional antibiotic therapy and possibly more surgery (Monahan *et al.*, 2020). This, underscores the need for preventative measures to mitigate post-operative infections in this setting.

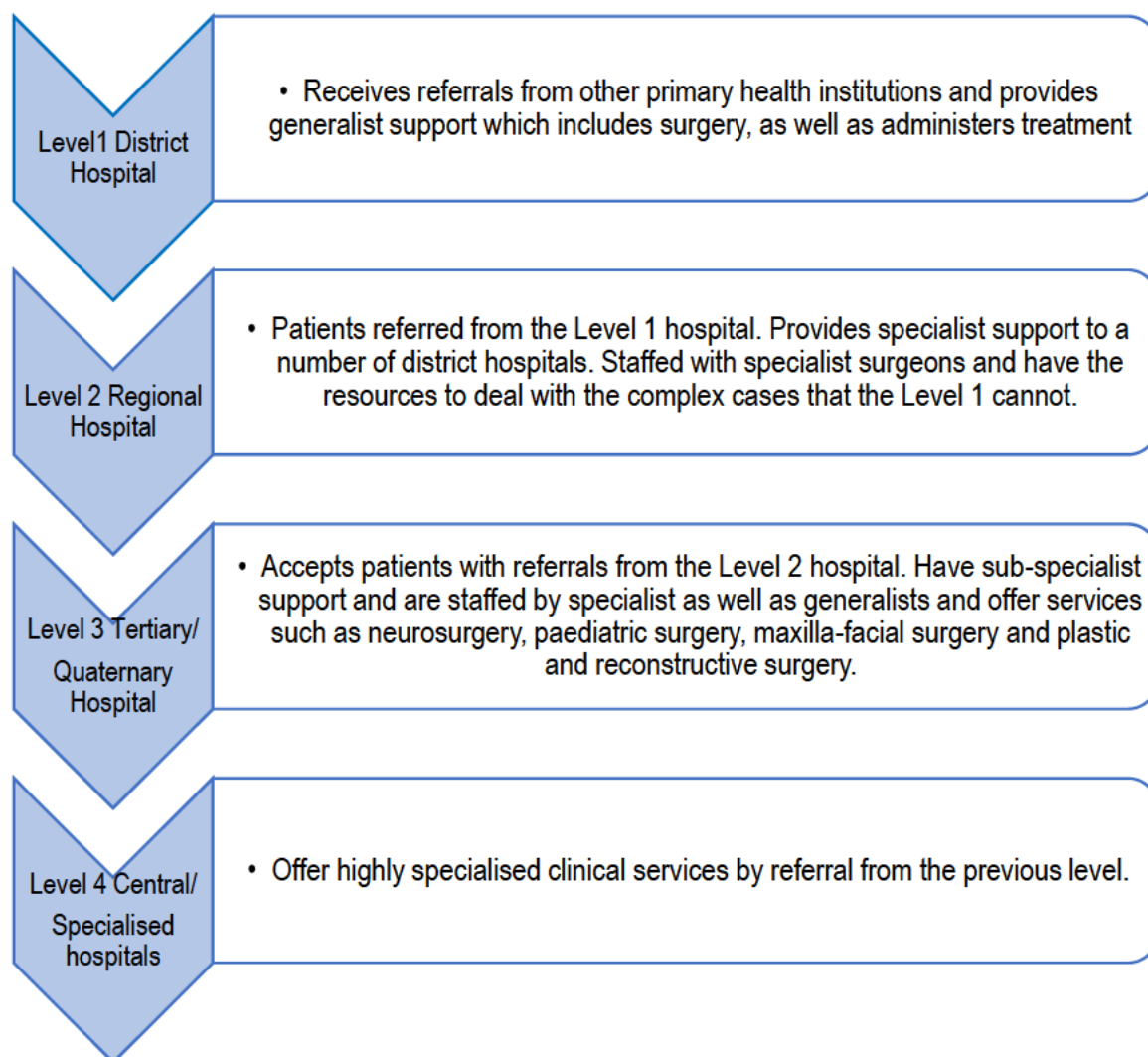


Figure 1: South African public healthcare level system

The South African Surgical Outcomes Study (SASOS) was a 7-day national cohort study conducted across 50 public sector hospitals in SA, during which data from almost 4000 surgical procedures were analyzed (Biccard and Madiba, 2015). The data showed that the primary indication for surgery was attributed to NCDs, such as metastatic cancer, stroke and chronic obstructive pulmonary disease, which accounted for 48.5% of surgeries, compared to injury and infective complications, which accounted for 32.6% and 18.9% respectively.

1.3 Impact of surgical site infections in Africa and South Africa

SSIs are a significant cause of postoperative morbidity and mortality in Africa, particularly in sub-Saharan Africa (SSA) (Sway *et al.*, 2019). The overall reported incidence rates varying in the region from 6.8-26%, with a pooled incidence of 14.8% (Ngaroua, Bénet and Djibrilla, 2016). Only a few studies have tried to establish the burden of SSI in the South African context

and reported that SSI rates ranged from 2.8-16.6%. Additionally, the rates differed based on the type of surgery and the setting or hospital level (Nair *et al.*, 2018; Naidoo, Madiba and Moodley, 2019b; Apalata *et al.*, 2020; Naidoo and Moodley, 2022).

The African Surgical Outcomes Study (ASOS) was a large study of over 10 000 surgical inpatients conducted in 25 African countries, and also reported a high burden of complications associated with SSI (Biccard *et al.*, 2018). This highlights the need for safe surgical care and improved post-operative management of patients in Africa. A South African study conducted at a central/academic hospital in KwaZulu-Natal, reported that one in every 10 admissions for post-discharge SSI died in hospital, and a consistent trend in post-discharge hospital admissions for SSI over a 10-year period (Naidoo, Madiba and Moodley, 2019a).

In SA, financial and healthcare resources are not always readily available. There is often a lack of surgical equipment, hospital beds, operating theatres, in the context of a quadruple burden of disease. It is therefore important to reduce preventable conditions, such as SSI, in order to reduce unnecessary expenditure and resource utilisation. Any type of SSI (mild, moderate or severe) will have implications for healthcare expenditure. Although mild SSIs may only require treatment in the form of dressing changes and antibiotic therapy, this will still have cost implications. Moderate to severe SSIs may require reoperation or hospital readmission for treatment, which not only has cost implications, but also has implications for bed occupancy. Depending on the extent of the infection, a hospital bed may be occupied for a few days or a prolonged period of time, contributing to increased length of stay (LoS).

Patients may develop a SSI while still inpatients and will, therefore need to remain in hospital for treatment, thereby increasing their LoS (Fenny *et al.*, 2020; Naidoo, Madiba and Moodley, 2020). Referring to Naidoo and colleagues (2020), SSIs in SA were linked to an excess of 1.06 days of hospitalisation at the 25th percentile of post-operative LoS, which equated to an additional amount of ZAR 8900 per day. Thus, in addition to reducing patient morbidity and mortality from SSIs, there is also a financial incentive to reduce infections. The prevention of SSIs is the main intention, specifically in a resource constrained setting, where resources are limited and readmission costs place a burden on a public healthcare system that is struggling to serve its people.

The Department of Health in SA has existing policies, such as the National Infection Prevention and Control Strategic Framework, and a practical implementation manual. However, the lack of an effective surveillance system for SSI hampers the implementation of initiatives to reduce such rates.

1.4 Patient knowledge and awareness of surgical site infections

“Comfortable with knowledge” is a fluid mix of confidence that an individual has based on their experience and body of information that they possess. This is a subjective measure of how a individual responds and the confidence in their ability to answer the question rather than their depth of knowledge on the subject (Koriat *et al.*, 2020). Patient knowledge and awareness of a disease or condition are amongst the key components that dictate their behavior, particularly following hospital discharge (DeSai *et al.*, 2021). Post-surgery, patients are expected to monitor their wounds, practice good hygiene and identify initial indications of infection. Insufficient understanding of SSIs and WCPs may delay the detection of infection, while improper self-care practices will heighten the likelihood of an adverse outcome (A’aqoulah *et al.*, 2025). In this regard, the Health Beliefs Model (HBM) is a valuable theoretical framework for comprehending how patients’ knowledge and perceptions affect health-related behaviours. According to the model, individuals are more likely to engage in preventive behaviours when they perceive themselves to be at risk, understand the seriousness of the condition, recognise the benefits of preventive actions, and believe they have the ability to perform those actions.

In order to improve patient self-care post discharge collaborative health care decision making is necessary (Groenen *et al.*, 2025). The World Health Organisation SSI guidelines provide a list of the recommended preventative actions during the pre, intra and post-operative care period to improve patient health (World Health Organization, 2018). These guidelines make emphasis to hand washing by healthcare workers for example. The importance of handwashing before touching any wound would extend to the patient as well, since surgical wounds generally take a few weeks to fully heal. By that time the patient has already been discharged from hospital and would be responsible for caring for his/her own surgical wound. In the context of SSIs, patient awareness of risk factors, signs and symptoms, and appropriate WCPs are therefore essential for effective prevention. Emphasis should be placed on the importance of equipping patients with the knowledge and skills required to recognise the early signs and symptoms of an SSI and to seek timely medical attention. It should also be acknowledged that

SSIs may occur despite optimal postoperative self-care. In summary, improved patient knowledge and awareness related to a disease will likely encourage behaviors that reduce the risk of acquiring the disease, or promote early detection and treatment, which is the foundation of the HBM.

1.5 Problem Statement

South Africa is a resource constrained country, with the majority of South Africans (83%) accessing health care through the public health sector (Ngobeni, Breitenbach and Aye, 2020). Furthermore, according to the South African General Household Survey (2025), 25.4 million rely on social grants as their main source of income. Limited financial, human and infrastructural resources place considerable strain on public hospitals, particularly within rural and under-served urban areas. This results in marked geospatial disparities in access to and quality of care (Willie, Masekela and Iyaloo, 2024). In this context, efficient utilisation of hospital resources is essential to ensure sustainability of the healthcare system.

Surgical site infection is a largely preventable postoperative complication (Allegranzi *et al.*, 2016), with rates in KwaZulu-Natal Province having been reported to be as high as 16.6%, a proportion of infections occurring after hospital discharge (Naidoo, Madiba and Moodley, 2019b). Patients are required to complete postoperative recovery at home, including the care of surgical wounds. While discharge instructions on wound care may be routinely provided, inadequate WCPs may result in SSIs (Peter and Seif, 2022). This, necessitates the return to hospital for further treatment, readmission, or additional antibiotic therapy and dressing changes. These complications increase healthcare costs, place further strain on already limited resources and negatively affect patient outcomes. Inadequate patient knowledge may contribute to poor post-operative wound care and increased risk of SSI (Tobiano *et al.*, 2022), particularly in communities with limited access to basic hygiene resources, such as potable water.

Despite the burden of SSIs, there is limited evidence in KwaZulu-Natal Province regarding surgical patients' knowledge and awareness of SSIs as well as appropriate post-operative WCPs. Understanding patient knowledge is essential for informing effective patient-centred prevention strategies aimed at reducing avoidable SSI complications in this setting (Mbamalu *et al.*, 2021). Although previous studies have investigated SSIs, minimal attention has been

given to patient knowledge of SSI in this setting (Rahiman and Rajkumar, 2019; Mirnoto and Irwan, 2025).

1.6 Aim and Objectives

The study aimed to establish surgical patient's knowledge of surgical site infections and wound care practices at a regional hospital in KwaZulu-Natal Province, South Africa.

The objectives of the study were as follows:

1. To determine how comfortable patients were with their knowledge of surgical site infection based on information received from healthcare workers (HCWs) and other sources.
2. To determine the patients' basic knowledge level of post-operative wound care practices
3. To identify differences in comfort with SSI knowledge of and preventative wound care practices based on socio-demographic variables.

1.7 Study structure

This study is set out in the following five chapters:

- Chapter 1. Introduction: this chapter provides an overview of the topic, outlining the aims the and objectives of the study.
- Chapter 2. Literature Review: this chapter details the in-depth review of the local and international literature focusing on SSI and WCP.
- Chapter 3. Methodology: this chapter presents the methods used to conduct the study, and details the study design, population and sample, as well as the data collection tools, processes and analysis. It addresses issues of credibility and trustworthiness, and those related to the ethics taken into consideration.
- Chapter 4. Results: this chapter presents the study findings, first detailing the participants' socio-demographics, followed by the findings for the three study objectives.
- Chapter 5. Discussion: this chapter discusses the study findings for the socio-demographic details and the three objectives with respect to the local and international literature.
- Chapter 6. Conclusions: this chapter presents a summary of the implications of the study findings, limitations that may have affected the study, and recommendations that need to be considered for future research, policies and practices.

CHAPTER 2: LITERATURE REVIEW

2.1 Preamble

This chapter reviews the literature related to SSI, provides an overview of relevant definitions, infection classification, epidemiology, pathogenesis and prevention, including the role of patient education.

2.2 Healthcare Associated Infections

Healthcare Associated Infections (HAIs), often termed “hospital infections” or “nosocomial infections”, are an infection a patient acquires within 48 hours or more following admission to hospital and are one of the most adverse events that compromise patient safety (Adal *et al.*, 2025; Paladini *et al.*, 2025). These infections include catheter associated urinary tract infection, central line associated blood stream infections, SSIs and ventilator associated pneumonia. Sepsis as a result of HAIs can be linked to approximately 20% of deaths worldwide, which equates to 11 million avoidable fatalities (Rudd *et al.*, 2020).

SSI is one of the most common HAIs that a patient acquires during the course of receiving medical care in a healthcare facility (World Health Organization, 2011). According to the South African National Department of Health (2020), HAIs are the most frequent harmful patient safety incidents linked to inpatient care. While some are easily treated, others may have a more detrimental effect on a patient's health, lengthening their hospital stay and associated expenses, and causing the patient great distress (Monegro, Muppidi and Regunath, 2023). SSIs account for up to 30% of all HAIs (Biccard *et al.*, 2018; Fisha *et al.*, 2019; Sobhy *et al.*, 2019). Approximately 1 in every 10 patients who has surgery acquire a SSI in low-and-middle income countries (LMICs) (WHO, 2016). In, Africa, SSIs comprise between 12.3 and 57.7% of all HAIs infections (Abubakar et.al. 2022).

2.2.1 Definition of surgical site infections

Surgical site infection (SSI) has replaced the previously used term ‘surgical wound infection’. The term SSI having been introduced by the USA Center for Diseases Control and Prevention (CDC) in 1992. SSI refers to an infection related to a surgical procedure that occurs near the surgical site within 30 days following surgery or up to 90 days following surgery where an implant is involved (Centers for Disease Control and Prevention, 2018).

2.3 Classification of surgical site infections

As reported by the European Centre for Disease Prevention and Control (2023), infections at the surgical site can occasionally be limited to the skin's surface, while other are more serious and can involve tissues under the skin, inside organs or implanted material (Figure 2).

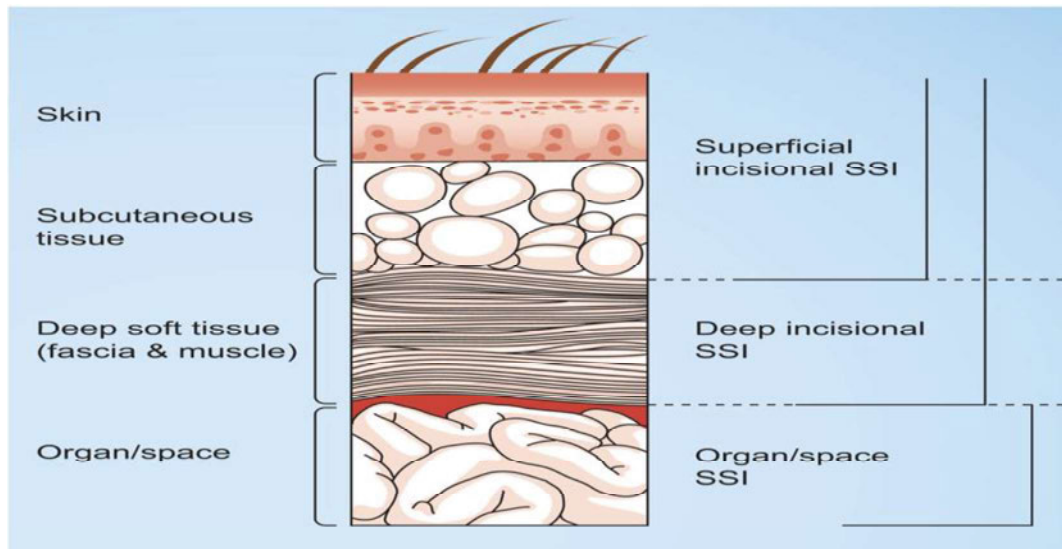


Figure 2: Cross section of the abdominal wall detailing the classification of SSIs
Source: (Mangram *et al.*, 1999).

Based on the National Healthcare Safety Network criteria (2024), the criteria for differentiating the three types of SSIs are detailed in Table 1 (Centers for Disease Control and Prevention, 2024). The surgical wound classification guide aids clinicians to assess the extent of bacterial infection and assess the likelihood of potential complications, enables risk stratification and identifies patients at risk for post-operative SSI, thereby assisting with the appropriate treatment of patients (Onyekwelu *et al.*, 2017; Wang-Chan *et al.*, 2017).

According to the guidelines set out by the CDC, surgical wounds are divided into four classes:

- Class 1: Clean refers to an uninfected wound in which there is no contamination or infection.
- Class II: Clean-contaminated refers to surgical wounds in which there is no sign of infection but the procedure is associated with an internal organ.
- Class III: Contaminated refers to operations with major breaks or leakage of the organ contents into the surgical wound.
- Class IV: Dirty or infected. This suggests that the organisms causing postoperative infection were present at the time of surgery.

Table 1: Surgical site infection classification

(Centers for Disease Control and Prevention, 2024)

Type	Definition
Superficial Incisional	Date of event occurs within 30 days following the NHSN operative procedure (where day 1=the procedure date) and involves only skin and subcutaneous tissue of the incision and patient has at least one of the following: a) Purulent drainage from the superficial incision. b) Organism(s) identified from an aseptically obtained specimen from the superficial incision or subcutaneous tissue by a culture or nonculture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment [for example, not Active Surveillance Culture/Testing (ASC/AST)]. c) A superficial incision that is deliberately opened by a physician designee and culture or non-culture-based testing of the superficial incision or subcutaneous tissue is not performed and patient has at least one of the following signs or symptoms: localized or tenderness; localized swelling; erythema; or heat. d) Diagnosis of a superficial incisional SSI by a physician designee.
Deep Incisional	Date of event occurs 30 to 90 days following the NHSN operative procedure (day 1= the procedure date) <i>and</i> involves deep soft tissues of the incision (for example, fascial and muscles layers) <i>and</i> patient has at least one of the following: a) Purulent drainage from the deep incision. b) A deep incision that is deliberately opened or aspirated by a physician designee or spontaneously dehisces and organism(s) identified from the deep soft tissues of the incision by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment or culture or nonculture based microbiologic testing method is not performed and patient has at least one of the following signs or symptoms: fever (>38°C); localized pain or tenderness. c) An abscess or other evidence of infection involving the deep incision detected on gross anatomical exam, histopathologic exam, or imaging test.
Organ/Space	Date of event occurs 30 to 90 days following the NHSN operative procedure (day 1= the procedure date) <i>and</i> Involves any part of the body deeper than the fascial/muscle layers that is opened or manipulated during the operative procedure <i>and</i> patient has at least one of the following: a) Purulent drainage from a drain placed into the organ/space. b) Organism(s) identified from fluid or tissue in the organ/space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment. c) An abscess or other evidence of infection involving the organ /space detected on gross anatomical exam or histopathologic exam, or imaging test evidence definitive or equivocal for infection.

*Physician may be interpreted to mean surgeon, infectious disease physician, emergency physician. *Physician's designee may be interpreted to mean a nurse practitioner or physicians' assistant.

2.4 Incidence of surgical site infections worldwide

The introduction of antibiotics has reduced SSI rates significantly since the mid 1900's, which have remained stable. A recent meta-analysis revealing the worldwide incidence of SSI to be 11% for general surgery procedures. The study by Mengistu and colleagues (2023) reported a much lower pooled incidence rate of 2.5% for SSIs, while the GlobalSurg 2 study reported incidence was 12.3%, 30 days post-surgery (GlobalSurgCollaborative, 2018). The International Surgical Outcomes Study (ISOS) reported an SSI incidence of 6.5% following elective surgery (Wan *et al.*, 2021). In 2021, the CDC National Health Safety Network reported 2 759 027 surgical procedures in the USA, of which 21 186 had SSIs. The European Centre for Disease Prevention and Control reported SSI incidence ranging between 2% and 4% for the period 2018-2020. Patients who developed SSI had a 2-11 times higher risk of death when compared with those who did not develop SSI (Centres for Disease Control and Prevention, 2022).

In some SSA countries, SSI rates can be as high as 41.9% (Nakhleh *et al.*, 2025). A recent SA prevalence and surveillance study by Nokaneng and Hollow (2025), reviewed several studies and noted that SSI rates varied from 0.65 - 48%, placing additional strain on the already stressed healthcare systems. SSI rates vary by the type of surgery performed, with open abdominal surgery considered among the highest risk procedures. SSIs are therefore a significant problem worldwide, affecting millions of patients each year and placing a burden on healthcare systems globally.

2.4.1 Surgical site infection incidence post-discharge

A notable proportion of SSIs occur after discharge from hospital (Sinha, 2019), with many factors contributing to its underreporting as part of surveillance (Clayphan *et al.*, 2022). These factors include limited resources, variable geographic barriers, and insufficient manpower and infrastructure constraints (Monahan *et al.*, 2020; Russo *et al.*, 2021). A systematic review of 55 studies reported an overall SSI rate of 9.9% (Woelber *et al.*, 2016), with 60.1% of the SSIs occurring once the patients were discharged from hospital (Woelber *et al.*, 2016). The systematic review further reported that the rate of post-discharge SSIs differed by surgical procedure: 66% for appendectomies, 80% for hernia repairs, and 58% for vascular operations.

In North West Ethiopia, a study on post-discharge SSI surveillance reported that most infections occurred shortly after hospital discharge, with an incidence of 70.3% (Alemayehu,

Azene and Mihretie, 2023). The data from a retrospective study over a 10 year period in SA showed a statistically significant increase in post-discharge admissions for SSI, ranging from 6.9 to 13.8 per 1000 surgeries (Naidoo, Madiba and Moodley, 2019a). Post-discharge SSI rates vary according to the hospital, type of procedure and patient risk profiles, but remains a global problem that requires further interventions. In the age of technology, the use and implementation of digital tools to improve post-discharge surveillance is available, with stakeholders in healthcare being responsible for identifying the most suitable platforms and rolling them out based on their resources (Dalcól, Tanner and de Brito Poveda, 2024).

2.5 Risk factors for surgical site infections

SSI are caused by micro-organisms, the most common being *Staphylococcus* species, *Streptococcus* species and Gram-negative bacilli. These micro-organisms can infect a surgical wound through various forms of contact, such as from the touch of a contaminated caregiver or surgical instrument, through germs in the air or those already on or in the patient's body, which then spread into the wound (Shakir *et al.*, 2021).

Patient (host), microbial and surgical environmental factors are the categories of risk factors associated with SSIs, as indicated in Figure 3. Advanced age, malnourishment, hypovolemia, obesity, steroid usage, diabetes, use of immunosuppressive drugs, smoking, HIV and coexisting infection at a remote site are patient risk factors for wound infection (Zabaglo, Leslie and Sharman, 2024). Risk factors associated with the surgical procedure include the development of a hematoma, use of foreign objects, such as drains, creation of dead space, a history of infection, inadequate length of the surgical hand scrubbing, shaving the skin before surgery, inadequate skin preparation, long duration of surgery, hypothermia and contamination from the operating room (Seidelman, Mantyh and Anderson, 2023).

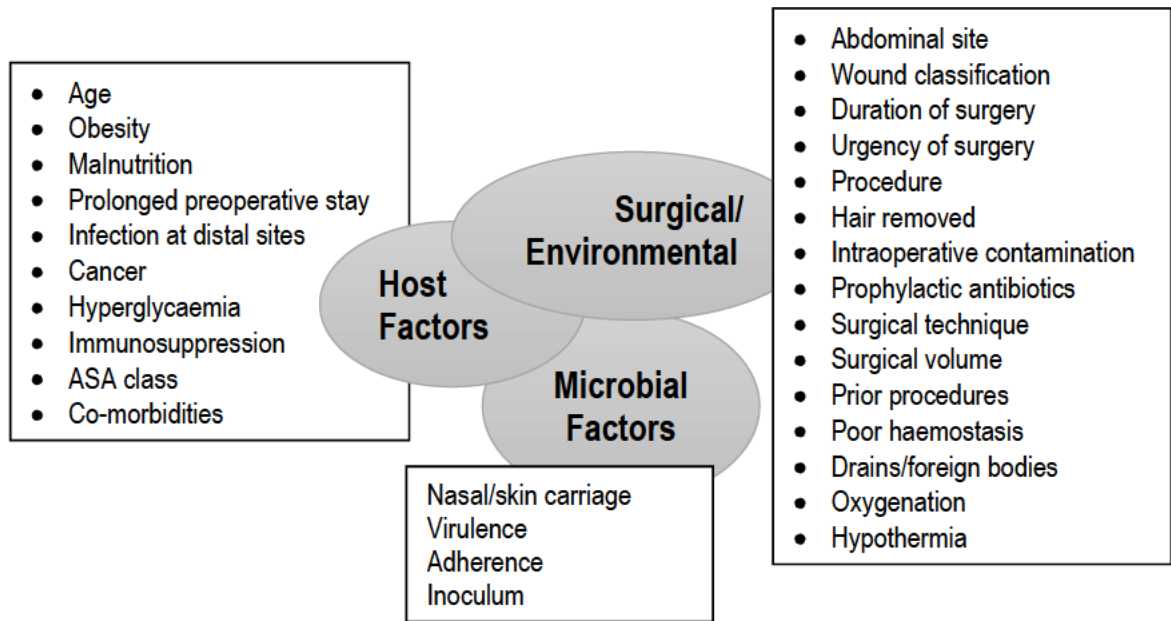


Figure 3: Risk factors for SSIs

Source: (John Hopkins University, 2010)

As per Table 2, patient (host) related risk factors can be classified as modifiable and non-modifiable. The presence of these risk factors puts patients at greater risk of developing a SSI, which could lead to prolonged recovery time as well as reduced quality of life. Risk factors associated with the surgical procedure include the development of a hematoma, use of foreign objects, such as drains, creation of dead space, a history of infection, inadequate length of the surgical hand scrubbing, shaving the skin.

Table 2: Modifiable patient related risk factors associated with surgical site infections

Modifiable Risk Factors	Impact
Diabetes	Wound healing is negatively impacted by hyperglycaemia, which promotes glycosylation of proteins impairs the innate immunity (Zhang <i>et al.</i> , 2015).
Immunosuppressive medication and conditions	Inflammatory phase of wound healing is compromised by immunosuppressive conditions and /or medications (Filsoufi <i>et al.</i> , 2007; Payne <i>et al.</i> , 2008).
Malnutrition	Decreased collagen synthesis and granulation formation in surgical wound is as result of malnutrition, which results in ineffective tissue healing (Hennessey <i>et al.</i> , 2010). Hypoalbuminemia results in ineffective innate immunity. Low albumin can result in tissue oedema, causing an increase in the leakage of intestinal fluid into the surgical wound.
Obesity	Oxygen and antibiotic delivery is compromised by adipose tissue, which results in decreased blood flow (Harrington <i>et al.</i> , 2004; Yuan and Chen, 2013; Meijs <i>et al.</i> , 2019).
Preoperative infections	All infections must be identified and treat prior to elective surgery irrespective of the site of the infection (Mangram <i>et al.</i> , 1999).
Tobacco use	Vasoconstriction, decreased inflammatory response as well as relative ischaemia, are a result of tobacco use (Wukich <i>et al.</i> , 2011).
Non-Modifiable Risk Factors	Impact
Age	With age, the skins basement membrane and dermis weaken, resulting in a decrease in the cutaneous vessels and nerves, thereby impairing wound healing.
History of previous infection	Demonstrates inherent immunity and a tendency for infection
History of radiation therapy	Hinders wound healing and induces tissue damage.

2.6 Pathogenesis of surgical site infections

The pathogenesis of SSI is a complex process in which the body tries to restore and heal the affected area. The classification, mechanisms and immune response initiated by SSI wound healing are outlined below.

2.6.1 Wound classification

The role of the skin is to maintain a physical barrier between the underlying body tissues and the external environment. When the skin is damaged or injured, a wound is created (Saleh, 2019), which can be classified as acute or chronic. Acute wounds arise from trauma or surgery, with the damaged skin and under normal circumstances the skin will heal and return to its natural state. The process of wound healing follows four phases: hemostasis and coagulation, inflammation, proliferation and maturation (Figure 4). These processes can overlap. Under normal conditions, an acute wound will progress through the normal stages of wound healing

and show signs of healing within four weeks without complications. Chronic wounds remain in the inflammation phase of healing and show little or no progress to go through the normal healing stages (Okur *et al.*, 2020). A wound is considered chronic when the healing process takes longer than three months (Iqbal *et al.*, 2017). Chronic wounds take a prolonged period of time to heal, sometimes never healing.

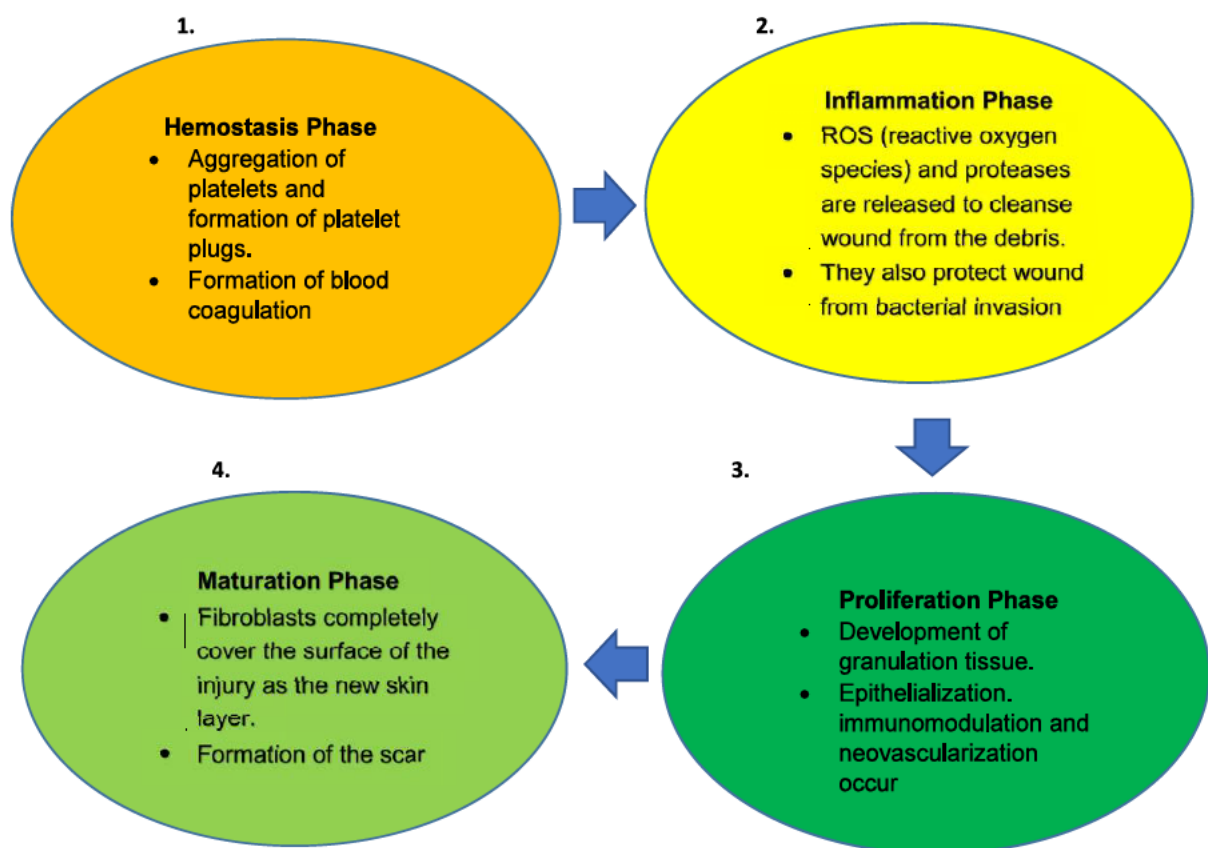


Figure 4: Process of Wound healing

Source: (Ambekar and Kandasubramanian, 2019)

2.6.2 Underlying mechanism of surgical site infections

A variety of micro-organisms are naturally found on the skin as normal flora (Seidelman, Mantyh and Anderson, 2023), with SSI occurring when micro-organisms colonize the surgical incision, causing inflammation and tissue damage. Chronic conditions, such as diabetes, poor nutrition, compromised immune system and advanced age, can all contribute to the incidence of SSI (Rahiman and Rajkumar, 2019),

Furthermore, surgery that results in significant tissue damage and lengthy recovery times might weaken the host's defenses, making it difficult to fend off micro-organisms, resulting in their being susceptible to a possible infection (Peterson, 1996; Guo and Dipietro, 2010). The layers of tissue under the skin are sterile, and under circumstances of skin injury (open surgery), the beneficial normal flora can become potential pathogens and cause SSIs. These microorganisms have virulence factors, including adhesions, poisons and enzymes, which make it easier for them to attach to the host cells and interfere with the host defenses (Nguyen and Soulika, 2019).

2.6.3 Immune response to wound healing

Swelling, redness, and discomfort at the surgical site are caused by the cellular immune system and tissue damage, with clinical symptoms being moderate to severe, depending on the general health of the host. In extreme circumstances, sepsis and systemic infection can develop, leading to multiple organ failure and death. Nonsteroidal anti-inflammatory medications are often prescribed for pain control during the perioperative period (Sheth *et al.*, 2020), which might contribute to an impaired immune response in surgical patients, resulting in a predisposition to SSI (Naidoo, Madiba and Moodley, 2019a). General anaesthesia given during the surgical procedure can also blunt the patient's immune response during the perioperative period (Kilpatrick *et al.*, 2023).

2.7 Consequences of surgical site infections

The consequences of SSI incorporated both systemic and broader consequences, such as mortality and morbidity, as well as economic implications as a consequence of prolonged hospitalisation or readmission of patients.

2.7.1 Economic burden

Surgical site infections result in patients returning to hospital post-discharge or extending their stay while in hospital, with the LoS, being a measure used to quantify the monetary cost to the healthcare system. In 2022, the US CDC indicated that the average length of stay resulting from a SSI increased by 9.7 days, the average cost linked to this being \$20 000, costing the healthcare system just over \$3 billion each year. A study conducted in Scotland found that out of 877 HAI admissions, 130 (14.8%) were as a result of a SSI, and showed the excess length of stay attributed to this as 9.8 days per infection (Stewart *et al.*, 2021). Patients who develop

SSI might have a higher risk of intensive care utilisation, which is a costly resource. This highlights the need for interventions to reduce monetary costs, minimize complications associated with SSIs and reduce the burden on healthcare systems while improving patient outcomes.

The quality of surgical patient care is measured in some countries using 30-day readmission data, with considerable literature from the US indicating that the annual cost of readmission is estimated at US\$17 billion (Jencks, Williams and Coleman, 2009). Most LMICs, lack data indicating the reasons for readmission as well as the associated costs (Snyders, Swart and Duvenage, 2020). A study conducted at a hospital in the Western Cape, SA reported a post-discharge SSI readmission rate of 2.87% (Snyders, Swart and Duvenage, 2020). SSI costs are likely to vary across different hospital settings (urban and rural), facility levels, surgery types and populations, and therefore cannot be generalised across all setting (Monahan *et al.*, 2020).

2.7.2 Morbidity and mortality

Surgical site infections have a significant impact on post-operative morbidity and mortality rates (Badia *et al.*, 2017). Astagneau and colleagues (2001), conducted a study in Northern France reporting a mortality rate of 38% in patients with SSIs from 1997 to 1999. Findings from Coello and colleagues (2005), showed significant increased mortality rates across all subcategories of SSI in their study of 150 English hospitals. A recent study in northern Italy reported a mortality rate of 4% for SSI following colon surgical procedures, and 3% for SSIs following hip arthroplasty surgery (Vicentini *et al.*, 2023). There is no conclusive evidence to associate age with an increased risk for SSIs, although older patients may have one or more comorbidities than their younger counterparts, which is a risk for SSI (Horasan *et al.*, 2013).

2.8 Surgical site infection prevention measures and treatment

Given the importance of post-discharge SSIs for the healthcare systems and patients themselves there remains a need for effective prevention strategies that will empower patients to prevent SSI at home. Patient education is considered a key approach to tackle post-discharge SSI.

2.8.1 Patient education

There are relatively few educational studies on SSI knowledge and wound care in African countries. Of those studies which do exist, most have investigated the educational approach by

handing out instructional materials, such brochures and post-operative care instructions, to advise patients on preventative measures against SSI (Mbamalu *et al.*, 2021). Very few studies assessed the patient's understanding of the information provided, or the effect of the provided information on their understanding of infection prevention and control (IPC). In addition, given the low literacy levels of many patients in Africa, the current consent and advisory delivered by medical practitioners might be challenge to patients, especially in the area of SSI and its subsequent management (Pittalis *et al.*, 2024).

Researchers in Finland found that wound complications were much lower in patients who felt they had received more information than expected upon hospital discharge than in those who felt they had received less information (Koivisto *et al.*, 2020). A study conducted in Australia found that discharge information that encouraged patient participation in shared decision-making and pain management conversations enhanced their ability to manage their surgical wounds at home (Tobiano *et al.*, 2022).

2.8.2 Patient risk reduction strategies

Modifying patient behaviour is an important approach to reduce the risk of SSI. A patient with a good understanding of preventative measures, compliance with medical instructions, proper wound care, and adherence to medication prescribed will be at lower risk for post-discharge SSI. Post-operative care includes prevention education interventions as a key component (Mbamalu *et al.*, 2021; Cvetanovska *et al.*, 2023). Patient engagements regarding correct hygiene and WCPs are essential and play an important role in the recovery process. Patients need to be aware of important areas, such as basic hygiene practices, including hand washing and wound cleansing, dressing and care of the wound by ensuring the wound is kept dry, as well as recognising wound complications requiring medical assistance. Targeting modifiable risk factors, such as nutritional status, cigarette smoking, wound surveillance and hygiene of the surgical site, can potentially reduce the risk of SSI (Lechowski *et al.*, 2023).

Inadequate wound care knowledge among patients can lead to consequences, such as being a healthcare burden, having financial impact and reducing their quality of life (Jan *et al.*, 2021). The success of any treatment depends on patient compliance (Jan *et al.*, 2021), with inadequate and/or gaps in their knowledge having a direct impact on how patients manage their wound

care. Therefore, assessment of patient knowledge is an essential component in minimising SSI and wound complication rates.

2.8.3 Patient knowledge and participation

Surgical site infection requires active participation from patients, as they are responsible for their health and the care of their surgical wounds once they are discharged from hospital. Patient should be aware and able to identify the ‘red flags’ of signs and symptoms, such as worsening pain, change in colour of the wound, discharge, odour, fever and chills, heat and the wound pulling apart, and realise these require them to seek medical assistance as soon as possible to allow for timely intervention (Hwekwete, 2025).

Patients need to familiarise themselves with practices, such as hand washing and hygiene, showering, drying and patting the wound dry, not scrubbing the surgical area and avoiding scented products around the wound area (Hwekwete, 2025). Wounds need to be handled carefully. Patients should know the do’s and don’ts of taking care of their type of wound, and this requires that they are provided with clear instructions.

2.9 Gaps in the literature

There is a scarcity of literature on patient knowledge of SSI and WCPs, despite the fact that a percentage of SSIs will occur shortly after the patient has left hospital. Proper care of the surgical wound is essential to prevent infection. Measuring comfort levels alongside knowledge shows how confident an individual is and distinguishes between mere understanding revealing the application and capability of one to apply the information learned. Knowledge and awareness of a particular disease or condition are cues to action for healthy behaviours, and an understanding of this can be used to inform prevention approaches going forward. This gap in knowledge must be addressed, particularly in settings where the SSI burden is high, to reduce morbidity and mortality, as well as the financial consequences of this preventable complication.

CHAPTER 3: METHODS

3.1 Preamble

This chapter presents a detailed description of the methods used during this research study., and describes the theoretical framework that assisted in shaping the research approach followed by the study design, setting and population, as well as the data collection tools and processes, and the method of analysis.

3.1.1 Theoretical framework

The Health Belief Model (HBM) is one of the most commonly used frameworks for explaining an individual's decision-making around healthy behavior (Alamer, 2024). The model (Figure 5), consists of three components, these being modifying factors (perceived seriousness and perceived susceptibility), individual beliefs (perceived benefits, perceived barriers, perceived threat, self-efficacy and cues to action). The model proposes that people react appropriately to messages about health and disease prevention, when they believe they are in real danger (perceived sensitivity), that the risk is very serious (perceived severity), and that changing their behaviour will result in many benefits (perceived benefits). They are also more likely to follow through on behaviour changes when they believe they can remove obstacles to engaging in healthy behaviours (perceived barriers). Self-efficacy is the term used to describe what individuals think of their own capacity to carry out an action, and can encourage people to embrace healthy behaviours and stop unhealthy ones. Cues to action are factors that compel people to take standard precautions or other health-related actions (Table 3).

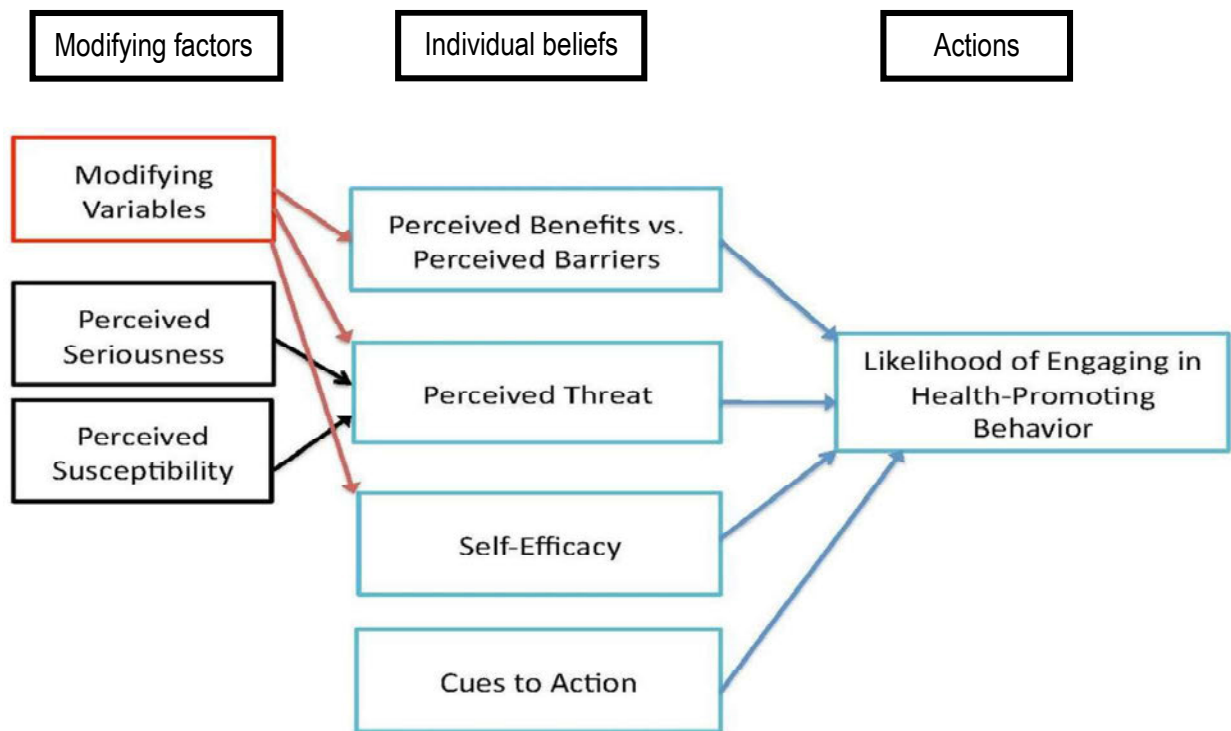


Figure 5: Health Belief Model

3.1.2 Application of Health Beliefs Model in this research

When surgery patients are discharged from hospital, a small proportion will return for treatment as a result of a SSI (Naidoo, Madiba and Moodley, 2019a; Merdad *et al.*, 2024; Rezaei, Zienkiewicz and Rezaei, 2025). Once discharged, patients are expected to engage in home care and monitor their surgical site themselves, resulting in the possibility that some will acquire a SSI when they return home (Tobiano *et al.*, 2022). When a patient is discharged from hospital they are expected to engage in meticulous hygiene and ensure that they clean the wound regularly until it has fully healed. Patients who are not aware of their risk of SSI may not follow the meticulous post-operative wound care as instructions given to them at discharge from hospital. It is therefore essential that prior to discharge, they are equipped with adequate knowledge and awareness of SSI signs and symptoms, their risks of SSI, complications arising from SSI as well as proper hygiene practices to clean and care for the wound (Alsahli *et al.*, 2022). Recent published studies which used the HBM found that knowledge was associated with healthier behaviours among surgical patients and reduced surgical complications. Placing patient education as a top priority, enhanced patient health outcomes (Lyu, Li and Li, 2024). A study by Awad and colleagues investigated and found that patient involvement when making decisions, increases their self-assurance in their capacity to act and produce better results

(Awad *et al.*, 2022) The study utilized the HBM and related this to how an individual behaviour is impacted by the modifying factors and personal beliefs that are indicated in Table 3.

Table 3: Core constructs of the Health Beliefs Model

Core Constructs	Impact on knowledge about SSI and WCP
Modifying factors	
• Perceived Seriousness	The patient believes they are at risk of acquiring SSI. (e.g. SSI could lead a to major infection and even death) Knowledge: Understanding the impact and seriousness the disease can have.
• Perceived Susceptibility	The patient believes that they are at risk of acquiring the condition. (e.g. I could acquire a SSI). Knowledge: Aware of the risk factors to add in prevention.
Individual beliefs	
• Perceived Benefits	The patient believes the benefits of the suggested actions. (e.g. Hand washing is essential to prevent infection) Knowledge: Comprehending that the action will reduce the risk, resulting in a positive outcome.
• Perceived Barriers	The patient believes in the barrier of the action. (e.g. My hands are clean, I cannot waste water and wash my hands all the time). Knowledge: Overcoming perceived barriers.
• Self-Efficiency	The patient has the confidence in their own abilities. (e.g. I am confident that I can take care of my wound) Knowledge: Trust and belief in one's own ability and skills.
• Cue to Action	The ability of the patient to initiate an action. (e.g. Recognising signs and symptoms, following the advice of the healthcare worker). Knowledge: Identifying the trigger and associating this with an action.
Actions	
• Likelihood of engaging in Health Promoting Behaviour	The patient reassesses the way they are treating the wound or goes to the clinic. Knowledge: Seeking appropriate help.

3.2 Study design

The study design has implications for the data collection process, with a quantitative, prospective, cross-sectional, descriptive design with an analytical (correlational) component being used in this research. Quantitative research enables the researcher to ask closed-ended questions, collect numerical data and analyze it using statistical methods in an unbiased objective manner (Polit and Beck, 2019). A cross-sectional survey was used to acquire information at a single point in time from a given population (Wang and Cheng, 2020). The selection of participants in a cross-sectional study is predetermined and based on specific inclusion and exclusion criteria. Quantitative research measures variables and investigates relationships between the variables that are statistically expressed. The quantitative approach

was conducted using two questionnaires, which enabled the researcher to determine the association between various socio-demographic/clinical variables and SSI knowledge or WCP among patients at a regional government hospital in KwaZulu-Natal Province, SA.

3.3 Study setting

The study site was the Dr Pixley Ka Isaka Seme Memorial Hospital, which is responsible for providing the community and surroundings it serves with healthcare services. It was opened in 2023 as a 500-bed regional facility that provides obstetrics and gynaecology, general surgery, orthopedics surgery, paediatrics, psychiatry and mental health, anaesthetics, and radiology services. Based on the north coast of KwaZulu-Natal Province it provides services to approximately 1.5 million residents of the northern eThekweni region, many of whom rely on the public sector for all their healthcare needs. The large catchment area this hospital serves includes the suburbs of Phoenix, Inanada, Ntuzuma and KwaMashu, as well as Tongaat and Verulam in the north of Durban (Figure 6).

Regional hospitals in the South African healthcare system are a level 2 institution to which patients are referred from clinics and other first-line healthcare facilities. This facility serves a predominantly Black African population, while also serving Indian, Coloured and other populations who live within its catchment area. . Because the facility manages a large, diverse population, it provides a high representative area to investigate the study objectives in the public sector.

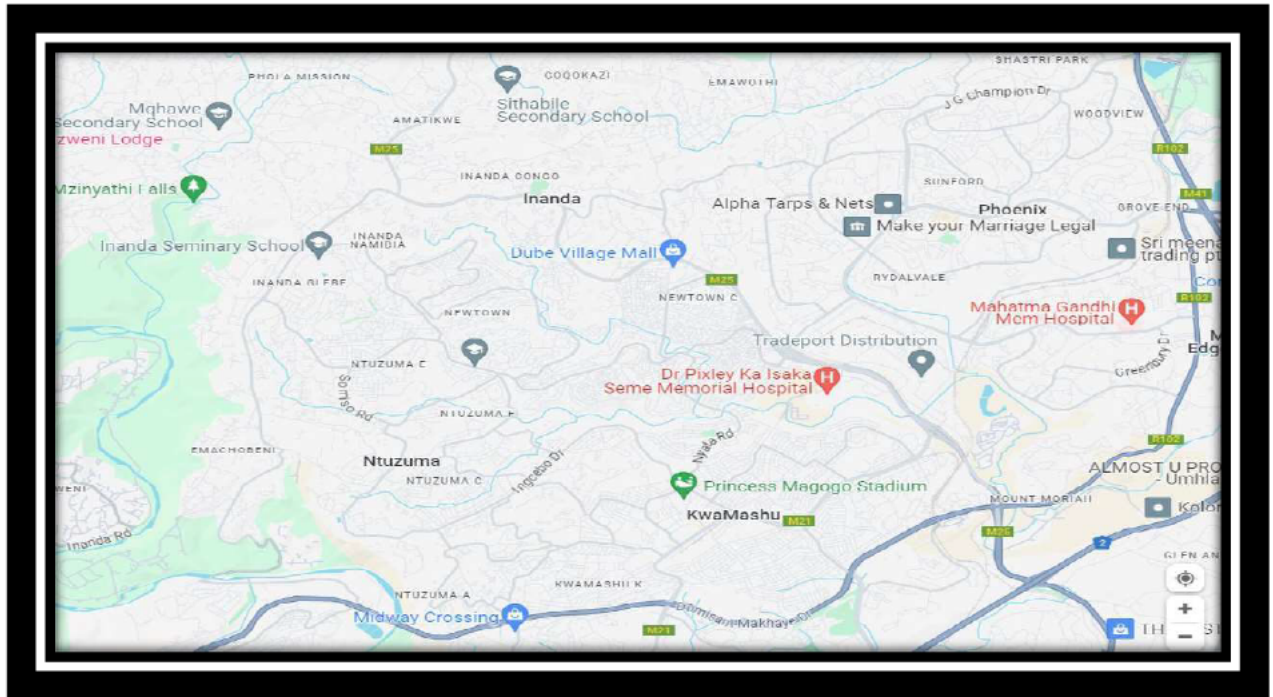


Figure 6: Catchment area the Dr Pixley ka Isaka Seme Memorial Hospital

The choice of this research site was based on logistics for the researcher, who wanted to be on-site during data collection, as well as the volume of surgical procedures at the study site. The hospital has a general surgery volume that would contribute to the participant recruitment being completed on time.

3.4 Study population

The study population is the target population available for the study that the researcher makes deductions from (Rudolph *et al.*, 2023), this being the patients who underwent a general elective surgical procedure (inclusive of high-risk procedures) at the Dr Pixley ka Isaka Seme Memorial Hospital from 7 January to 24 April 2025. General surgery is among the surgical specialties with the highest SSI rates, hence general surgery procedures are considered high-risk. Many of the residential areas fall within the lower socio-economic groups, with education levels being low, unemployment being high, and service provision poor. The road infrastructure is poor, with many people living in very small houses or informal settlements that do not have on-site portable water and majority of these individuals are reliant on government social grants as their major source of income. A large percentage of these individuals are reliant on government funded healthcare and social support.

3.5 Study sample

The sample selected from the study population is known as the study sample (Zrineh, Al-Usta and Alwawi, 2026). Sampling is the act, process or technique of selecting a representative part of a population, called a sample, for the purpose of determining parameters or characteristics of the whole population (Polit and Beck, 2019). The goal of sampling is to obtain information a specific population by directly interacting with them.

3.5.1 Sampling method

This study used consecutive, non-probability sampling, the former being a technique in which a sample is selected from a readily available population in a specific order, the latter entailing a technique in which some units in the population have a zero chance of selection (Rudolph *et al.*, 2023). The non-probability sampling technique is characterised by the subjective judgement of the researcher in the selection of a persons who represents an accessible study population. However, consecutive nonprobability sampling enables straightfoword and seamless participant recruitment, and assists in obtained the required sample size for statistical analysis (Andrade, 2021). This approach is consistent with earlier research that made use of consecutive non-probability sampling (Gurguri, 2020). Recruitment of patients was over an extended period (7th January 2025 to 24th April 2025), the socio-demographics intending to be representative of the population the hospital serves.

The following inclusion criteria applied for surgical patients:

- 18 years and older (males and females)
- Underwent surgery during the study period
- All surgery other than emergencies
- Able to provide written informed consent

The following exclusion criteria applied to the surgical patients:

- Were prisoners
- Not South African citizens
- Unable to communicate in English or isiZulu

Non-South African citizens were excluded from this study because this would have introduced confounding variables due to differences in healthcare access and socio-economic status. They were also excluded from this research because of language barriers and the researcher did not

have access to interpreters of the other African/Foreign languages at the time. As a result of ethical considerations, prisoners were excluded as they are regarded as a vulnerable population.

3.5.2 Sample size

Selecting a suitable sample size is essential for deriving reasonable deductions from the study results (Memon *et al.*, 2020), and the minimum sample size of 213 was determined for this research using Cochran's sample size formula, to meet the desired statistical constraints. The parameters used to achieve this sample size was a confidence level of 95%, with a 5% margin of error using a population proportion of 16.6%, this being derived from a published South African study of SSI in high risk patients (Naidoo, Madiba and Moodley, 2019b). The population proportion is the proportion of the study sample that the researcher anticipates will have an outcome of interest for SSI. Based on the statistical parameters outlined above the minimum sample size was adjusted to 255, to account for non-response as well as missing data. This concurs with current literature which allows mathematical adjustments to ensure statistical power of the study (Bujang, 2021).

3.6 Data collection tool

Data collection tools must be valid and reliable. Questionnaires are a structured, predetermined tool used to obtain responses from participants that can be converted into statistical data. A range of variables, such as patient preferences, behaviors and actions can be measured with a customized questionnaire (Taherdoost, 2021).

Two questionnaires were used to collect data on patient's comfort with their knowledge of SSI (Anderson *et al.*, 2013) and WCP knowledge (Pieper *et al.*, 2007). Both, validated questionnaires were slightly modified for this research by cross cultural translational from English to isiZulu. Both the SSI questionnaire and WCP questionnaire collected patient's socio-demographic data, such as their age, gender, race, educational level and employment status. Both questionnaires also collected some clinical variables (clinical history and type of surgical procedure) from the same patients at the same interview. Each questionnaire was simple and easy to read using language that was easy to understand. The original English version of the questionnaire under went forward translation by a competent bilingual translator (whose first language is isiZulu) into the local isiZulu language, and made available to patients in both languages, with the participants being asked to complete it in the language they preferred. Both

questionnaires employed dichotomisation which is the process whereby a continuous variable is separated into two groups. This assists in simplification of complex data and this has been used by the medical communities to assess and evaluate data leading to effective measurement of disease (Nelson *et al.*, 2022). Dichotomisation allowed for the simplification of the analysis, with results that are more easily interpretable. The use of the $p < 0.2$ threshold facilitates the efficient selection of covariates that should be included in a regression analysis which yields the "best" model.

a. Surgical site infection survey

To address Objective 1, the questionnaire focused on the patient's SSI knowledge and this was adapted from "A survey to examine patient awareness, knowledge, and perceptions regarding the risks and consequences of surgical site infections" (Anderson *et al.*, 2013). (Appendix E). The survey consisted two components:

1. Socio-demographic details: age, gender, race, educational level and employment status.
2. Comfort and knowledge to SSI: 15 questions about prior admissions, previous infections, interactions with HCWs, and their level of comfort with their SSI knowledge. They were required to select one of two or three options, some with yes/no options. One of the questions required the patient to respond to the concept of comfort.

b. Wound care practice survey

An amended version of a previously validated questionnaire, "Discharge knowledge and concerns of patients going home with a wound", was used as the data collection instrument for this study (Pieper *et al.*, 2007) (Appendix F). The original questionnaire focused on patient beliefs and knowledge on WCPs, and includes aspects of wound management, hygiene practices, and compliance with wound care instructions given by healthcare workers. The questionnaire consisted of two section:

1. Socio-demographic details: age, gender, race, educational level and employment status.
2. Knowledge of WCPs: 14 WCP knowledge/beliefs statements with "True" and "False" options needing to be selected to indicate agreement or disagreement, or if they were correct or incorrect. The correctness of responses was based on established clinical

guidelines and best practice recommendations. The metric measure used to define knowledge was derived from similar studies, with an overall threshold score of $< 50\%$ being as classified as “Poor” while scores of $\geq 50\%$ being classified as “Adequate” (Muleme *et al.*, 2017; Owojori, Mulaudzi and Edokpayi, 2022; Datta, Singh and Mishra, 2023). Poor WCP knowledge was the study outcome, categorised as “Yes” or “No”, knowledge in the study denoting the skills and/or ability of participants to process and apply the information that was shared with them.

3.7 Pilot study

A pilot study is an important part of the research process to determine the feasibility, quality and efficiency of the main study (Teresi *et al.*, 2022), and are used to pre-test the research instrument on a small sample of participants. Pilot studies determine the reliability of the study and highlight ambiguous areas that require modification, or questions that need to be addressed.

Validity and reliability are the key essentials in providing credible and impactful research (Hossan, Wolfs and Petkovic, 2025). Validity in research refer to how accurately a study assesses what it is intended to measure. While reliability ensures results are trustworthy and reproducible and free from random errors (Bujang *et al.*, 2024). The study used a pre-test through the pilot study to ensure that validity and reliability was upheld. To ensure rigour, both questionnaires were reviewed by an epidemiologist/public health specialist and a surgeon to ensure all critical confounding clinical variables and social determinants of health relevant to the South African public hospital context were included. A pre-test of both questionnaires was conducted through a pilot study, to confirm that the wording was clear, unambiguous, and culturally appropriate. Where applicable, the data provided by patients was cross-checked with the healthcare worker notes in the patient medical record.

Pilot testing the research tools was conducted by the researcher at the Dr Pixley Ka Isaka Seme Memorial Hospital to test the tools effectiveness, validity and reliability of the questionnaires. The pilot study entailed the completion of the same tools used in the main study, being conducted. Piloting of both questionnaires were conducted among five participants. The original questionnaire was pilot tested among 2 of the 5 participants while the isiZulu version of the questionnaire was pilot tested among 3 of the 5 participants. The researcher and a trained

research assistant were responsible for the recruitment process in the ward and provided the questionnaires to potential participants to complete for the pilot study.

The intention was for the feedback received to help to refine the final questionnaires and process. However, no amendments to being required, as these were easy to understand and did not require further simplification. The participants recruited and data obtained as part of the pilot study were excluded from the main study. A quality control process of the data was implemented, through cross-checking some of the information with the doctor's progress notes in the patient medical file.

3.8 Data collection process

Data collection began once ethical approval and permissions from the healthcare authorities had been obtained. Training of research assistant, who had a background in administration, was done by the researcher. The training involved aspects of ethics (such as consent and confidentiality), communication skills, and the purpose of the study (including data collection process and criteria). A meeting was arranged with the Head of Department (HOD)-Surgery at the hospital to explain the study. The HOD-Surgery did not object, to the study being conducted in his unit. Thereafter, the researcher was acquainted with the ward staff who were briefed on the study.

Post-surgery patients were approached daily prior to discharge from the hospital and asked to participate in the study if they satisfied the eligibility criteria. Before the questionnaires were administered to prospective participants, the researcher explained its purpose, what would be required of them, and the need for written consent (Appendix G) prior to completing the questionnaires. Both questionnaires took a maximum of 30 minutes to complete by the participants and they were reminded that their responses would be anonymous. The researcher/research assistant were present during the process and to provide further explanation if the patients required this. During data collection, the researcher/research assistant did not encounter any participants who provided informed consent but were unable to read or understand both questionnaires.

3.9 Data analysis

The hard copies of the completed questionnaires were assessed for completeness before being captured onto a Microsoft Excel spreadsheet for data analysis. The data was quantitatively analysed using descriptive statistics, univariate and multivariate analysis.

a. SSI analysis

The SSI questionnaire data consisted two components:

1. Socio-demographic details: these were descriptively analysed using number and percentage for the different variables, e.g. age, sex, race, employment status, marital status and educational qualifications.
2. SSI comfort and knowledge: the responses to the 15 questions were first descriptively analysed to address Objective 1, that being how comfortable patients were with their knowledge of SSI.

To address Objective 3, a univariate statistical analysis (chi-squared testing) was performed to identify any relevant associations between their socio-demographic variables or questionnaire responses and the study outcome (comfort with their knowledge about SSI). The dependent variable (study outcome) was collected as binary response, either a “Yes” or “No” response to the last question in the questionnaire related to comfort. There was adaption of some variables based on the local relevance.

For the questionnaire data analysis, characteristics and/or variables with $p < 0.2$ in the univariate statistical analysis were entered into a multivariate logistic regression model as independent variables. The results of the logistic regression are presented as odds ratios (OR) and 95% confidence intervals (CI). Statistical significance was set at $p < 0.05$, the statistical analyses being performed using the Statistical Package for the Social Sciences (SPSS) version 29.0 (IBM Corp., NY).

b. Wound Care Practice analysis

1. Socio-demographic variables: Descriptive statistical techniques (frequencies with percentages) were used to summarise the study participant characteristics for the WCP questionnaire. The questionnaire consisted of 14 WCP knowledge/beliefs statements, that were predefined with participant response being “True” acknowledging and

agreeing with the statement or “False” indicating disagreement or the statement is incorrect.

2. To provide a standardised measure of WCP knowledge, the number of correct responses was converted into a percentage, which enabled consistent comparison across participants. Based on the percentage score, participants were categorised into one of two knowledge levels: Adequate WCP Knowledge - participants scoring $\geq 50\%$; Poor WCP Knowledge - participants scoring $< 50\%$, which addressed objective 2.

To address Objective 3, Univariate statistical analysis (chi-squared testing or Fisher’s Exact test) was performed to identify potential univariate statistical associations between participant characteristics and WCP knowledge levels. This approach was both objective and statistically interpretable, allowing for meaningful insight into patient understanding of WCP.

3.10 Ethical considerations

To ensure that the study was conducted in an ethical manner, permission was obtained from the Durban University of Technology (DUT) Institutional Research and Ethics Committee (IREC 191/24). The permission letter for this study is provided in Appendix A. Gatekeeper permission was obtained from the Provincial Department of Health KwaZulu-Natal (Appendix B) and the Dr Pixley Ka Isaka Seme Memorial Hospital (Appendix C). Participants received a “Letter of Information” (Appendix D) and an informed consent form that clearly detailed the aims and objectives of the study.

The Protection of Personal Information Act (POPIA) ensures the right to privacy is taken seriously and includes a data subject's right to be protected against any unlawful collection, retention, dissemination and use of their personal information (Kandeh, Botha and Futcher, 2018). POPIA requires people to receive consent from individuals before being able to obtain, retain and process personal information for research purposes. “Personal Information” includes contact details, socio-demographic information, personal history as well as communication records.

The research principles of autonomy, beneficence, self-determination, justice and right to privacy and confidentiality was upheld during the research process. The respect for the participants rights, consent, confidentiality and privacy was upheld by the researcher through

the principle of autonomy, and as per the POPIA. Confidentiality was maintained by encrypting sensitive information, password protecting data, and protection patient identity as per the POPIA by ensuring all personal information was not mentioned and each patient was uniquely coded.

The principle of beneficence was applied by ensuring the information received by participants are used solely for the purpose of the study and in the interest of surgical patients as per the duty to do good. Self-determination ensured that prospective participants were aware of their freedom to choose whether or not to participate in research studies, and that their decision to decline did not have any bearing on their ability to receive care now or in the future. All participants were treated with the same, with fairness and equality, and received no direct benefit from their participation in this study.

All data, both electronic and raw, will be stored under the strictest confidence for the required period of time, and will be destroyed after five years with the supervisor's permission. The hard copy data was stored in a locked cupboard, while the electronic data was password-protected on a laptop. The researcher and the supervisors were the only individuals who had access to the data.

CHAPTER 4: RESULTS

4.1 Preamble

This chapter presents the results from the various statistical analyses done for each of the two surveys. There are general results presented for the study participants' socio-demographic information in the first sub-section, followed by the survey specific results in the subsequent sub-sections.

4.2 Recruitment Process overview

An overview of the participant recruitment process is shown in Figure 7, with 340 potentially methodologically eligible participants being reduced to 255 patients who were deemed eligible to participate in this study following application of the study eligibility criteria. The research/research assistant acquired a list of eligible patients from the HOD Surgery, on a daily basis to recruit them to the study. This pre-populated patient list ensured that there was a lower chance of missing a patient. The most common reason for exclusion from this study was refusal to provide informed consent. The overall response rate for this study was >70%, this being considered an acceptable response rate based on similar studies.

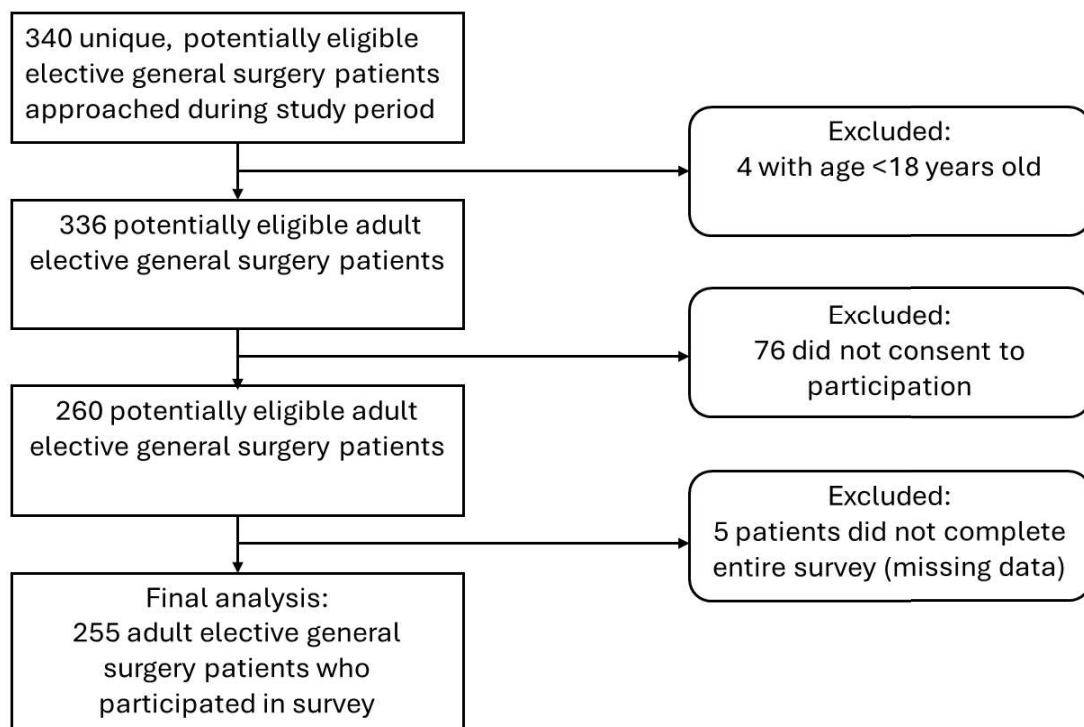


Figure 7: Study participant flow diagram

4.3 Socio-demographics details

A description of the socio-demographic characteristics of the 255 participants is provided in Table 4. The age variable was classified in this study as less than 60 years old and greater than 60 years old justified by the study population experiencing the highest burden of illness. This is further justified by Bucataru and colleagues who found that age > 60 years is a known risk factor for SSI (Bucataru *et al.*, 2023). Most participants were 60 years or younger (83.9%), with similar proportions of males and females (49.4% vs 50.6%). Just over two-thirds of participants (69%) were Black African race group, while most (75.7%) were unemployed, did not complete high school (55.3%). Furthermore, completion of high school is significant predictor associated with SSI risk (Mezemir *et al.*, 2020). Most patients did not have multiple comorbid diseases on presentation to the hospital (82.4%).

Table 4: Socio-demographic details

Variables	Characteristics	n (% of N=255)
Age	≤60 years	214 (83.9)
	>60 years	41 (16.1)
Sex	Female	129 (50.6)
	Male	126 (49.4)
Black African race group	No	79 (31.0)
	Yes	176 (69.0)
Employed	No	193 (75.7)
	Yes	62 (24.3)
Married	No	176 (69.0)
	Yes	79 (31.0)
Completed high school	No	141 (55.3)
	Yes	114 (44.7)
Multi-morbidity	No	210 (82.4)
	Yes	45 (17.6)

4.4 Surgical Site Infection results: Objective 1

A summary of participants' responses to the questionnaire items is provided in Table 5. Slightly more than half (51.4%) having no previous admissions, 57.3% did not have any prior surgery, 44.3% had a history of prior chronic disease, and 6.7% reported a previous SSI or other HAI. Almost half reported that HCWs did not discuss the risk of SSI with them (49.0%), and 60.0% indicated that HCWs spoke to them about SSI risk and prevention for less than five minutes.

Most of the participants (93.3%) had never received any written education materials, such as informational flyers, on SSI. More than half (56.1%) had learned about SSI from a clinic/HCW or acquired their SSI knowledge from other non-healthcare sources, 96.1% felt that approaches to improve knowledge around SSI were required, and 48.2% did not feel comfortable with their level of SSI knowledge.

Table 5: Summary of participants' responses to the SSI questionnaire items

Variables	Characteristics	n (% of N=255)
<i>Participant had previous hospital admission</i>	No	131 (51.4)
	Yes	124 (48.6)
<i>Participant had prior surgery</i>	No	146 (57.3)
	Yes: More than 2 years	65 (25.5)
	Yes: Within the last 2 years	44 (17.2)
<i>Participant had prior chronic disease</i>	No	113 (44.3)
	Yes	142 (55.7)
<i>Participant had prior HAI, other than SSI</i>	No	238 (93.3)
	Yes	17 (6.7)
<i>Participant had prior SSI</i>	No	248 (97.3)
	Yes	7 (2.7)
<i>Number of times HCW discussed SSI with participant</i>	None	125 (49.0)
	Once	43 (16.9)
	Twice or more	87 (34.1)
<i>HCW spoke to participant about SSI for >5 minutes</i>	No	153 (60.0)
	Yes	102 (40.0)
<i>Participant received informational flyer on SSI in hospital</i>	No	238 (93.3)
	Yes	17 (6.7)
<i>Participant learned about SSI outside hospital</i>	No	112 (43.9)
	Yes: Clinic or HCW	97 (38.1)
	Yes: Other source	46 (18.0)
<i>Participant felt that education about SSI can be improved</i>	No	10 (3.9)
	Yes	245 (96.1)
<i>Participant comfortable with level of knowledge about SSIs</i>	No	123 (48.2)
	Yes	132 (51.8)

HAI: Healthcare-associated infection, SSI: Surgical Site Infection, HCW: Health Care Worker.

4.5 Wound Care Practice results: Objective 2

Descriptive analysis was used to provide a standardised measure of WCP knowledge. The number of correct responses was converted into a percentage score (Table 6), which enabled consistent comparison across participants.

Table 6: Summary of responses to the WCP questionnaire items

Survey item/statement		No. (%)	Correct answer
1. Hands should be washed before the dressing is changed	True	247 (96.9%)	True
	False	8 (3.1%)	
2. Good nutrition is needed for wound healing	True	253 (99.2%)	True
	False	2 (0.8%)	
3. A person with a wound cannot leave the house	True	171 (67.1%)	False
	False	84 (32.9%)	
4. Smoking takes oxygen away from the wound	True	224 (87.8%)	True
	False	31 (12.2%)	
5. Bacteria/germs in the wound cause wound odour	True	252 (98.8%)	True
	False	3 (1.2%)	
6. Turpentine is a wound cleaner	True	30 (11.8%)	False
	False	225 (88.2%)	
7. Peroxide is good for wounds because of the bubbles	True	41 (16.1%)	False
	False	214 (83.9%)	
8. It is best to quickly pull tape off the skin	True	107 (42.0%)	False
	False	148 (58.0%)	
9. Tape should be stretched tight across the dressing	True	197 (77.3%)	False
	False	58 (22.7%)	
10. Wound care is best done by someone besides the patient	True	167 (65.5%)	False
	False	88 (34.5%)	
11. Antibiotics are needed until the wound closes	True	245 (96.1%)	False
	False	10 (3.9%)	
12. A person should never drink alcohol until the wound heals	True	245 (96.0%)	False
	False	11 (4.3%)	
13. Wounds need to dry out	True	252 (98.8%)	False
	False	3 (1.2%)	
14. Wounds need air to breathe	True	231 (90.6%)	False
	False	24 (9.4%)	

WCP: wound care practice

Based on the percentage score, they were categorised into one of two knowledge levels: Adequate WCP Knowledge ($\geq 50\%$) and Poor WCP Knowledge ($< 50\%$). The correct responses to the questionnaire ranged from 1.2% to 99.2%, depending on the questionnaire item, with 61 patients (23.9%) scoring $< 50\%$ (poor WCP knowledge).

4.6 Findings to address Objective 3

This section details the univariate then the multivariate analysis of the SSI survey, followed by the univariate and multivariate analysis of the wound practice survey.

4.6.1 Univariate analysis of surgical site infection survey

The results of the univariate statistical analysis are shown in Table 7. There were statistically significant univariate associations between the variables and comfort with SSI knowledge ($p < 0.05$): number of times HCW discussed SSI with participant, HCW spoke to participant about SSI for > 5 minutes, participant received informational flyer on SSI while in hospital, learned about SSI outside hospital and reported need for improvement in SSI education. In addition, the following variables met the criteria for inclusion in the multivariate statistical analysis ($p < 0.2$ in the univariate analysis): participant was Black African, had a previous hospital admission, prior surgery and chronic disease.

Table 7: Bivariate statistical associations between socio-demographic information, questionnaire responses, and comfort with SSI knowledge

	Characteristic	Level of comfort with SSI knowledge		p-value*
		Uncomfortable (N=123)	Comfortable (N=132)	
Age	≤60 years	103 (83.7)	111 (84.1)	0.939
	>60 years	20 (16.3)	21 (15.9)	
Sex	Female	65 (52.8)	64 (48.5)	0.486
	Male	58 (47.2)	68 (51.5)	
Black African	No	31 (25.2)	48 (36.4)	0.054
	Yes	92 (74.8)	84 (63.6)	
Employed	No	92 (74.8)	101 (76.5)	0.749
	Yes	31 (25.2)	31 (23.5)	
Married	No	85 (69.1)	91 (68.9)	0.977
	Yes	38 (30.9)	41 (31.1)	
Completed high school	No	71 (57.7)	70 (53.0)	0.451
	Yes	52 (42.3)	62 (47.0)	
Multimorbidity	No	105 (85.4)	105 (79.5)	0.223
	Yes	18 (14.6)	27 (20.5)	
Had previous hospital admission	No	71 (57.7)	60 (45.5)	0.050
	Yes	52 (42.3)	72 (54.5)	
Had prior surgery	No	79 (64.2)	67 (50.8)	0.064
	Yes: more than 2 years	24 (19.5)	41 (31.0)	
	Yes: within the last 2 years	20 (16.3)	24 (18.2)	
Had prior chronic disease	No	60 (48.8)	53 (40.2)	0.166
	Yes	63 (51.2)	79 (59.8)	
Had prior HAI, other than SSI	No	116 (94.3)	122 (92.4)	0.547
	Yes	7 (5.7)	10 (7.6)	
Had prior SSI	No	121 (98.4)	127 (96.2)	0.291
	Yes	2 (1.6)	5 (3.8)	
Number of times HCW discussed SSI with participant	None	86 (69.9)	39 (29.5)	<0.001
	Once	20 (16.3)	23 (17.4)	
	Twice or more	17 (13.8)	70 (53.0)	
HCW spoke to participant about SSI for >5 minutes	No	95 (77.2)	58 (43.9)	<0.001
	Yes	28 (22.8)	74 (56.1)	
Received informational flyer on SSI in hospital	No	121 (98.4)	117 (88.6)	0.002
	Yes	2 (1.6)	15 (11.4)	
Learned about SSI outside hospital	No	77 (62.6)	35 (26.5)	<0.001
	Yes: Clinic or HCW	31 (25.2)	66 (50.0)	
	Yes: Other source	15 (12.2)	31 (23.5)	
Education about SSI can be improved	No	1 (0.8)	9 (6.8)	0.014
	Yes	122 (99.2)	123 (93.2)	

*Participant socio-demographic characteristics or questionnaire responses with $p < 0.2$ were included in the multivariate logistic regression analysis. HAI: Healthcare-associated infection, SSI: Surgical Site Infection, HCW: Health Care Worker

4.6.2 Multivariate analysis of the surgical site infection survey

Table 8 indicates that the significant predictors of comfort with SSI knowledge analysis were: HCW discussed SSI with participant on two or more occasions (OR: 8.93, 95%CI: 2.87-27.81; $p<0.001$), participant received informational flyer on SSI in hospital (OR: 11.40, 95%CI: 1.90-68.35; $p=0.008$), learned about SSI outside hospital via another clinic/HCW (OR: 7.37, 95%CI: 3.47-15.63; $p<0.001$) or other non-healthcare source (OR: 5.18, 95%CI: 2.14–12.55; $p<0.001$), and felt that education on SSI could be improved (OR: 0.05, 95%CI: 0.01-0.49; $p=0.010$).

Table 8: Multivariate statistical associations between socio-demographic characteristics, questionnaire responses, and comfort with SSI knowledge*

Variables	Characteristic	OR (95% CI)	p-value
<i>Black African race group</i>	No	Reference group (1.00)	-
	Yes	1.03 (0.52-2.06)	0.928
<i>Had previous hospital admission</i>	No	Reference group (1.00)	-
	Yes	0.85 (0.22-3.27)	0.815
<i>Had prior surgery</i>	No	Reference group (1.00)	-
	Yes: more than 2 years	2.50 (0.63-9.92)	0.194
	Yes: within the last 2 years	0.79 (0.18-3.45)	0.755
<i>Had prior chronic disease</i>	No	Reference group (1.00)	-
	Yes	0.82 (0.42-1.60)	0.553
<i>Number of times HCW discussed SSI with participant</i>	None	Reference group (1.00)	-
	Once	1.70 (0.45-6.39)	0.429
	Twice or more	8.93 (2.87-27.81)	<0.001
<i>HCW spoke to participant about SSI for >5 minutes</i>	No	Reference group (1.00)	-
	Yes	1.02 (0.33-3.10)	0.979
<i>Received informational flyer on SSI in hospital</i>	No	Reference group (1.00)	-
	Yes	11.40 (1.90-68.35)	0.008
<i>Learnt about SSI outside hospital</i>	No	Reference group (1.00)	-
	Yes: Clinic or HCW	7.37 (3.47-15.63)	<0.001
	Yes: Other source	5.18 (2.14-12.55)	<0.001
<i>Felt education about SSI can be improved</i>	No	Reference group (1.00)	-
	Yes	0.05 (0.01-0.49)	0.010

OR: Odds ratio, CI: Confidence Interval, SSI: Surgical Site Infection, HCW: Health Care Worker.

*Only participant socio-demographic characteristics or questionnaire responses with $p<0.2$ were included in the multivariate logistic regression analysis.

4.6.3 Univariate analysis of the wound care practice survey

Table 9 shows the univariate statistical associations between participant socio-demographic information and WCP knowledge. The only statistically significant variable in the univariate analysis ($p<0.05$) was completion of high school. Along with completion of high school, patient race also met the criteria of $p<0.2$ and was included in the multivariate analysis.

Table 9: Bivariate statistical associations between participants' patient characteristics, and level of knowledge on WCP

Variables	Characteristic	WCP level of knowledge		p-value*
		Poor (N=61) No, (%)	Acceptable No. (%)	
Age	≤60 years	48 (78.7)	166 (85.6)	0.202
	>60 years	13 (21.3)	28 (14.4)	
Sex	Female	29 (47.5)	100 (51.5)	0.585
	Male	32 (52.5)	94 (48.5)	
Black African	No	14 (23.0)	65 (33.5)	0.153
	Yes	47 (77.0)	129 (66.5)	
Employed	No	47 (77.0)	146 (75.3)	0.776
	Yes	14 (23.0)	48 (24.7)	
Married	No	43 (70.5)	133 (68.6)	0.776
	Yes	18 (29.5)	61 (31.4)	
Completed high school	No	45 (73.8)	96 (49.5)	0.001
	Yes	16 (26.2)	98 (50.5)	
Multimorbidity	No	50 (82.0)	160 (82.5)	0.928
	Yes	11 (18.0)	34 (17.5)	

*Participant socio-demographic characteristics or questionnaire responses with $p < 0.2$ were included in the multivariate logistic regression analysis.

WCP: Wound care practice

4.6.4 Multivariate analysis of the wound care practice survey

Table 10 indicates a statistical association between completing high school (OR:0.34, 95%CI: 0.18-0.64; $p=0.001$) and poor WCP knowledge. The relationship between Black African and poor WCP knowledge did not reach statistical significance in the multivariate model (OR: 0.55, 95%CI: 0.28-1.09; $p=0.088$).

Table 10 Multivariate statistical associations between socio-demographic characteristics and level of knowledge on WCP

Variable	Characteristic	OR (95% CI)	p-value
Black African	No	Reference group (1.00)	-
	Yes	0.55 (0.28-1.09)	0.088
Completed high school	No	Reference group (1.00)	-
	Yes	0.34 (0.18-0.64)	0.001

OR: Odds ratio, CI: Confidence Interval.

Only participant socio-demographic characteristics or questionnaire responses with $p < 0.2$ in the univariate analysis were included in the multivariate logistic regression analysis.

CHAPTER 5: DISCUSSION

5.1 Introduction

The findings of the statistical analyses are discussed in detail in this chapter with respect to the study objectives.

5.2 Socio-demographic details

This population had similar in socio-demographics to what was reported for South African patients in the SASOS (Biccard and Madiba, 2015), mostly younger age, black African, and approximately two thirds were female. The findings appear to reflect the socio-demographics of most South African surgical patients in the public healthcare sector.

1. To determine the how comfortable patients were with their knowledge of surgical site infection based on information received from HCWs and other sources.
2. To determine the patients' basic knowledge level of post-operative wound care practices.
3. To identify differences in knowledge of surgical site infection and preventative wound care practices based on socio-demographic variables.

5.3 Objective 1: To determine how comfortable patients were with their knowledge of surgical site infection based on information received from HCWs and other sources.

Nearly half of the participants in this study did not feel comfortable with their knowledge related to SSI, which is important, given the link between knowledge of a disease and the resulting action, such as engagement in preventative behaviours. In an American study, Anderson and colleagues reported that 94% of participants were comfortable with their knowledge of SSI (Anderson *et al.*, 2013). Knowledge around a particular health condition is an important aspect of the HBM (Alyafei and Easton-Carr, 2025), and is one of the core concepts in driving “healthy” behaviours that would lower patients' SSI risk at home. Given the link between knowledge of a disease and engagement in preventative behaviours, patient knowledge and comfort levels have a significant impact on how willing patients are to participate in ‘healthy behaviours’, such as taking care of their wounds post-operatively. Knowledge of a disease, according to the HBM, will initiate a cue to action by the patient, thus

enabling them to take ownership of their health care journey. When patients have appropriate knowledge about SSIs, they are most likely to be confident in their ability to take care of themselves and comply with their treatment plan which will allow for wound healing and a positive outcome. By understanding basic post-operative care, such as proper hand-washing techniques, early detection of SSI through recognising the signs of infection and proper wound care, patients could reduce their risk of developing SSIs after being discharged from hospital. This highlights the need for improved interventions to increase SSI knowledge among South African patients and empower them with postoperative knowledge after they have been discharged from hospital and are recovering. It must be acknowledged that SSIs are multifactorial, and patient compliance post-operative is important, however it must be noted that this cannot guarantee the prevention of an infection but may reduce the risk of acquiring one.

5.4 Objective 2: To determine the patients' basic knowledge level of postoperative wound care practices

Nearly one-quarter of participants in this study had poor WCP knowledge, which leaves them at potentially higher risk of SSI once they are discharged from hospital. Similar studies by Mashbari and colleagues (2023), found that 27.9% of patients exhibited poor knowledge levels. Poor education levels was directly linked to lack of understanding and knowledge of WCP (Priyadarshani and Samarawickrama, 2017). While in contrast, Mokgethi (2019), revealed that regardless of low educational levels, the majority of participants correctly answered questions on wound healing. Furthermore, poor knowledge levels impact how patients respond and comply with treatment, thus affecting their wound healing journey (Coyer *et al.*, 2005). The impact of poor knowledge levels leads to a lack of understanding may result in higher rates of infections and complications and delayed wound healing. Moreover, patients who have poor WCP knowledge levels may not be able to verbalise their concerns prior to discharge, thus resulting in non-compliance with both their treatment and post discharge instructions (DeSai *et al.*, 2021).

5.5 Objective 3: To identify differences in knowledge of surgical site infection and preventative wound care practices based on socio-demographic variables

The following were found to be predictors of comfort with SSI knowledge: HCW discussed SSI with participant on two or more occasions, participant received informational flyer on SSI

in hospital, participant learned about SSI outside hospital via another Clinic/HCW or other non-healthcare source, and participant felt that education about SSI could be improved.

This research found an almost 9-fold higher odds of comfort with SSI knowledge among participants who had a HCW speak to them about SSI on two or more occasions. This is important, because during this process there is reiteration of the SSI prevention messages, the repeated engagement giving patient additional opportunities to ask questions and clarify their knowledge. The engagement of HCWs with patients on more than one or several occasions across all types of health conditions is beneficial, and can have a positive impact on their health care journey (Haggerty *et al.*, 2003). A recent study reported that conversations between patients and HCWs opens up the lines of communication and promotes improved health knowledge, awareness and understanding (Sharkiya, 2023). This further emphasizes that repeated interactions with HCWs have a positive impact on patients, forging better communication and awareness of their health condition.

Similar studies in Kerala, India, reported that 46% of participants were comfortable with their knowledge of SSI, while 64% indicated there was a need for education improvement. This study highlighted that 42% of participants reporting that a HCW never discussed SSI with them, a further 50% stating that they spent less than five mins educating them on SSI. In six locations across Saudi Arabia, Albishi and colleagues (2019), reported poor knowledge and awareness by 49.1% and 35.2% respectively, in addition to only 32.8% of patients recalling a HCW speaking to them about SSI. This aligns with this study's findings, where increased interaction and reiteration of SSI instructions were found to be essential to assisting with improving patient knowledge.

Study participants who received informational flyers (such as a leaflet, pictorial information or information sheet) on SSI had 11-fold higher odds of feeling comfortable with their knowledge around SSI. Informational flyers contain important information, which is generally summarized in the patient's preferred language (Tartari *et al.*, 2017), making it easy to understand and remember, particularly since postoperative wound care and SSI avoidance is complex. The patient might not remember all the verbal information around SSI while still in hospital, for example, they might feel fatigue or weakened from surgery or receiving post-operative on analgesia, with a written information document on SSI being useful. Furthermore, patients

might be afraid to ask questions, the written information document providing the answers to their questions on SSI.

Patient educational materials, such as a flyer, provide both written information and instructions as well as pictures, which is an effective information resource (Tiwari, Pandey and Chaudhari, 2023). Printed information provides patients with a material resource that they can refer to that reinforces the verbal instructions given by the HCW. Pictorial information is an effective learning tool that demonstrates complex information and instructions to the patient, often assisting in clarification and reinforcement instruction, especially in patients with low literacy levels (Alexander, 1999; Blinder *et al.*, 2001). When combined, written and pictorial information can cater to patients with different levels of health literacy, thereby reinforcing and improving the recall of health information (Atchison *et al.*, 2005).

Participants who learned about SSI outside of a major hospital facility had a 5-fold (learning from other non-healthcare source) to 7-fold (learning from another HCW or clinic) higher odds of being comfortable with their knowledge around SSI. Healthcare workers remain an important source of information, even after discharge from hospital (Omonaiye *et al.*, 2024). These HCWs and staff at other healthcare facilities in the community are potentially important in reinforcing SSI awareness and prevention when patients are discharged from hospital. It is therefore important that these individuals also be included as stakeholders in the development of patient educational materials for SSI. HCWs/clinic staff at the primary healthcare level who see a high volume of surgical patients should also receive regular refresher training on SSI awareness and prevention. Other sources of SSI information also appear to be important. However, these should be scrutinized to ensure that the correct information is being communicated to patients. For example, some researchers have raised concerns over the quality of healthcare information provided on Wikipedia or social media (Von Muhlen and Ohno-Machado, 2012; Ventola, 2014). It might be worthy for these platforms partner with bona fide HCWs to ensure that high quality, trustworthy information on SSI is communicated to patients.

Comfort with SSI knowledge was 20-fold lower in participants who felt that there was room for improvement in current SSI patient education. This is unsurprising since knowledge and awareness around a disease condition is an important driver of health-related behaviours (Alves, 2024). This finding directly emphasizes the need for improved SSI education by one

of the key stakeholders, the patients themselves. It is imperative that healthcare stakeholders be included in discussions, planning and disseminating SSI education materials and information in this setting.

This study found a direct link with educational attainment and those participants who did not complete high school, being the key characteristic associated with poor WCP knowledge. Several studies have found a strong link between health literacy and education level (Bayati *et al.*, 2018; Coughlin *et al.*, 2020; Rashdi *et al.*, 2025). Patients with low levels of educational attainment struggle to assess and identify the need for healthcare intervention, which results in delays in seeking medical assistance that can exacerbate their health condition, and in turn result in longer stays in hospital, higher medical costs and increase use of resources (Rashdi *et al.*, 2025). Patients who can comprehend, process and apply health information will be able to manage their health in a positive manner by making decisions and taking actions that leads to positive outcomes.

Pieper and colleagues (2007) reported similar findings related to education level, and found that health literacy was a concern,, where patients who may not be able to read and understand the information are unable to apply the instructions (Pieper *et al.*, 2007). The published literature suggests a very close link between socio-economic factors, such as educational attainment and health literacy levels (Svendsen *et al.*, 2020; Schillinger, 2021), with completion of high school often being linked to higher levels of health literacy. Although the current study did not measure health literacy levels among the survey participants, it was noted that half of the participants did not complete high school, the inference being that there may be low levels of health literacy in the study population. The implications of low levels of health literacy are that patients are unable to process, understand, communicate and engage effectively on health-related issues (Nielsen-Bohlman, Panzer and Kindig, 2004; Berkman *et al.*, 2011). As such, those who cannot comprehend or grasp the concepts of safe wound care will struggle to manage their surgical wounds after being discharged from hospital, which could lead to prolonged healing or infectious complications (Sanger *et al.*, 2014; Shahid *et al.*, 2022).

CHAPTER 6: CONCLUSIONS

6.1 Preamble

This chapter briefly reiterates the main findings of this research, the implications of these findings, areas of caution when interpreting the findings, and considerations for future research studies.

Main findings for Objective 1: To determine how comfortable patients were with their knowledge of surgical site infection based on information received from HCWs and other sources

Nearly half of the study participants were uncomfortable with their level of SSI knowledge. This highlights a crucial deficiency in surgical patient comprehension and understanding of SSI.

Main findings for Objective 2: To determine the patients' basic knowledge level of postoperative wound care practices

Almost one-quarter of participants had poor WCP knowledge, which leaves them at a higher risk of SSI once they are discharged from hospital.

Main findings for Objective 3: To identify differences in knowledge of surgical site infection and preventative wound care practices based on socio-demographic variables

The finding of poor educational attainment is significant as it emphasises the importance of health literacy among patients. This emphasises a gap in current patient communication and education strategies, which may overlook those who lack a high school education.

There were several predictors of comfort with SSI knowledge, most of which were related to communication between HCWs and patients, and delivery of informational materials (Raliphaswa *et al.*, 2023). Completion of high school was linked to a lower odds of poor WCP knowledge, which suggests that future interventions to improve WCP should also be designed to account for individuals who might not have sufficient education to comprehend and carry out the verbal and written instructions that are given to them by healthcare staff.

6.2 Summary

When the findings of both surveys are taken into consideration, important gaps in patient education and HCW communication with patients become evident. These gaps can contribute to risky behaviours after the patient has been discharged from hospital, which can compromise the post-operative recovery process and wound healing. It is important that the patients and healthcare workers be included in the future development of any interventions to improve SSI and WCP knowledge, as these are some of the key stakeholders. Improved interventions for enhanced SSI and WCP knowledge will likely have a positive impact on patient outcomes, with the most obvious being a reduction in SSI incidence and associated complications.

6.3 Limitations

A number of limitations may have affected the findings of this study. This study collected data from a single public-sector hospital and only recruited patients from the general surgical wards, raising the possibility that some of the findings might not be applicable to patients at other South African hospitals or from other surgical specialties. The perspective and responses from patients might differ from those in other sites and/or wards. The study used convenience sampling methods, which could have introduced potential selection bias. The SSI survey was subjective, self-reported comfort, and did not objectively measure SSI knowledge. The WCP survey did not specifically measure health literacy. It is also possible that some socio-demographic factors (such as religion, residency (urban/rural), and income level) might influence comfort with SSI knowledge or WCP knowledge. However, this research did not collect these variables and their impact could therefore not be established. An additional limitation of this research was the inability to fully integrate all the HBM constructs could be fully applied to this study, with the study's findings limited to knowledge.

6.4 Recommendations

A number of recommendations are made as a result of this study:

- Larger scale studies at multiple sites and across surgical specialities should be undertaken to determine the magnitude of basic knowledge of SSI and WCP which would be more generalisable to other surgical populations in SA.
- Patient follow-ups at 30 days post discharge from hospital should be conducted to determine the incidence of SSI in relation to SSI and WCP knowledge.

- Emphasis on development of standardised educational materials that are in a simple, easy to understand language must be provided to patients.
- Provisions such as leaflets or pictorial materials must be made available to ensure that patients with low literacy levels or who are struggling to understand can refer to these simple instructions.
- HCWs should focus in improving communication skills with patients, dedicating sufficient time and interactions to allow patients to feel confident in their ability to perform self-care after they are discharged from hospital.
- Future research must target HCWs and patients to ensure that SSI prevention strategies address the core issues identified in this research such as empowering patients and enhancing communication strategies to reduce the risk of SSI.

6.5 Final remarks

This study established patients' basic knowledge on SSI and WCP, as well as the associated socio-demographic factors within the context of a South African regional hospital. No other study of this nature has been undertaken in the South African context. This research provides pertinent data and has identified gaps in surgical patient care which must be addressed in future research studies and the development of appropriate patient educational interventions.

REFERENCES

- A'aqoulah, A., Alomran, M., Alhumaid, N., El-Metwally, A. and Kalmey, F. 2025. The Impact of Patients' Engagement in the Prevention of Surgical Site Infections: A Systematic Review. *Infection and Drug Resistance*, Article ID: 5761–5770.
- Achoki, T., Sartorius, B., Watkins, D., Glenn, S. D., Kengne, A. P., Oni, T., Wiysonge, C. S., Walker, A., Adetokunboh, O. O. and Babalola, T. K. 2022. Health trends, inequalities and opportunities in South Africa's provinces, 1990–2019: findings from the Global Burden of Disease 2019 Study. *Journal of Epidemiology and Community Health*, 76 (5): 471–481.
- Adal, O., Tsehay, Y. T., Ayenew, B., Abate, T. W., Mekonnen, G. B., Mulatu, S., Mamo, S. T., Ayenew, T., Messelu, M. A. and Belayneh, A. G. 2025. The burden and predictors of hospital-acquired infection in intensive care units across Sub-Sahara Africa: systematic review and metanalysis. *BMC Infectious Diseases*, 25 (1): 634–648. 10.1186/s12879-025-11038-7.
- Alamer, A. S. 2024. Behavior change theories and models within health belief model research: a five-decade holistic bibliometric analysis. *Cureus*, 16 (6).
- Alemayehu, M. A., Azene, A. G. and Mihretie, K. M. 2023. Time to development of surgical site infection and its predictors among general surgery patients admitted at specialized hospitals in Amhara region, northwest Ethiopia: a prospective follow-up study. *BMC Infectious Diseases*, 23 (1): 334–351. <https://doi.org/10.1186/s12879-023-08301-0>.
- Alexander, R. E. 1999. Patient understanding of postsurgical instruction forms. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 87 (2): 153–158.
- Allegranzi, B., Bischoff, P., de Jonge, S., Kubilay, N. Z., Zayed, B., Gomes, S. M., Abbas, M., Atema, J. J., Gans, S. and van Rijen, M. 2016. New WHO recommendations on preoperative measures for surgical site infection prevention: an evidence-based global perspective. *The Lancet Infectious Diseases*, 16 (12): e276–e287.
- Alsahli, A. M., Alqarzaie, A. A., Alasmari, A. M., AlOtaibi, M. M., Aljuraishi, A. M., Khojah, A. A., Alzahrani, N. A. M. and Alaqeel, F. 2022. Awareness and Knowledge of Postoperative Surgical Site Infections in Patients from Saudi Arabia: A Multi-Regional Cross-Sectional Study. *Saudi Journal of Medicine and Medical Sciences*, 10 (3): 243–252. 10.4103/sjmms.sjmms_421_21.
- Alves, R. F. 2024. The relationship between health-related knowledge and attitudes and health risk behaviours among Portuguese university students. *Global Health Promotion*, 31 (1): 36–44. 10.1177/17579759231195561.
- Alyafei, A. and Easton-Carr, R. 2025. *The Health Belief Model of Behavior Change*. [Updated 2024 May 19] Available: <https://www.ncbi.nlm.nih.gov/books/NBK606120/> (Accessed 05/08/2025).
- Ambekar, R. S. and Kandasubramanian, B. 2019. Advancements in nanofibers for wound dressing: A review. *European Polymer Journal*, 117: 304–336. <https://doi.org/10.1016/j.eurpolymj.2019.05.020>.

Anderson, M., Ottum, A., Zerbel, S., Sethi, A., Gaines, M. E. and Safdar, N. 2013. A survey to examine patient awareness, knowledge, and perceptions regarding the risks and consequences of surgical site infections. *American Journal of Infection Control*, 41 (12): 1293–1295.

Andrade, C. 2021. The Inconvenient Truth About Convenience and Purposive Samples. *Indian Journal of Psychological Medicine*, 43 (1): 86–88. 10.1177/0253717620977000.

Apalata, T., Abaver, D., Fotso, C. B., Muballe, D. and Vasaikar, S. 2020. Postoperative infections: Aetiology, incidence and risk factors among neurosurgical patients in Mthatha, South Africa. *South African Medical Journal*, 110 (5): 403–408.

Atchison, K. A., Black, E. E., Leathers, R., Belin, T. R., Abrego, M., Gironde, M. W., Wong, D., Shetty, V. and DerMartirosian, C. 2005. A qualitative report of patient problems and postoperative instructions. *Journey of Oral Maxillofacial Surgery*, 63 (4): 449–456. 10.1016/j.joms.2004.07.019.

Awad, K., Awad, R., Elkazaz, H., Saleh, M. and Mehanna, A. 2022. Applying the Health Belief Model to predict preference for surgical intervention versus medical therapy among patients with open-angle glaucoma. *BMJ Open Ophthalmology*, 7 (1): e001113. <https://doi.org/10.1136/bmjophth-2022-001113>.

Badia, J. M., Casey, A. L., Petrosillo, N., Hudson, P. M., Mitchell, S. A. and Crosby, C. 2017. Impact of surgical site infection on healthcare costs and patient outcomes: a systematic review in six European countries. *Journal of Hospital Infection*, 96 (1): 1–15. <https://doi.org/10.1016/j.jhin.2017.03.004>.

Bayati, T., Dehghan, A., Bonyadi, F. and Bazrafkan, L. 2018. Investigating the effect of education on health literacy and its relation to health-promoting behaviors in health center. *Journal of Education and Health Promotion*, 7 (1): 127–133. https://doi.org/10.4103/jehp.jehp_65_18.

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., Viera, A., Crotty, K., Holland, A., Brasure, M., Lohr, K. N. and Harden, E. 2011. Health literacy interventions and outcomes: an updated systematic review. *Evidence Report/Technology Assessment*, 199: 1–941. Available: <https://europepmc.org/article/nbk/nbk82434> (Accessed 28 September 2025).

Biccard, B. M. and Madiba, T. E. 2015. The South African Surgical Outcomes Study: A 7-day prospective observational cohort study. *South African Medical Journal*, 105 (6): 465–475. 10.7196/samj.9435.

Biccard, B. M., Madiba, T. E., Kluyts, H.-L., Munlemvo, D. M., Madzimbamuto, F. D., Basenero, A., Gordon, C. S., Youssouf, C., Rakotoarison, S. R. and Gobin, V. 2018. Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *The Lancet*, 391 (10130): 1589–1598.

Blinder, D., Rotenberg, L., Peleg, M. and Taicher, S. 2001. Patient compliance to instructions after oral surgical procedures. *International of Journal Oral Maxillofacial Surgery* 30 (3): 216–219. 10.1054/ijom.2000.0045.

Bucataru, A., Balasoiu, M., Ghenea, A. E., Zlatian, O. M., Vulcanescu, D. D., Horhat, F. G., Bagiu, I. C., Sorop, V. B., Sorop, M. I. and Oprisoni, A. 2023. Factors contributing to surgical site infections: a comprehensive systematic review of etiology and risk factors. *Clinics and Practice*, 14 (1): 52–68.

Bujang, M. A. 2021. A step-by-step process on sample size determination for medical research. *The Malaysian Journal of Medical Sciences: MJMS*, 28 (2): 15.

Bujang, M. A., Omar, E. D., Foo, D. H. P. and Hon, Y. K. 2024. Sample size determination for conducting a pilot study to assess reliability of a questionnaire. *Restorative Dentistry & Endodontics*, 49 (1): e3. <https://doi.org/10.5395/rde.2024.49.e3>.

Centers for Disease Control and Prevention. 2018. *Healthcare-associated infections (HAIs)* Available: <https://www.cdc.gov/healthcare-associated-infections/php/data/index.html> (Accessed 05/04/2024).

Centers for Disease Control and Prevention. 2024. *Surgical Site Infection Event (SSI)*. Centres for Disease Control and Prevention and National Healthcare Safety Network. Available: <https://www.cdc.gov/nhsn/pdfs/pscmanual/9pscscsscurrent.pdf> (Accessed 1 April 2024).

Centres for Disease Control and Prevention. 2022. *Current HAI Progress Report, 2021*. Centers for Disease Control and Prevention. Available: <https://www.cdc.gov/nhsn/datastat/progress-report.html> (Accessed 19 June 2024).

Clayphan, B., Dixon, L., Biggs, S., Jordan, L., Pullyblank, A., Holden, K., Walker, D., Pitts, K., Bertman, K. and Glancy, D. 2022. PreciSSIon: a collaborative initiative to reduce surgical site infections after elective colorectal surgery. *Journal of Hospital Infection*, 130: 131–137.

Coughlin, S. S., Vernon, M., Hatzigeorgiou, C. and George, V. 2020. Health literacy, social determinants of health, and disease prevention and control. *Journal of Environment and Health Sciences*, 6 (1): 3061–3063. <https://doi.org/10.15436/2378-6841.20.3061>.

Coyer, F., Courtney, M., Edwards, H. and Finlayson, K. 2005. *National Institute for Clinical Studies Report for Phase I, Evidence Uptake Network: Best Practice Community Care for Clients with Chronic Venous Leg Ulcers*. 16/12/2025).

Cvetanovska, N., Jessup, R. L., Wong Shee, A., Rogers, S. and Beauchamp, A. 2023. Patients' perspectives of factors influencing active participation in healthcare interactions: A qualitative study. *Patient Education and Counseling*, 114: 107808. <https://doi.org/10.1016/j.pec.2023.107808>.

Dalcól, C., Tanner, J. and de Brito Poveda, V. 2024. Digital tools for post-discharge surveillance of surgical site infection. *Journal of Advanced Nursing*, 80 (1): 96–109.

Datta, R., Singh, A. and Mishra, P. 2023. A survey of awareness, knowledge, attitude, and skills of telemedicine among healthcare professionals in India. *Medical Journal Armed Forces India*, 79 (6): 702–709. <https://doi.org/10.1016/j.mjafi.2021.08.017>.

DeSai, C., Janowiak, K., Secheli, B., Phelps, E., McDonald, S., Reed, G. and Blomkalns, A. 2021. Empowering patients: simplifying discharge instructions. *BMJ Open Quality*, 10 (3): e001419. 10.1136/bmjopen-2021-001419.

Fenny, A. P., Asante, F. A., Otiaku, E., Bediako-Bowan, A. and Enemark, U. 2020. Attributable cost and extra length of stay of surgical site infection at a Ghanaian teaching hospital. *Infection Prevention in Practice*, 2 (2): 100045.

Filsoufi, F., Rahmanian, P. B., Castillo, J. G., Pinney, S., Broumand, S. R. and Adams, D. H. 2007. Incidence, treatment strategies and outcome of deep sternal wound infection after orthotopic heart transplantation. *The Journal of Heart and Lung Transplantation*, 26 (11): 1084–1090.

Fisha, K., Azage, M., Mulat, G. and Tamirat, K. S. 2019. The prevalence and root causes of surgical site infections in public versus private hospitals in Ethiopia: a retrospective observational cohort study. *Patient Safety in Surgery*, 13-22: 26. 10.1186/s13037-019-0206-4.

GlobalSurgCollaborative. 2018. Surgical site infection after gastrointestinal surgery in high-income, middle-income, and low-income countries: a prospective, international, multicentre cohort study. *Lancet Infectious Diseases*, 18 (5): 516–525. 10.1016/s1473-3099(18)30101-4.

Groenen, H., Bontekoning, N., Van Dieren, S., Orsini, R. G., Boormeester, M. A., Tobiano, G. and Eskes, A. M. 2025. Patients' Ability to Self-Manage Their Surgical Wound to Prevent Wound Complications: A Cross-Sectional Study. *Journal of Advanced Nursing*, 81 (7): 4208–4215.

Guo, S. and Dipietro, L. A. 2010. Factors affecting wound healing. *Journal of Dental Research*, 89 (3): 219–229. 10.1177/0022034509359125.

Haggerty, J. L., Reid, R. J., Freeman, G. K., Starfield, B. H., Adair, C. E. and McKendry, R. 2003. Continuity of care: a multidisciplinary review. *BMJ*, 327 (7425): 1219–1221.

Harrington, G., Russo, P., Spelman, D., Borrell, S., Watson, K., Barr, W., Martin, R., Edmonds, D., Cocks, J., Greenbough, J., Lowe, J., Randle, L., Castell, J., Browne, E., Bellis, K. and Aberline, M. 2004. Surgical-Site Infection Rates and Risk Factor Analysis in Coronary Artery Bypass Graft Surgery. *Infection Control & Hospital Epidemiology*, 25 (6): 472–476. 10.1086/502424.

Hennessey, D. B., Burke, J. P., Ni-Dhonocho, T., Shields, C., Winter, D. C. and Mealy, K. 2010. Preoperative Hypoalbuminemia is an Independent Risk Factor for the Development of Surgical Site Infection Following Gastrointestinal Surgery: A Multi-Institutional Study. *Annals of Surgery*, 252 (2): 325–329. 10.1097/SLA.0b013e3181e9819a.

Horasan, E. S., Dağ, A., Ersoz, G. and Kaya, A. 2013. Surgical site infections and mortality in elderly patients. *Médecine et Maladies Infectieuses*, 43 (10): 417–422. <https://doi.org/10.1016/j.medmal.2013.07.009>.

Hossan, D., Wolfs, B. and Petkovic, M. 2025. Questionnaire validity and reliability: A review with practical guidelines. *Journal of Entrepreneurship, Business and Economics*, 13 (1): 135–186.

Hwekwete, A. 2025. Best practices for surgical wound management. *British Journal of Nursing*, 34 (15): S4–S10.

Iqbal, A., Jan, A., Wajid, M. and Tariq, S. 2017. Management of chronic non-healing wounds by hirudotherapy. *World Journal of Plastic Surgery*, 6 (1): 9.

Jan, M., Almutairi, K. H., Aldugman, M. A., Althomali, R. N., Almujaary, F. M., Mughaedh, N. A. A. and Alhadi, L. N. 2021. Knowledge, attitudes, and practices regarding wound care among general population in Aseer region. *Journal of Family Medicine and Primary Care*, 10 (4): 1731–1736. 10.4103/jfmprc.jfmprc_2331_20.

Jencks, S. F., Williams, M. V. and Coleman, E. A. 2009. Rehospitalizations among patients in the Medicare fee-for-service program. *New England Journal of Medicine*, 360 (14): 1418–1428.

John Hopkins University. 2010. *Surgical site infection prevention*. Available: https://www.hopkinsmedicine.org/-/media/heic/ssi_prevention_best_practices.pdf (Accessed 11 June 2024).

Kandeh, A. T., Botha, R. A. and Futcher, L. A. 2018. Enforcement of the Protection of Personal Information (POPI) Act: Perspective of data management professionals. 2018, 20 (1): 1–9. 10.4102/sajim.v20i1.917.

Kilpatrick, M., Hutchinson, A., Manias, E. and Bouchoucha, S. L. 2023. Nurses' knowledge and implementation of antimicrobial stewardship and infection prevention strategies in acute paediatric settings. *Journal of Hospital Infection*, 137: 54–60. 10.1016/j.jhin.2023.05.001.

Koivisto, J.-M., Saarinen, I., Kaipia, A., Puukka, P., Kivinen, K., Laine, K.-M. and Haavisto, E. 2020. Patient education in relation to informational needs and postoperative complications in surgical patients. *International Journal for Quality in Health Care*, 32 (1): 35–40.

Koriat, A., Undorf, M., Newman, E. and Schwarz, N. 2020. Subjective confidence in the response to personality questions: Some insight into the construction of people's responses to test items. *Frontiers in Psychology*, 11: 1250.

Lechowski, S., Kułakowska, A., Kłakowicz, P., Lepczyński, B. and Siedlak, A. 2023. Surgical site infections – an updated review of guidelines in the light of new scientific data. *Journal of Education, Health and Sport*, 28 (1): 19–38. 10.12775/JEHS.2023.28.01.002.

Lyu, X., Li, J. and Li, S. 2024. Approaches to reach trustworthy patient education: a narrative review. In: *Proceedings of Healthcare*. MDPI, 2322.

Mangram, A. J., Horan, T. C., Pearson, M. L., Silver, L. C. and Jarvis, W. R. 1999. Guideline for Prevention of Surgical Site Infection, 1999. *Infection Control & Hospital Epidemiology*, 20 (4): 247–280. 10.1086/501620.

Mbamalu, O., Bonaconsa, C., Nampoothiri, V., Surendran, S., Veepanattu, P., Singh, S., Dhar, P., Carter, V., Boutall, A. and Pennel, T. 2021. Patient understanding of and participation in

infection-related care across surgical pathways: a scoping review. *International Journal of Infectious Diseases*, 110: 123–134.

Meijs, A. P., Koek, M. B. G., Vos, M. C., Geerlings, S. E., Vogely, H. C. and de Greeff, S. C. 2019. The effect of body mass index on the risk of surgical site infection. *Infection Control & Hospital Epidemiology*, 40 (9): 991–996. 10.1017/ice.2019.165.

Memon, M. A., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F. and Cham, T. H. 2020. Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, 4 (2): 1–20.

Merdad, M., Alqutub, A., Mogharbel, A., Alghamdi, A. A., Alsulami, O., Awadh, M. and Alsulami, A. S. 2024. Rate and causes of 30-day Unplanned Readmission/Return following head and neck surgery at a tertiary care center in Saudi Arabia. *Saudi Journal of Medicine & Medical Sciences*, 12 (2): 162–168.

Mezemir, R., Seid, A., Gishu, T., Demas, T. and Gize, A. 2020. Prevalence and root causes of surgical site infections at an academic trauma and burn center in Ethiopia: a cross-sectional study. *Patient Safety in Surgery*, 14: 1–7. 10.1186/s13037-019-0229-x.

Mirnoto, J. and Irwan, A. M. 2025. Patient knowledge and participation in preventing surgical site infections: an integrative review. *Gulhane Medical Journal*, 67 (2): 58–66. . <https://doi.org/10.4274/gulhane.galenos.2025.00821>

Monahan, M., Jowett, S., Pinkney, T., Brocklehurst, P., Morton, D. G., Abdali, Z. and Roberts, T. E. 2020. Surgical site infection and costs in low- and middle-income countries: A systematic review of the economic burden. *PLoS ONE*, 15 (6): e0232960. 10.1371/journal.pone.0232960.

Monegro, A. F., Muppidi, V. and Regunath, H. 2023. *Hospital-Acquired Infections*. StatPearls Publishing, Treasure Island (FL).

Muleme, J., Kankya, C., Ssempebwa, J. C., Mazeri, S. and Muwonge, A. 2017. A framework for integrating qualitative and quantitative data in knowledge, attitude, and practice studies: a case study of pesticide usage in eastern Uganda. *Frontiers in Public Health*, 5: 318–332. <https://doi.org/10.3389/fpubh.2017.00318>.

Naidoo, K. and Moodley, Y. 2022. Incidence and microbiology of surgical site infection following hysterectomy at a south african quaternary hospital. *South Valley University - International Journal of Medical Sciences*, 5 (2): 308–317. Available: <https://doi.org/10.21608/svuijm.2022.135351.1303> (Accessed 5 March 2023).

Naidoo, N., Madiba, T. and Moodley, Y. 2019a. Admissions for post-discharge surgical site infection at a quaternary South African public sector hospital. *South African Journal of Surgery*, 57 (4): 13–18. http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0038-23612019000400004&nrm=iso

Naidoo, N., Madiba, T. E. and Moodley, Y. 2019b. Incidence and risk factors for surgical site infection following laparotomy at a South African quaternary hospital. *Surgical Chronicles* Article ID: 24(24): 179–184. <http://hdl.handle.net/11462/2163>

- Naidoo, N., Madiba, T. E. and Moodley, Y. 2020. Impact of surgical site infection on postoperative length of stay and hospitalization costs at a quaternary South African hospital. *Surgical Chronicles*, 25 (4): 311–314.
- Nair, A., Steinberg, W., Habib, T., Saeed, H. and Raubenheimer, J. 2018. Prevalence of healthcare-associated infection at a tertiary hospital in the Northern Cape Province, South Africa. *South African Family Practice*, 60 (5): 162–167.
- Nakhleh, H., Fatokun, B. S., Nakyanzi, H., Mshaymesh, S., Wellington, J. and Uwishema, O. 2025. Surgical site infections in sub-Saharan Africa: epidemiology, risk factors, and prevention strategies. *Annals of Medicine and Surgery*, 87 (6): 3388–3392. <https://doi.org/10.1097/ms9.00000000000003188>.
- Nelson, S. P., Ramakrishnan, V., Nietert, P., Kamen, D., Ramos, P. and Wolf, B. 2022. A comparison of joint dichotomization and single dichotomization of interacting variables to discriminate a disease outcome. *The International Journal of Biostatistics*, 18 (2): 613–625.
- Ngaroua, N. J. E., Bénet, T. and Djibrilla, Y. 2016. Incidence of surgical site infections in sub-Saharan Africa: systematic review and meta-analysis. *Pan African Medical Journal*, 24: 171. 10.11604/pamj.2016.24.171.9754.
- Ngobeni, V., Breitenbach, M. C. and Aye, G. C. 2020. Technical efficiency of provincial public healthcare in South Africa. *Cost Effectiveness and Resource Allocation*, 18 (1): 3. <https://doi.org/10.1186/s12962-020-0199-y>
- Nguyen, A. V. and Soulika, A. M. 2019. The Dynamics of the Skin's Immune System. *International Journal of Molecular Sciences*, 20 (8): 1811. <https://www.mdpi.com/1422-0067/20/8/1811>
- Nielsen-Bohlman, L., Panzer, A. M. and Kindig, D. A. 2004. The extent and associations of limited health literacy. In: *Health literacy: a prescription to end confusion*. National Academies Press (US), 59–107.
- Okur, M. E., Karantas, I. D., Şenyiğit, Z., Üstündağ Okur, N. and Siafaka, P. I. 2020. Recent trends on wound management: New therapeutic choices based on polymeric carriers. *Asian Journal of Pharmaceutical Sciences*, 15 (6): 661–684. <https://doi.org/10.1016/j.ajps.2019.11.008>.
- Omonaiye, O., Ward-Stockham, K., Darzins, P., Kitt, C., Newnham, E., Taylor, N. F. and Considine, J. 2024. Hospital discharge processes: Insights from patients, caregivers, and staff in an Australian healthcare setting. *PLOS One*, 19 (9): e0308042.
- Onyekwelu, I., Yakkanti, R., Protzer, L., Pinkston, C. M., Tucker, C. and Seligson, D. 2017. Surgical Wound Classification and Surgical Site Infections in the Orthopaedic Patient. *Journal of the American Academy of Orthopaedic Surgeons Global Research and Reviews*, 1 (3): e022. 10.5435/JAAOSGlobal-D-17-00022.
- Owojori, O. M., Mulaudzi, R. and Edokpayi, J. N. 2022. Student's knowledge, attitude, and perception (KAP) to solid waste management: A survey towards a more circular economy from

a rural-based tertiary institution in South Africa. *Sustainability*, 14 (3): 1310–1333. <https://doi.org/10.3390/su14031310>.

Paladini, F., D’Urso, F., Broccolo, F. and Pollini, M. 2025. Combating Healthcare-Associated Infections in Modern Hospitals: Nanotechnology-Based Approaches in the Era of Antimicrobial Resistance. *Nanomaterials*, 15 (18): 1405. <https://www.mdpi.com/2079-4991/15/18/1405>

Payne, W. G., Naidu, D. K., Wheeler, C. K., Barkoe, D., Mentis, M., Salas, R. E., Smith Jr, D. J. and Robson, M. C. 2008. Wound healing in patients with cancer. *Eplasty*, 8: e9.

Peter, E. G. and Seif, S. A. 2022. The influence of home environment and wound care practice on surgical site infection among post cesarean section women in Dodoma-Tanzania. *International Journal of Africa Nursing Sciences*, 17: 100474 – 100482. <https://doi.org/10.1016/j.ijans.2022.100474>

Peterson, J. W. 1996. Bacterial Pathogenesis. In: Baron, S. ed. *Medical Microbiology*. 4th edn. Galveston (TX): University of Texas Medical Branch at Galveston
Copyright © 1996, The University of Texas Medical Branch at Galveston. Available: <https://www.ncbi.nlm.nih.gov/books/NBK7627/toc/?report=printable> (Accessed 22 May 2024).

Pieper, B., Sieggreen, M., Nordstrom, C. K., Freeland, B., Kulwicki, P., Frattaroli, M., Sidor, D., Palleschi, M. T., Burns, J. and Bednarski, D. 2007. Discharge knowledge and concerns of patients going home with a wound. *Journal of Wound Ostomy & Continence Nursing*, 34 (3): 245–253. <https://doi.org/10.1097/01.won.0000270817.06942.00>.

Pittalis, C., Sackey, C., Okeny, P., Nandi, B. and Gajewski, J. 2024. Surgical informed consent practices and influencing factors in sub-Saharan Africa: a scoping review of the literature. *BMJ Quality & Safety*, 33 (10): 653–662.

Polit, D. and Beck, C. 2019. *Nursing Research*. Wolters Kluwer Health.

Priyadarshani, R. and Samarawickrama, M. 2017. Knowledge, attitudes and practices of patients regarding chronic wound care and point prevalence of chronic wounds at Surgical and Medical Units in Teaching Hospital Karapitiya. *Sri Lanka. higher education*, 16: 7.7.

Rahiman, O. M. F. and Rajkumar, K. 2019. Analysis of patient knowledge and awareness about risk and management of surgical site infections. *International Surgery Journal*, 6 (10): 3571–3575.

Raliphaswa, N. S., Ramathuba, D. U., Luhailima, T. R., Mulondo, S. A., Malwela, T., Tshililo, A. R., Mafumo, J. L., Maputle, M. S., Maluleke, M. and Mbedzi, T. E. 2023. Barriers to effective communication between patients, relatives, and health care professionals in the era of COVID-19 pandemic at public hospitals in Limpopo Province. *Journal of Respiration*, 3 (1): 29–38.

Rashdi, P. T., Surahio, K. S., Nadeem, R. and Sarfraz, B. 2025. The intersection of health literacy and educational attainment: A review of global perspectives. *International Journal of Applied Educational Research*, 3 (3): 141–156. [https://doi.org/10.69889/ijlapt.v2i03\(Mar\).104](https://doi.org/10.69889/ijlapt.v2i03(Mar).104).

Rezaei, A. R., Zienkiewicz, D. and Rezaei, A. R. 2025. Surgical site infections: a comprehensive review. *Journal of Trauma and Injury*, Article ID.

Rudd, K. E., Johnson, S. C., Agesa, K. M., Shackelford, K. A., Tsoi, D., Kievlan, D. R., Colombara, D. V., Ikuta, K. S., Kissoon, N. and Finfer, S. 2020. Global, regional, and national sepsis incidence and mortality, 1990–2017: analysis for the Global Burden of Disease Study. *The Lancet*, 395 (10219): 200–211.

Rudolph, J. E., Zhong, Y., Duggal, P., Mehta, S. H. and Lau, B. 2023. Defining representativeness of study samples in medical and population health research. *BMJ Medicine*, 2 (1): e000399. [10.1136/bmjmed-2022-000399](https://doi.org/10.1136/bmjmed-2022-000399).

Russo, P., Saguil, E., Chakravarthy, M., Lee, K., Ling, M., Morikane, K., Spencer, M., Danker, W., Yu, N. and Edmiston Jr, C. 2021. Improving surgical site infection prevention in Asia-Pacific through appropriate surveillance programs: Challenges and recommendation. *Infection, Disease & Health*, 26 (3): 198–207.

Sanger, P. C., Hartzler, A., Han, S. M., Armstrong, C. A., Stewart, M. R., Lordon, R. J., Lober, W. B. and Evans, H. L. 2014. Patient perspectives on post-discharge surgical site infections: towards a patient-centered mobile health solution. *PloS One*, 9 (12): e114016. <https://doi.org/10.1371/journal.pone.0114016>.

Schillinger, D. 2021. Social determinants, health literacy, and disparities: intersections and controversies. *HLRP: Health Literacy Research and Practice*, 5 (3): e234–e243. <https://doi.org/10.3928/24748307-20210712-01>.

Seidelman, J. L., Mantyh, C. R. and Anderson, D. J. 2023. Surgical Site Infection Prevention: A Review. *Journal of the American Medical Association*, 329 (3): 244–252. [10.1001/jama.2022.24075](https://doi.org/10.1001/jama.2022.24075).

Shahid, R., Shoker, M., Chu, L. M., Frehlick, R., Ward, H. and Pahwa, P. 2022. Impact of low health literacy on patients' health outcomes: a multicenter cohort study. *BMC Health Services Research*, 22 (1): 1148 – 1157. <https://doi.org/10.1186/s12913-022-08527-9>.

Shakir, A., Abate, D., Tebeje, F. and Weledegebre, F. 2021. Magnitude of Surgical Site Infections, Bacterial Etiologies, Associated Factors and Antimicrobial Susceptibility Patterns of Isolates Among Post-Operative Patients in Harari Region Public Hospitals, Harar, Eastern Ethiopia. *Infection and Drug Resistance*, 14: 4629–4639. [10.2147/idr.S329721](https://doi.org/10.2147/idr.S329721).

Sharkiyya, S. H. 2023. Quality communication can improve patient-centred health outcomes among older patients: a rapid review. *BMC Health Services Research*, 23 (1): 886. [10.1186/s12913-023-09869-8](https://doi.org/10.1186/s12913-023-09869-8).

Sheth, K. R., Bernthal, N. M., Ho, H. S., Bergese, S. D., Apfel, C. C., Stoicea, N. and Jahr, J. S. 2020. Perioperative bleeding and non-steroidal anti-inflammatory drugs: An evidence-based literature review, and current clinical appraisal. *Medicine (Baltimore)*, 99 (31): e20042. [10.1097/md.00000000000020042](https://doi.org/10.1097/md.00000000000020042).

Sinha, S. 2019. Management of post-surgical wounds in general practice. *Australian Journal for General Practitioners*, 48: 596–599. <https://www1.racgp.org.au/ajgp/2019/september/post-surgical-wounds-in-general-practice>

Snyders, P., Swart, O. and Duvenage, R. 2020. Thirty-day readmission rate: A predictor of initial surgical severity or quality of surgical care? A regional hospital analysis. *South African Medical Journal*, 110 (6): 537–539.

Sobhy, S., Arroyo-Manzano, D., Murugesu, N., Karthikeyan, G., Kumar, V., Kaur, I., Fernandez, E., Gundabattula, S. R., Betran, A. P., Khan, K., Zamora, J. and Thangaratinam, S. 2019. Maternal and perinatal mortality and complications associated with caesarean section in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet*, 393 (10184): 1973–1982. [https://doi.org/10.1016/S0140-6736\(18\)32386-9](https://doi.org/10.1016/S0140-6736(18)32386-9).

Stewart, S., Robertson, C., Pan, J., Kennedy, S., Haahr, L., Manoukian, S., Mason, H., Kavanagh, K., Graves, N., Dancer, S. J., Cook, B. and Reilly, J. 2021. Impact of healthcare-associated infection on length of stay. *Journal of Hospital Infection*, 114: 23–31. <https://doi.org/10.1016/j.jhin.2021.02.026>.

Svendsen, M. T., Bak, C. K., Sørensen, K., Pelikan, J., Riddersholm, S. J., Skals, R. K., Mortensen, R. N., Maindal, H. T., Bøggild, H. and Nielsen, G. 2020. Associations of health literacy with socioeconomic position, health risk behavior, and health status: a large national population-based survey among Danish adults. *BMC Public Health*, 20 (1): 565 – 577. <https://doi.org/10.1186/s12889-020-08498-8>.

Sway, A., Nthumba, P., Solomkin, J., Tarchini, G., Gibbs, R., Ren, Y. and Wanyoro, A. 2019. Burden of surgical site infection following cesarean section in sub-Saharan Africa: a narrative review. *International Journal of Womens Health*, 11: 309–318. 10.2147/ijwh.S182362.

Taherdoost, H. 2021. Data collection methods and tools for research; a step-by-step guide to choose data collection technique for academic and business research projects. *International Journal of Academic Research in Management (IJARM)*, 10 (1): 10–38.

Tartari, E., Weterings, V., Gastmeier, P., Rodríguez Baño, J., Widmer, A., Kluytmans, J. and Voss, A. 2017. Patient engagement with surgical site infection prevention: an expert panel perspective. *Antimicrobial Resistance & Infection Control*, 6 (1): 45. 10.1186/s13756-017-0202-3.

Teresi, J. A., Yu, X., Stewart, A. L. and Hays, R. D. 2022. Guidelines for designing and evaluating feasibility pilot studies. *Medical Care*, 60 (1): 95–103.

Tiwari, R. R., Pandey, B. and Chaudhari, K. S. 2023. Image-Based Communication for Strengthening Patient Health Education in Rural and Underserved Settings. *Cureus*, 15 (7): e41279. 10.7759/cureus.41279.

Tobiano, G., Walker, R. M., Chaboyer, W., Carlini, J., Webber, L., Latimer, S., Kang, E., Eskes, A. M., O'Connor, T. and Perger, D. 2022. Patient experiences of, and preferences for, surgical wound care education. *International Wound Journal*, 20 (5): 1687–1699.

Ventola, C. L. 2014. Social media and health care professionals: benefits, risks, and best practices. *Pharmacy and Therapeutics*, 39 (7): 491–520.

Vicentini, C., Elhadidy, H., Marengo, N., Paladini, G., Cornio, A. R. and Zotti, C. M. 2023. Mortality and Case Fatality Rates Associated With Surgical Site Infections: A Retrospective Surveillance Study. *Surgical Infection (Larchmt)*, 24 (8): 734–740. 10.1089/sur.2023.082.

Von Muhlen, M. and Ohno-Machado, L. 2012. Reviewing social media use by clinicians. *Journal of the American Medical Informatics Association*, 19 (5): 777–781.

Wan, Y. I., Patel, A., Achary, C., Hewson, R., Phull, M. and Pearse, R. M. 2021. Postoperative infection and mortality following elective surgery in the International Surgical Outcomes Study (ISOS). *British Journal of Surgery*, 108 (2): 220–227. 10.1093/bjs/znaa075.

Wang-Chan, A., Gingert, C., Angst, E. and Hetzer, F. H. 2017. Clinical relevance and effect of surgical wound classification in appendicitis: Retrospective evaluation of wound classification discrepancies between surgeons, Swissnoso-trained infection control nurse, and histology as well as surgical site infection rates by wound class. *Journal of Surgical Research*, 215: 132–139.

Wang, X. and Cheng, Z. 2020. Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. *Chest*, 158 (1s): S65–S71. 10.1016/j.chest.2020.03.012.

Willie, M., Masekela, S. and Iyaloo, S. 2024. *Persistent Inequalities In Healthcare Access In South Africa*. Available: https://www.researchgate.net/profile/Michael-Willie/publication/385416296_Persistent_Inequalities_In_Healthcare_Access_In_South_Africa/links/67250c66db208342dee45233/Persistent-Inequalities-In-Healthcare-Access-In-South-Africa.pdf (Accessed 22/02/2025).

Woelber, E., Schrick, E. J., Gessner, B. D. and Evans, H. L. 2016. Proportion of surgical site infections occurring after hospital discharge: a systematic review. *Surgical Infections*, 17 (5): 510–519. <https://doi.org/10.1089/sur.2015.241>.

World Health Organization. 2011. *Report on the burden of endemic health care-associated infection worldwide*. Geneva, Switzerland: World Health Organization. Available: https://apps.who.int/iris/bitstream/handle/10665/80135/9789241501507_eng.pdf;jsessionid=64A964F12A0FAA73F2166B89CD63F264?sequence=1 (Accessed 20 December 2023).

World Health Organization. 2018. *Global guidelines for the prevention of surgical site infection*. Geneva, Switzerland: World Health Organisation. Available: <https://iris.who.int/bitstream/handle/10665/277399/9789241550475-eng.pdf> (Accessed 05 July 2023).

Wukich, D. K., McMillen, R. L., Lowery, N. J. and Frykberg, R. G. 2011. Surgical Site Infections After Foot and Ankle Surgery: A comparison of patients with and without diabetes. *Diabetes Care*, 34 (10): 2211–2213. 10.2337/dc11-0846.

Yuan, K. and Chen, H.-L. 2013. Obesity and surgical site infections risk in orthopedics: A meta-analysis. *International Journal of Surgery*, 11 (5): 383–388. <https://doi.org/10.1016/j.ijsu.2013.02.018>.

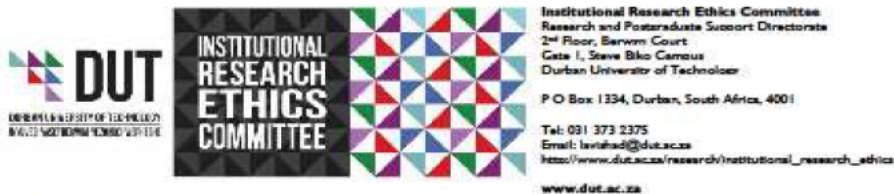
Zabaglo, M., Leslie, S. W. and Sharman, T. 2024. Postoperative wound infections. In: *StatPearls [Internet]*. StatPearls Publishing.

Zhang, Y., Zheng, Q.-J., Wang, S., Zeng, S.-X., Zhang, Y.-P., Bai, X.-J. and Hou, T.-Y. 2015. Diabetes mellitus is associated with increased risk of surgical site infections: a meta-analysis of prospective cohort studies. *American Journal of Infection Control*, 43 (8): 810–815.

Zrineh, A., Al-Usta, M. and Alwawi, A. 2026. Sampling Methods and Sample Size Determination in Clinical Research: An Educational Review. *Journal of General and Family Medicine*, 27 (1): e70096.

APPENDICES

Appendix A



3 December 2024

Ms N Naidoo
Department of Biomedical Technology
Durban University of Technology

Dear Ms Naidoo

Patient knowledge, awareness and care of surgical site infections at a selected regional hospital in KwaZulu-Natal, South Africa
Ethics Clearance Number: IREC 191/24

The DUT-Institutional Research Ethics Committee acknowledges receipt of your notification regarding the piloting of your data collection tool.

Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the DUT-IREC acknowledges receipt of your gatekeeper permission letters.

Please note that **FULL APPROVAL** is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the DUT-IREC as outlined in the DUT-IREC SOP's.

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

Professor P Mashau
Chairperson: DUT-IREC

Appendix B



KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

Physical Address: 330 Langalobale Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za

Health Research & Knowledge
Management

NHRD Ref: KZ_202409_033

Dear Ms N Naidoo
(DUT)

Approval of research

1. The research proposal titled 'Patient knowledge, awareness and care of surgical site infections at a selected regional hospital in KwaZulu-Natal, South Africa.' was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

The proposal is hereby approved for research to be undertaken at Dr Pixley ka Isaka Seme Memorial hospital.

2. You are requested to take note of the following:
 - a. **Kindly liaise with the facility manager BEFORE your research begins.**
This is to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.
 - b. All research conducted in KwaZulu-Natal must comply with government regulations relating to Covid-19. These include but are not limited to: regulations concerning social distancing, the wearing of personal protective equipment, and limitations on meetings and social gatherings.
 - c. Please ensure that you provide your letter of ethics re-certification to this unit when the current approval expires.
 - d. Provide an interim progress report and final report (electronic and hard copies) when your research is complete to HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200 and e-mail an electronic copy to hrkm@kznhealth.gov.za
 - e. Please note that the Department of Health shall not be held liable for any injury that occurs as a result of this study.

For any additional information please contact Dr. G Shezi on 033-395 3189.

Yours Sincerely

Dr E Lutge

Chairperson, Provincial Health Research Committee

Date: 16 October 2024

GROWING KWAZULU-NATAL TOGETHER

Appendix C



KWAZULU-NATAL PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

DR PIXLEY KA ISAKA SEME MEMORIAL HOSPITAL (DPKISMH)

Private Reg X611 KwaMashu, 43040

Clinical Ethics & Research Committee

310 Bheane Street, KwaMashu, 43040

Tel: 031 590 1999 Email address: ethics@dpkismh.gov.za
www.kznhealth.gov.za

Reference: DPK 11/24
Enquiries: Mrs T. Mbili
Date: 18 September 2024

Ms N. Naidoo
Department of Biomedical Technology
Durban University of Technology

Dear Ms Naidoo

Re: Study Protocol – Patient knowledge, awareness and care of surgical site infections at a selected regional hospital in KwaZulu-Natal, South Africa. (IREC 191/24)

Kindly be informed that provisional permission has been granted to you by the
Dr Pixley Ka Isaka Seme Memorial Hospital (DPKISMH) Clinical Ethics and Research Committee to conduct research.

Please note the following:

1. This research will only commence once this office has received approval of your study from the Provincial Health Research & Ethics Committee (PHREC) in the KZN Department of Health and Institutional Research Ethics Committee (DUT IREC) approval.
2. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health and the hospital concerning this research.
3. You are required to alert the facility at the commencement of the research study.
4. You are also required to update the committee after 6 months on the progress of your study.
5. The facility will not provide any resources for this research.
6. You will be required to provide feedback on your findings to the facility.

Kind Regards

Dr. N. Mpuku
Chairperson
Clinical Ethics & Research Committee
Dr Pixley Ka Isaka Seme Memorial Hospital

GROWING KWAZULU-NATAL TOGETHER



Appendix D

LETTER OF INFORMATION

Title of the Research Study: Patient knowledge, awareness and care of surgical site infections at a selected regional hospital in KwaZulu-Natal, South Africa.

Principal Investigator/s/researcher: Niroshni Naidoo, B.Tech.

Co-Investigator/s/supervisor/s: Prof. J.K Adam (Supervisor), Dr. Y. Moodley (Co-Supervisor), Mr. S. Kader (Collaborator).

Brief Introduction and Purpose of the Study:

Surgical Site Infections (SSIs) are one of the most common infections that patients get surgery. Most SSIs occur 21 days from the surgery and sometimes get worse once the patients have been sent home. This could be due to a lack of understanding of SSIs. This study will gather information on your understanding and care of SSIs, and will consist of two survey questionnaires. One will focus on SSI and the other on wound care. Adult patients who will undergo planned surgery for high-risk procedures will be taking part in the questionnaire survey from October 2024 to April 2025. It is hoped that this study will identify important information that will help to improve SSI rates by determining the baseline level of patient SSI understanding.

Good Day.

I trust you are well.

I am a postgraduate student at the DUT conducting research for my Masters' degree in Health Sciences. I would like to invite you to participate in the research by completing two questionnaires, which will take no more than 30 minutes of your time. You have been chosen as one of the respondents and your participation in this study will be valued. I humbly request your participation. Please note that you are taking part in the study is voluntary and should you wish to leave the study, you can do so at any time. Your participation will be highly appreciated.

Attached is the Institutional Research and Ethics Committee (IREC) clearance, Information Letter and consent form for the study, and the Gatekeeper's letter granting permission to conduct the study.

What is Research

Research is a search for new knowledge. This could include the work of previous research that leads to new and creative outcomes. As a participant, you are entitled to ask, as many questions as you wish in order to fully understand the study. Research is a process that involves the investigation of a problem to answer a question. Research is a slow process that looks deeply into a problem, establish facts, and draw conclusions. It will also make recommendations.

Purpose of the study

The aim of the research is to establish patient knowledge awareness and care of surgical site infections at a selected regional hospital in KwaZulu-Natal Province, South Africa

The objectives of the study are as follows:

1. To determine the basic knowledge of elective surgical patients around surgical site infection care as a result of the surgical procedure.
2. To determine the basic knowledge and awareness of elective surgical patients around SSI.

3. To establish if there are any differences in knowledge, awareness and care of SSI according to socio-economic and socio-demographic factors.

Research Questions:

- What is the basic knowledge of elective surgical patients around surgical site infection care?
- What is the basic knowledge and awareness of elective surgical patients around SSI?
- Are there any differences in knowledge, awareness and care of SSI according to socio-economic and socio-demographic factors?

This is a study of surgical patients who have undergone an elective surgical procedure and will be conducted at a regional hospital, the Dr. Pixley Ka Isaka Seme Hospital in KwaZulu-Natal Province, South Africa. The study will recruit all adult patients who underwent high-risk procedures for SSI during the period from February to July 2025. Patients will be excluded if they refuse to provide written informed consent, or do not answer all questions. Questionnaires will be the way information will be collected. The researcher will use purposeful sampling to identify and select patients-for-the study. Questionnaires will be the way information will be collected. Patients will be asked a series of closed-ended questions regarding their knowledge, awareness and wound care of SSIs. The questionnaires will be conducted in an area that is safe and quiet with no disturbances.

Inclusion criteria:

- Patients who underwent high-risk procedures during the study period.
- Patients 18 years and older.

Exclusion criteria:

- Patients unable/unwilling to sign informed consent.
- Patients who do not complete all questions on the survey
- Patients undergoing emergency surgery
- Patients who are prisoners will be excluded from the study
- Non-South African patients will be excluded
- Patient who do not communicate and speak English or isiZulu

The study questionnaires will require approximately 30 minutes of your time to complete. The study is expected to recruit a minimum of **213** participants. Once the required number of questionnaires have been completed, the responses will be looked at and analysed.

As a participant, you will be requested to complete a questionnaire by yourself and honestly within the allocated time. By completing the questionnaire, you are aware of the purpose of the study and have given consent to participate in the study.

Risks or Discomforts to the Participant:

You will not be subjected to any risks or discomfort as this research will be based on answering the questionnaires only. There will be no major risks to the participant.

Explain to the participant the reasons he/she may be withdraw from the Study:

You the participant are voluntarily, taking part in the study. Should you wish to terminate your participation, you are free to do so at no risk or obligation.

Benefits:

To reduce the SSI rates and improve SSI care practices.

Remuneration:

You will not receive any monies or gifts for completing the questionnaires.

Costs of the Study:

There will be no costs to you for taking part in the study.

Confidentiality:

The participant will complete both questionnaires and the information of the participant will be unknown. Only the people involved in the study will have access to the results. No information will be presented unless permission is given from you, the participant. The results from the study will be written up.

Results:

It is hoped that this study will identify important information that will aid in forming a baseline to improve patient knowledge, awareness and care of SSIs.

Research-related Injury:

The researcher will be asking some questions, and there will be no extra medical procedures that will be done that will be uncomfortable or painful for the participant.

Storage of all electronic and hard copies including tape recording: All information collected from the study will be kept under lock and key. Electronic information will be stored on the researcher's laptop and will be password protected. No persons will be able to view this information except the researcher and her supervisors. After 5 years, this information will be destroyed.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher (Niroshni Naidoo 0844241828), my supervisor Prof J Adam (0827860682), or the DUT-Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Acting Director: Research and Postgraduate Support on researchdirector@dut.ac.za

Appendix E

Questionnaire on: Knowledge /Awareness of Surgical Site Infections (SSIs)

Demographic information:

Participant Number (To be filled in by the researcher):

Date of Birth (date/month/year) / or Age:

Sex: (Tick the applicable):

Male:

Female:

Other:

Race (Tick the applicable):

African:

White:

Coloured:

Indian:

Employment Status (Tick the applicable):

Employed:

Unemployed:

Marital Status (Tick the applicable):

Single:

Married:

Divorced:

Living with a partner:

Educational Qualifications (Tick the applicable):

Highest qualification Grade 10 (Standard 8) or below:

Highest qualification Grade 12 (Matric):

Tertiary Qualification (Certificate/diploma/degree):

Type of Surgical procedure:

Clinical History:

Date questionnaire completed: -----/-----/-----

(Day/Month/Year)

Thank you for taking the time to answer the following questions. Your input is important to us to assist us with our research, which will be of benefit to the healthcare system.

The following responses will be required for the questions below:

Yes or No

Multiple Choice: Chose one option only.

Surgical Site Infection (SSI) Questionnaire (Anderson *et al.*, 2013).

Please circle in the most appropriate answer. Example

☒

True

False

Question 1:

Number of previous hospital admissions

None

1-5

6 or more

Question 2:

Any other previous surgeries

Yes

No

Question 3:

If YES, any within the last 2 years

Yes

No

Question 4:

History of chronic disease

Yes

No

Question 5:

History of any hospital acquired infection (HAI) besides SSI?

Yes

No

Question 6:

If YES, which HAI

CAUTI - Catheter associated urinary tract infection

CLABSI – central line -associated bloodstream infection

Question 7:

Previous SSI

Yes

No

If YES, within last 2 years

Yes

No

Question 9:

How many times did any healthcare worker (HCW) discuss SSI?

Zero

One

2 or more

Question 10:

How much total time was spent talking with a HCW in minutes?

None

<5

5-15

>15

Question 11:

Received Informational Flyer

Yes

No

Question 12:

Learned about SSI outside hospital

Yes

No

Question 13:

If YES, by what source

Work

Clinic/provider

Newspaper/magazine

TV

Internet

Question 14:

Can education about SSI be improved?

Yes

No

Question 15:

Are you comfortable with your level of knowledge about SSIs

Yes

No

Thank you for time and effort in agreeing for your participation in filling in this questionnaire.

Reference:

Anderson, M., Ottum, A., Zerbel, S., Sethi, A., Gaines, M. E. and Safdar, N. 2013. A survey to examine patient awareness, knowledge, and perceptions regarding the risks and consequences of surgical site infections. *American Journal of Infection Control*, 41 (12): 1293-1295.

Ikwethemba ku: Ukwazi/ukwazi izifundo zomcimbi wezifo zeSurgical Site Infections (SSIs)

Ulwazi lomuntu: Inombolo yomlingisi (Ibhalwe ngumlingisi):

Usuku lwezalukazi (usuku/inyanga/umnyaka) / noma Ubudala:

Ulwazi lwe-sex: (Gxumeza okunqikithi):

Indoda:

Umzala:

Okunye:

Isifundo (Gxumeza okunqikithi):

UmAfrika:

UmLungu:

Ophakathi:

UmHindi

Isimo sezindleko (Gxumeza okunqikithi):

Ephumelelwayo:

Akaphumelelwayo

Isimo somshado (Gxumeza okunqikithi):

Uyindlela:

Unomfazi omuhle:

Omuqhele:

Uhamba nesigqabo

Izifundo zokufunda (Gxumeza okunqikithi):

Ikakhulukazi engqondweni le-Grade 10 (Standard 8) noma ephakeme:

Ikakhulukazi engqondweni le-Grade 12 (Matric):

Ikakhulukazi engqondweni zezikole (I-Certificate / I-diploma / I-degrezi):

Uhlobo lwezitimba zeSurgical:

Izimvo zeKlinikalayo:

Usuku ongawuzama ube nensiza ngokungahambisani nalesi sikole sokuze kube kuhlangukane:

___/___/___

Usuku ongawuzama ube nensiza ngokungahambisani nalesi sikole sokuze kube kuhlangukane.

Izinqulo eziyiziqhenyayo ezizokufuneka ngemibuzo edlule: Yebo noma Cha Ukukhethwa okulula: Khetha ikhasi lomlando kanye nakho.

Ikhwalifikhezha lomcimbi wezifo zeSurgical Site Infections (SSI) (Anderson *et al.* 2013).

Sicela usiqonde okulula ekuthenjweni kwenkampani.

Isiqhelo

Ewe Cha

Umbuzo 1: Inani lezimali ezingaphelanga ezikhona

Kungekudluleki 1-5 6 noma kusukela kulo

Umbuzo 2: Zinye izinyanga ezilandelayo zangasese?

Yebo Cha

Umbuzo 3: Uma YEBO, ngasese ezilandelayo

Yebo Cha

Umbuzo 4: Ukuphila kwedwa kokugula

Yebo Cha

Umbuzo 5: Inqubo yeningi emgazwe ekliniki yokugula (Hospital Acquired Infections - HAI) ngaphandle kweSSI?

Yebo Cha

Umbuzo 6: Uma YEBO, ingabe yini uma ekugcineni izifo zabelungu zezibhedlela?

CAUTI - Isifo sokugqoka sesibhedlela (Catheter-associated urinary tract infection)

CLABSI - Isifo sesibhedlela esilandelayo (Central line-associated bloodstream infection)

Umbuzo 7: Izifo zeSurgical Site Infections ezilandelayo

Yebo Cha

Umbuzo 8: Uma YEBO, ezilandelayo ezidlule izinga lokugcina ezifana nazo?

Yebo Cha

Umbuzo 9: Unombuzo ozobaqondisi (HCW) wezifo zeSSI ngemva kokuthi zingaphi izikhathi?

Iningi lika-0 Okanye kanye lokukhuluma 2 okuningi

Umbuzo 10: Ingabe kudinga isikhathi esilandelayo ekhuluma nabantu bokugula ngenkathi weSSI?

Akukhona kabi <5 5-15 >15

Umbuzo 11: Uma YEBO, usutholaphi icala eliyibhalwe ngeSSI?

Yebo Cha

Umbuzo 12: Ubona izifundo zeSSI ezithengiselwano

Yebo Cha

Umbuzo 13: Uma YEBO, ngezifundo zeSSI zithengiselwano ezilula ngani

Ehhotela Kliniki / Isikhundla iNewspaper / Imagazini i-TV i-Internet

Umbuzo 14: Ingabe kudinga ukufundisa ngeSSI kuyoba kuhle?

Yebo Cha

Umbuzo 15: Uma YEBO, uyakholelwa ngokwazi kwakho mayelana nezifo zeSSI?

Yebo Cha

Ngiyafisa ukubonga ngokukhululekile kwezinsuku nemisebenzi enenzekele ekuqanjelweni ukwenza ulwazi oluhlangabezana nokuzisiza ngokuphumelelayo nokuqhubeka ngokunciphisa ekuchitheni kwalolu mxhumanisi.

Isibonelo:

Anderson, M., Ottum, A., Zerbel, S., Sethi, A., Gaines, M. E. and Safdar, N. 2013. A survey to examine patient awareness, knowledge, and perceptions regarding the risks and consequences of surgical site infections. *American Journal of Infection Control*, 41 (12): 1293-1295.

Appendix F

Questionnaire on: SSI Wound care Practices

Demographic information:

Participant Number (To be filled in by the researcher):

Date of Birth (date/month/year) / or Age:

Sex: (Tick the applicable):

Male:

Female:

Other:

Race (Tick the applicable):

African:

White:

Coloured:

Indian:

Employment Status (Tick the applicable):

Employed:

Unemployed:

Marital Status (Tick the applicable):

Single:

Married:

Divorced:

Living with a partner:

Educational Qualifications (Tick the applicable):

Highest qualification Grade 10 (Standard 8) or below:

Highest qualification Grade 12 (Matric):

Tertiary Qualification (Certificate/diploma/degree):

Type of Surgical procedure:

Clinical History:

Date questionnaire completed: -----/-----/-----

(Day/Month/Year)

Thank you for taking the time to answer the following questions. Your input is important to assist us with our research, which will be of benefit to the healthcare system.

The following responses will be required for the questions below:

True (Correct)

False (Incorrect)

SSI Wound-care Practices Questionnaire (Pieper et al., 2007)

Please circle in the most appropriate answer.

Example

☒ True

False

*

Question 1:

Hands should be washed before the dressing is changed.

True

False

Question 2:

Good nutrition is needed or wound healing.

True

False

Question 3:

A person with a wound cannot leave the house.

True

False

Question 4:

Smoking takes oxygen away from the wound.

True

False

Question 5:

Bacteria/germs in the wound cause wound odour.

True

False

Question 6:

Turpentine is a wound cleaner.

True

False

Question 7:

Peroxide is good for wounds because of the bubbles.

True

False

Question 8:

It is best to quickly pull tape off the skin.

True

False

Question 9:

Tape should be stretched tight across the dressing.

True

False

Question 10:

Wound care is best done by someone besides the patient.

True

False

Question 11:

Antibiotics are needed until the wound closes.

True

False

Question 12:

A person should never drink alcohol until the wound heals.

True

False

Question 13:

Wounds need to dry out.

True

False

Question 14:

Wounds need to breathe the air

True

False

Thank you for taking the time and effort in agreeing to participate in filling in this questionnaire.

Reference:

Pieper, B., Sieggreen, M., Nordstrom, C. K., Freeland, B., Kulwicki, P., Frattaroli, M., Sidor, D., Palleschi, M. T., Burns, J. and Bednarski, D. 2007. Discharge knowledge and concerns of patients going home with a wound. *Journal of Wound Ostomy & Continence Nursing*, 34 (3): 245-253.

Umbuzo F

Izalukazi ezenzakalayo: Izifo zokuhlambulula izimbiza

Ulwazi lomuntu: Inombolo yomlingisi (Ibhalwe ngumlingisi):

Usuku lwezalukazi (usuku/inyanga/umnyaka) / noma Ubudala:

Ulwazi lwe-sex: (Gxumeza okunqikithi):

Indoda:

Umzala:

Okunye:

Isifundo (Gxumeza okunqikithi):

UmAfrika:

UmLungu:

Ophakathi:

UmHindi

Isimo sezindleko (Gxumeza okunqikithi):

Ephumelelwayo:

Akaphumelelwayo

Isimo somshado (Gxumeza okunqikithi):

Uyindlela:

Unomfazi omuhle:

Omuqhele:

Uhamba nesigqabo

Izifundo zokufunda (Gxumeza okunqikithi):

Ikakhulukazi engqondweni le-Grade 10 (Standard 8) noma ephakeme:

Ikakhulukazi engqondweni le-Grade 12 (Matric):

Ikakhulukazi engqondweni zezikole (I-Certificate / Idiploma / Idegrezi):

Uhlobo lwezitimba zeSurgical:

Izimvo zeKlinikalayo:

Usuku ongawuzama ube nensiza ngokungahambisani nalesi sikole sokuze kube kuhlangukane:

___/___/___

Singakufisa ukubonga ngekuphendula izibalo ezisunqikile ezilandelako. Ukwazi kwakho kubalulekile kithina ukusiza ngesikhathi sokufunda, okuzoba nesiza endleleni yethu yokufunda, okuyisiseko ekusizo kwezempilo

Izilungiselo ezilandelayo zizoba zifuneka ngezibuzo ezilula:

Ewe (Kunzima)

Cha (Akunzima)

Ikhasi lokubuzwa kwezifundo zeziyoni zokuhlambulula izimbiza (Pieper, *et al.* 2007) Sicela gxumeze incwadi endaweni ehamba phambili engcono.

Isibonelo

☒ Ewe ☐ Cha

Umbuzo 1: Izandla kufanele zolwaziwe phambi kokuhlabisa izimbiza.

Ewe ☐ Cha ☐

Umbuzo 2: Ubudala obuhle kudinga ukufanelelela ukulungiswa kwamazimbiza.

Ewe ☐ Cha ☐

Umbuzo 3: Umuntu onemvula akakwazi ukushintsha ekhaya.

Ewe ☐ Cha ☐

Umbuzo 4: Ukushesha kushaya isibane se-oksijini ekusweni kwezimbiza.

Ewe ☐ Cha ☐

Umbuzo 5: Iintsholongwane/izidalwa ezikhona ezimbizini zenzela ukungcakatha kwesimila.

Ewe ☐ Cha ☐

Umbuzo 6: I-Turpentine iyizenzisi yezimbiza.

Ewe ☐ Cha ☐

Umbuzo 7: I-Peroxide iyakuhlela kwezimbiza ngenxa yezizwela.

Ewe ☐ Cha ☐

Umbuzo 8: Kufanele kube kuhle ukubamba iteyiphu emhlane ngokudla.

Ewe Cha

Umbuzo 9: Iteyiphu kufanele ibe ivuthwe kakhulu emhlane kwesingxenywe sezingubo.

Ewe Cha

Umbuzo 10: Ukulungiswa kwezimbiza kungumsebenzi onjengabantu abanye ngaphandle kwenombolo.

Ewe Cha

Umbuzo 11: Izinye ezifanayo ezitshiyeneyo zidinga ukuba zingasinyamezelela kwezimbiza zingacitshenziswa.

Ewe Cha

Umbuzo 12: Umuntu akufanele akhiphe izinywa ukuya kwezimbiza kukuvalaka.

Ewe Cha

Umbuzo 13:

Izimbiza zidinga ukuba zihluleke.

Ewe Cha

Umbuzo 14: Izimbiza zidinga ukuba zithokozise uthando lwesifuba.

Ewe Cha

Ngiyafisa ukubonga ngokukhululekile kwezinsuku nemisebenzi enenzekele ekuqanjelweni ukwenza ulwazi oluhlangabezana nokuzisiza ngokuphumelelayo nokuqhubeka ngokunciphisa ekuchitheni kwalolu mxhumanisi.

Isibonelo:

Pieper, B., Sieggreen, M., Nordstrom, C. K., Freeland, B., Kulwicki, P., Frattaroli, M., Sidor, D., Palleschi, M. T., Burns, J. and Bednarski, D. 2007. Discharge knowledge and concerns of patients going home with a wound. *Journal of Wound Ostomy & Continence Nursing*, 34 (3): 245-253.

Appendix G



CONSENT

Full Title of the Study: Patient knowledge, awareness and care of surgical site infections at a regional hospital in KwaZulu-Natal, South Africa

Names of Researcher/s: N. Naidoo, Prof. J.K Adam, Dr. Y. Moodley and Mr. S. Kader

Statement of Agreement to Participate in the Research Study:

- ☐ I hereby confirm that I have been informed by the researcher, Niroshni Naidoo, about the nature, conduct, benefits, and risks of this study - Research Ethics Clearance Number: IREC 191/24.
- ☐ I have also received read and understood the above written information (Participant Letter of Information) regarding the study. (Appendix B)
- ☐ I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- ☐ In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- ☐ I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- ☐ I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- ☐ I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	Date	Time	Signature

I, N. Naidoo herewith confirm that the above participant has been fully informed about the nature, conduct, and risks of the above study.

_____	_____	_____
Full Name of Researcher	Date	Signature

_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature

_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature

Appendix H

From: [Vasileios Papaziogas](#)
To: [Nirshini Naidoo](#)
Subject: Re: Submission to SURGICAL CHRONICLES
Date: Sunday, 14 September 2025 08:57:19

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Dear Dr. Naidoo,
we would like to inform you that your manuscript entitled: "Assessing comfort levels around surgical site infection knowledge among general surgery patients from KwaZulu-Natal, South Africa" has been accepted for publication in our journal and is scheduled to appear in the first issue of 2026.

You will receive proofs for correction in due course.

Thank you once again for your contribution to our journal.

Sincerely yours

Dr. Vasileios Papaziogas
Professor of Surgery
Editor in Chief

Dr. George Tsoulfas
Ass. Professor of Surgery
Assistant Editor

Appendix I

From: samaweb@samedical.org
To: [Niroshni Naidoo](#)
Subject: Submission Acknowledgement
Date: Monday, 23 February 2026 13:12:52

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Dear Niroshni Naidoo

Thank you for submitting the manuscript, "Assessing wound care practice knowledge levels in general surgery patients from KwaZulu-Natal, South Africa" to South African Journal of Public Health. With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Submission URL:

<https://samajournals.co.za/index.php/sajph/authorDashboard/submission/4874>

Username: niroshnin13

If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Kind regards

[Southern African Journal of Public Health](#)

