CHAPTER ONE

1.0   INTRODUCTION

Knowledge of determinants of post-operative wound infection and infection prevention practices among nurses and student nurses play key roles in reducing increasing cases of post-operative wound infection at Solwezi General Hospital. Chapter one (1) gives the background information to the study and the statement of the problem. Factors influencing knowledge of determinants of post-operative wound infection and infection prevention practices are discussed. The chapter also discusses the theoretical framework that guided the study and provides a justification for the study. The general and specific objectives, research hypotheses are stated. In addition, the conceptual definitions of terms, the operational definition of variables, variable and cut points are outlined.

1.2   BACKGROUND

Post-operative wound infection is an infection in the tissues of either an incision or organ occurring within thirty (30) days after an operation or within one year if an implant is present in the body (Tietjen et al., 2004). Abdominal surgeries, surgeries lasting over two hours, infected wounds, and the presence of multiple diagnoses in the individual present the highest risk of developing post operative wound infections. Generally, factors increasing an individual's risk include malnutrition, decreased blood volume, lengthy post-operative wound infection, hypothermia, poor tissue perfusion, diabetes mellitus, and the use of immunosuppressive agents such as steroids (Tietijen et al., 2004).

Post-operative wound infection prolongs patient hospitalisation, leading to increased usage of pharmaceutical services, more laboratory investigations and other services thereby, creating an economic burden on the health care system in Zambia bearing in mind that resources are scarce in this sector. The cost of providing these health services to patients that have been hospitalised longer than expected is an unforeseen cost that result in economic burden that deprive the health sector of the much needed resources that can be utilised to provide health services for the hard-to-reach population (Mukwato, 2006, Chanda, 2004)

In 2003, Central Board of Health observed that the rates of nosocomial infections related to poor infection prevention practices were unacceptable. For example, a hospital accreditation survey conducted in 2002 by the Ministry of Health, reported high rates of post operative infections, showing a post operative wound infection of 30% or more among caesarean section patients. In addition, the high rate of attrition, illness and death among health workers are cited as partly contributing to the high risk of infection inherent in the health care professionals when adequate precautions are not taken.

The first edition of Zambia Infection Prevention Guidelines was developed in 2003 by the Central Board of Health. The sole purpose of developing the Infection prevention guidelines was to provide standard guidelines for infection prevention practices applicable at all levels of the health care system in Zambia, which are technically sound and also feasible in the current environment of health care services in Zambia (CBoH, 2003). These basic guidelines such as hand washing with soap and water, and other specific procedures such as sterilisation can go a long way in curbing post-operative wound infection in most of our health facilities in Zambia.

Considering the economical impact on the health care system and suffering endued by patients as a result of post operative wound infection, it becomes clear that Infection prevention guidelines as recommended by the Ministry of Health and John Hopkins Information Education on Gynaecology and Obstetrics (JHPIEGO) that are cost effective are adhered to by all health care providers. It is also clear that knowledge of determinants of post operative wound infection by health care providers is important especially nursing staff who spend 24 hours nursing post operative patients in the fight against post-operative wound infection.

Infection prevention guidelines are Ministry of Health's response to increase in nosocomial infection and have been distributed in all hospitals in Zambia including Solwezi General Hospital where the current study was conducted. Further, Solwezi General Hospital Health Workers have benefited from some of the trainings in Infection Prevention guidelines by the Ministry of Health and its cooperating partners in the past five to seven years.

Solwezi General Hospital has an Infection Prevention Committee that comprises 14 hospital staff. The main mandate for this committee is to ensure that Infection Prevention and Control Guidelines are adhered to by all hospital staff. The committee holds monthly meetings to review the performance of the hospital in terms of infection prevention.

Smith et al. (2009) stated that the relationship between nursing and infection control was first identified by Florence Nightingale in 1854 during the Crimean war when she served in a military hospital in Scutari in Italy. At that time, the conditions in the hospitals were deplorable. Nightingales observations in Scutari led her to believe that improving hygienic conditions would decrease the number of deaths. Kamisky (2004) believe that Nightingale championed the cause of improved hygiene, food and living conditions for the hospitalised soldiers. She curbed the hospital conditions and called for basic public health, infection control measures, cleanliness, hygiene and education about the importance of the issue. Today nurses are key players in the fight to ensure the survival of infection control practices (Smith et al., 2009). Therefore, this study seeks to determine knowledge of determinants of post-operative wound infection and infection prevention practices among nurses and student nurses in order to reduce the rate of hospital acquired infections such as post-operative wound infection.

1.3 STATEMENT OF THE PROBLEM

Worldwide, it is estimated that almost ten percent (10%) of the hospitalised patients acquire at least one hospital acquired infections (Humphreys et al., 2008). The prevalence of hospital acquired infections in developing countries is between thirty to fifty percent (Habibi et al., 2008). Like other developing countries Zambia is also experiencing a high rate of hospital acquired infections such as post-operative wound infections (CBoH, 2003).

Post operative wound infection rate is high (75%) at Solwezi General Hospital (Solwezi General Hospital records, 2011) despites Nurses and other health care providers being trained in infection prevention and control measures. Furthermore, the Ministry of Health has distributed infection prevention and control guidelines to most of the Health Institutions in Zambia including Solwezi General Hospital. In an effort to encourage compliance to the infection prevention guidelines, the Ministry of

Health has also established the National Infection Prevention Committee which has established satellites in various Hospitals across the country.

A review of records in the general surgical wards showed that post-operative wound infection problem has been on the increase for a period of five years as indicated in table 1 below.

TABLE 1: ANNUAL POST-OPERATIVE WOUND INFECTION AT SOLWEZI GENERAL HOSPITAL 2008-2012

Wound type	2008			2009			2010			2011			2012		
	total	Infection	Death	Total	Infection	Death	Total	Infection	Death	Total	Infection	Death	Total	Infection	Death
Amputation	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
C-Section	2	2	0	3	3	0	3	3	0	0	0	0	2	1	1
Hernia	1	1	0	0	0	0	0	0	0	2	2	0	1	1	0
Abdominal	0	0	0	0	0	0	1	1	0	3	3	0	0	0	0
BPH(urinary)	1	1	0	0	0	0	0	0	0	2	2	0	1	1	0
Peritonitis	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0
Burns	1	1	0	2	2	0	0	0	0	3	3	1	2	2	0
Keloids	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0
Cataracts	0	0	0	1	1	0	0	0	0	1	1	0	2	2	0
Stab Wound	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Total	**5**	**5**	**0**	**7**	**7**	**0**	**4**	**4**	**0**	**11**	**11**	**1**	**9**	**8**	**1**

Solwezi General Hospital Statistics (2013)

- Cases of post-operative wound infections have been increasing steadily in the past five years with 2011 being the worst year.
- Most operation conducted at the hospital were not recorded due to frequent change of staff in the Department of Health Information Management System leading to low surgeries being recorded at the institution.

Deep surgical site wound infection can contribute to high mortality rate. For example, at Solwezi General Hospital eighty-five percent (85%) of the cases discussed during Morbidity and Mortality meetings are due to post operative wound infection (Solwezi General Hospital records, 2013). This demonstrates the severity of the problem at the General Hospital. It is therefore, important to find lasting solutions to the problem of post-operative wound infection as related to compliance with IP guidelines at Solwezi General Hospital and the health sector in general.

Therefore, the purpose of the current study is to assess the level of knowledge of determinants of post operative wound infection and Infection prevention practices among nurses and student nurses who spend more time (24 hrs) nursing post operative patients at Solwezi General Hospital in North Western Province in order to find lasting solutions to the problem so as to alleviate the suffering of patients and reduce the economic burden on the health care system.

1.4 FACTORS INFLUENCING KNOWLEDGE OF DETERMINANTS OF POST-OPERATIVE WOUND INFECTION AND INFECTION PREVENTION PRACTICES

Factors influencing knowledge of determinants of post-operative wound infection and infection prevention practices can be classified into two categories; service delivery related and individual and disease-related factors

1.4.1 Individual and disease related factors

1.4.1.1 Training

Training in infection prevention can influence health care providers' knowledge of determinants of post-operative wound infection and infection prevention practices. Health care providers who trained in infection prevention are more likely to comply with infection prevention guidelines than those who are untrained. Training can help health care providers' realize the importance of basic infection control practices such as hand hygiene, standard precautions, post-exposure prophylaxis and cleaning of the hospital environment (Jain et al., 2012).

1.4.1.2 Infections

Health care providers suffering from any kind of infection especially droplet infections are likely to infect patients under their care especially patients recovering from surgery. Therefore, health care providers suffering from infections should not be permitted to take care of post-operative patients. The other most important way of spread of infections is through the contaminated hands of the health care provider (Mayank et al., 2009). The prevalence of health care associated infections in developing countries can be as high as 30-50% (Habibi et al., 2008; Lahsaeizadeh,et

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al., 2008). This situation is worrying as health care associated infections are associated with increased morbidity, mortality and health care expenditures.

1.4.1.3 Knowledge

Knowledge of determinants of postoperative wound infection can influence the health care providers' infection prevention practices. A health care provider who has no knowledge of the determinants of post-operative wound infection and infection prevention practices will not be able to follow infection prevention guidelines. Educating health care providers is a vital strategy for effective infection control (WHO, 2005).

1.4.1.4 **Hand washing**

One single most important infection prevention procedures is hand-washing. Proper hand hygiene and the use of protective gloves, whether in the operating room for surgery or handling contaminated materials are key components in minimising post-operative wound infection. Appropriate hand hygiene must be done before and after attending to a client or handling contaminated objects and instruments (CBoH, 2003). Quite often health care providers do not wash their hands after attending to a patient ignoring the fact that most pathogens are spread via contaminated hands.

Hand hygiene includes other procedures such as antiseptic hand rub that involves the use of a waterless, alcohol-based hand rub. This practice helps to inhibit or kill transient and resident flora. These hand rubs also contain a small amount of an emollient such as glycerine or sorbitol that protects and soften the skin. Surgical hand scrub is another hand hygiene that mechanically removes soil, debris, and transient organisms and reduce resident flora prior to performing any invasive surgical procedure. The goal is to prevent wound contamination by microorganisms from the hands and arms of the surgical team (CBoH, 2003). It is, therefore, encouraged that staff attending to post-operative patients practice hand washing in order to minimise the risks of patients developing post-operative wound infection.

Patient associated factors refer to the health status of the patient at the time of operation. It involves the general condition of the patient and the diseases the patient is suffering from. Diseases such as diabetes, heart failure, HIV and AIDS and others are likely to be associated with post-operative wound infection.

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1.4.1.5 Diabetes Mellitus and HIV

In the case of diabetes mellitus, the increased sugar levels such as over 120mg/dl in blood become a good media for bacteria growth if the patient has a wound. The prevalence of HIV and AIDS in Zambia is at 16% according to Ministry of Health records for 2005, this has lead to increased susceptibility to infection of all kinds including prolonged hospitalisation due to post-operative wound infection. The immunity of patients is severed by HIV resulting into failure to respond well to secondary infections or opportunistic infections. The problem of post-operative wound infection in Zambia is made worse in such a situation if these diseases such as Diabetes Mellitus, and HIV and AIDS are not prevented and controlled (**Ministry of Health, 2005).**

1.4.1.6 Obesity

Obesity is another condition associated with diabetes mellitus and must be considered together with diabetes mellitus as they both increases susceptibility to post-operative wound infection (**Singhal, et al 2004).**

1.4.2   Service related factors

These factors are health facility associated and include inadequate and erratic funding to health facilities, broken down equipment, lack of protocols, lack of working Infection Prevention Committees to monitor usage of guidelines and many others.

1.4.2.1 Protocols

Protocol is a plan for performing a scientific experiment or medical treatment or procedure formulated on how to carry out certain treatments to achieve maximum care (Horny, 2007). In the case of post-operative wound infection, these procedures start from pre-operative care to post-operative care. They include surgical site preparation, scrubbing, wound dressing, choice of antibiotics and general ward management such as time of the day when the wound dressing are done. These factors may influence post-operative wound infection at a health facility.

Infection Prevention Committees set up by the Ministry of Health in 2005 plays a major role in infection prevention at any health Institutions.

In some institutions these committees do not exist or they do not serve the purpose of their function. They do not meet or have objectives for their existence. They do not monitor infection rates in health facilities, check if protocols displayed in wards are understood or followed. The operating theatre rooms may not be inspected for compliance to principles of Infection Prevention thereby increasing the rate of post-operative wound infection in the hospitals.

1.4.2.2 Staff

Availability of appropriate human resources at all the levels of health care is a critical factor in ensuring the delivery of efficient and effective essential health services to Zambians Currently, the health sector is experiencing a human resource crisis, which is significantly undermining its capacity to provide even the basic health care services to the people (Ministry of Health, 2005). This is a factor which affects all health institutions leading to poor service delivery including pre and post-operative care. Inadequate staffing affects timing of procedures and quality of care offered to patient.

In some institutions untrained staff are used to carry out procedures such as wound dressing and this may compromise on compliance to protocols or guidelines to be followed. Therefore, it is important that staff carrying out surgical procedures are trained to do so if post-operative wound infection is to be prevented (Johns, 2012)

1.4.2.3 Medical-Surgical Supplies

Medical–surgical supplies can influence infection prevention practices of health care providers. In situations where there are no wound cleaning antiseptic solutions or sterile gauze swabs the health care provider may not be able to dress the wound as required. Another important infection preventive protocol that must be complied with is the use of gloves. Appropriate use of gloves prior to contact with blood, body fluids, secretions or excretions is important in the fight against postoperative wound infection (CBoH, 2003). Other procedures that need compliance on the part of the Health care providers are personal protective equipment such as masks, sterile drapes, and procedures such as decontamination, sterilisation, and waste management.

The health care providers are expected to comply with protocols when performing procedures that might increase the risk of post-operative may infection if post-operative wound infection is to be prevented. Non compliance to protocols would lead to infections.
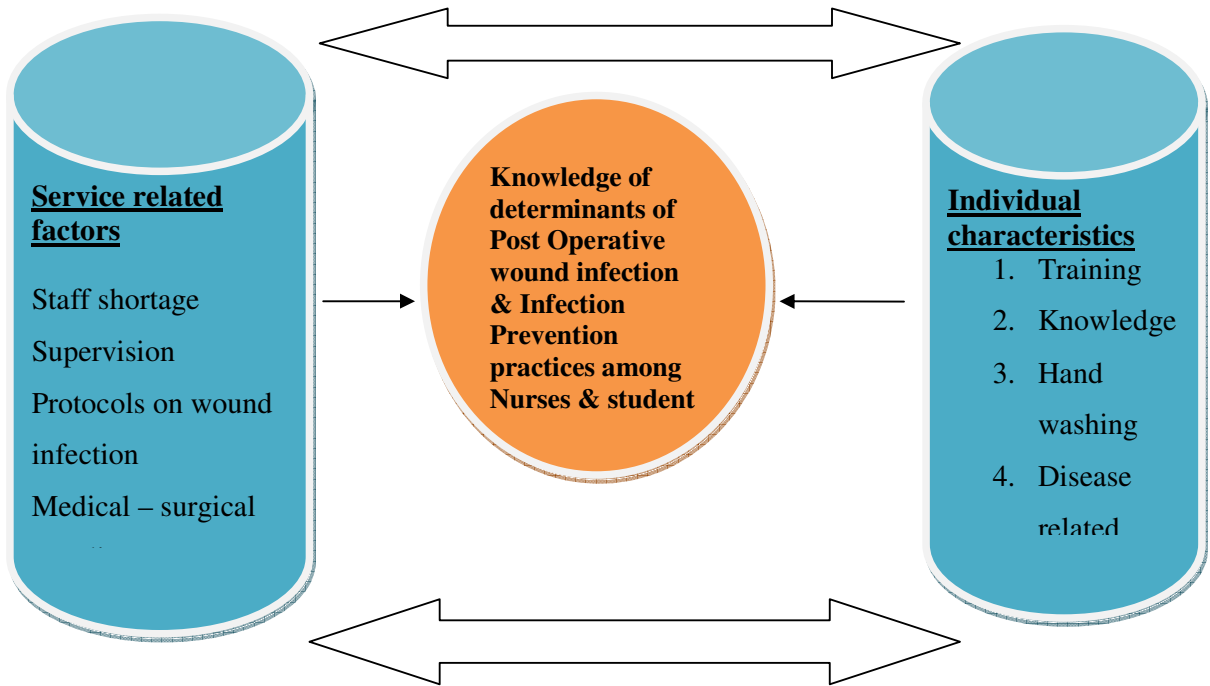
1.4.2.4 Medical Equipment

Equipment may influence health care providers' infection prevention practices. For example, lack of sterilizers to sterile wound dressing equipment may lead to contamination of the wound if unsterilized equipment is used to dress the wound. In addition, equipment that is handled and used by health care providers between patients should be cleaned regularly. Gilboy and Howard (2008) describe the importance of cleaning equipment

1.4.2.5 Supervision

Supervision can influence health care providers' infection prevention practices. When health care providers are not supervised regularly, they may tend to be complacent and take it easy since no one is seeing their deeds and actions (Jain, 2012). Therefore, supervisors should visit surgical wards regularly and frequently monitor whether the nurses prevention practices in clinical areas.

The Service related and personal factors influencing the respondents knowledge of determinants of postoperative wound infection and the infection prevention practices are illustrated in a diagrammatic form in figure one (1) on page nine (9).

Figure 1: **Factors influencing knowledge of determinants of post-operative wound infection and infection prevention practices**

Service related factors

Staff shortage

Supervision

Protocols on wound infection

Medical – surgical

Knowledge of determinants of Post Operative wound infection & Infection Prevention practices among Nurses & student

Individual characteristics
1. Training
2. Knowledge
3. Hand washing
4. Disease related

1.5 JUSTIFICATION FOR THE STUDY

The study aimed at establishing knowledge of determinants of postoperative wound infection and infection prevention practices (compliance with IP guidelines) among nurses and student nurses. Nurses and student nurses have great potential for improving management of surgical patients because they provide nursing care to these patients for 24 hours every day. Since no study has been conducted at Solwezi general hospital of this nature, the study will provide baseline data for further research.

It is hoped that the results obtained from this research will be utilised by Solwezi hospital management, nurse managers, nurses and the infection prevention committee to plan the educational materials strategies that would enhance quality nursing care and reduce wound infection at Solwezi general hospital and many other interested parties.

1.6. RESEARCH THEORY

1.6.1   Theory of Reasoned Action (TRA) Model

The theoretical model that guided this study was the Theory of Reasoned Action (TRA). This is a model for the prediction of behavioural intention, spanning predictions of attitude and behaviour. The subsequent separation of behavioural intention from behaviour allows for explanation of limiting factors on attitude influence (Ajzen, 1980). The theory of reasoned action was developed by Martin Fishbein and Icek Ajzen (1975, 1980), derived from previous research that started out as the theory of attitude, which led to the study of attitude and behaviour. The theory was born largely out of frustration with traditional attitude-behaviour research, much of which found weak correlation between attitude measures and performance of volition (voluntary) behaviours.

Derived from the social psychology setting, the TRA was proposed by Ajzen and Fishbein (1975, 1980). The components of TRA are three general constructs; Behavioural Intention (BI), Attitude (A) and Subjective Norms (SN). TRA suggests that a person's behaviour intention depends on the person's attitude about the behaviour and subjective norms. If a person intents to follow behaviour, then it is likely that the person will do it.

Behavioural intention measures a person's relative strength of intention to perform behaviour. Attitude consists of beliefs about the consequences of performing the behaviour multiplied by his or her valuation of these consequences. Subjective norm is seen as a combination of perceived expectations from relevant individuals or groups along with intentions to comply with these expectations. In other words, the person's perception that most people who are important to him or her think he should or should not perform the behaviour in question. Therefore, a person's volitional behaviour is predicted by his/her attitude toward that behaviour and how he/she thinks other people would view them if they performed the behaviour. A person's attitude combined with subjective norms forms his/her behavioural intention.

Fishbien and Ajzen say, though, that attitudes and norms are not weighted equally in predicting behaviour, indeed, depending on the individual and the situation, these

factors might have very different effects on behavioural intentions. Intention; thus a weight is associated with each of these factors in predicted formula of the theory (BI = (AB) WIT (SN) W2). For example, you might be the kind of person who cares little for what others think. If this is the case, the subjective norms would carry little weight in predicting your behaviour (Miller, 2005).

TRA has been tested in numerous studies across many areas including dieting, using condoms, consuming genetically engineered foods and limiting such exposures. The theory has been revised and extended by Ajzen himself into the theory of planned behaviour. This extension involves the additions of one major predictor, perceived additions of one major predictor, perceived behavioural control to the model. This addition was made to counter for times when people have the intentions of carrying out behaviour but the actual behaviour is thwarted because they lack confidence or control over behaviour.

The researcher used the TRA to describe, plan his study, develop the research instrument, analyse and interpret data. TRA postulates that individual behaviour is guided by beliefs, attitudes, intentions, expectations and social norms. This implies that actors have certain measurable attitudes and beliefs that shape their intentions to adopt a given behaviour. Ajzen and Fishbein (1980) suggest that for a person to adopt and act out a given behaviour, he or she must first develop the intention to perform that behaviour. This behavioural intention is determined by the actor's attitude towards the behaviour and her or his subjective norm. Therefore, in order to change behaviour, attitudes and beliefs about behaviour should change first.

This theory can help us understand why Nurses do not comply with infection prevention guidelines. In this study, knowledge attained by nurses and student nurses through in-service training and School of Nursing respectively will motivate them to comply with infection prevention guidelines. Ultimately, young people's attitude towards infection prevention can lead to an intention to comply with IP guidelines. Thus if young people perceive that the outcome from performing a behaviour (compliance with IP guidelines) is positive, they will have a positive attitude towards infection prevention.

The opposite can also be stated if the behaviour is thought to be negative. The interrelatedness of the concepts and components of the theory are depicted in figure one (1) on page thirteen (13).

Figure 2: Theory of Reasoned Action Model
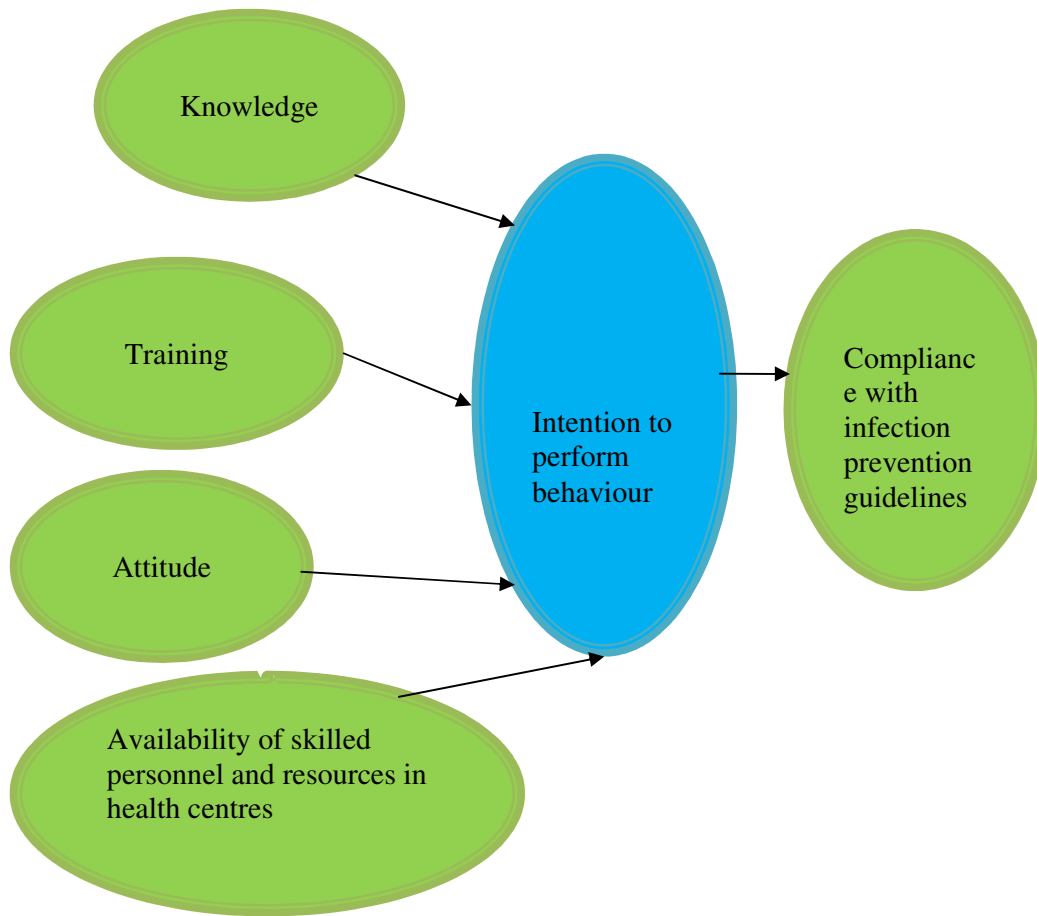
1.7. RESEARCH QUESTIONS

The research question for this study was:-

1.7.1. Do Nurses and Student Nurses have knowledge of determinants of Post-operative wound infection and comply with Infection prevention guidelines?

1.8 RESEARCH OBJECTIVES

1.8.1. GENERAL OBJECTIVE

To determine the level of knowledge of Nurses and Student Nurses on determinants of post operative wound infection and Infection Prevention practices at Solwezi General Hospital.

1.8.2 SPECIFIC OBJECTIVES

The specific objectives for this study were:

1. To assess the Nurses and Student Nurses' level of knowledge of determinants of post operative wound infection.
2. To determine Nurses and Student Nurses' infection prevention practices.
3. To compare knowledge levels of the determinants of post operative wound infection and infection prevention practices among Nurses and Student Nurses.

1.9 HYPOTHESIS

1.9.1. Hull Hypothesis

There is no association between knowledge of the determinants of post operative wound infection and infection prevention practices among nurses and student nurses and the following:

1. Training in IP
2. Availability of IP guidelines
3. Staff shortage
4. Protocols
5. Supervision
6. Medical – surgical supplies
7. Medical equipment
8. Washes hands regularly

1.10 CONCEPTUAL DEFINITION OF TERMS

1.10.**1 Knowledge:** Knowledge refers to the information, understanding and skills that you gain through education or experience (Hornby, 2010).

1.10.2 **Post operative**: connected with the period after a surgical operation (Hornby, 2010).

1.10.3 **Wound**: A cut or a break in continuity of any tissue caused by injury or operation (Weller, 2006).

1.10.4 **Infection**: invasion and multiplication of microorganisms in the body tissue (Weller, 2006).

1.10.5 **Determinants**: a thing that decides whether or how something happens (Hornby, 2010).

1.10.6 **Infection prevention practices**: actions taken or aimed at stopping spread if infection among humans (Hornby, 2010).

1.10.7 **Nurse**: a person whose job is to take care of the sick or injured people especially, one who is trained to do such work (Hornby, 2010).

1.10.8 **Student Nurse**: a person who is studying to be a nurse in a nursing school (Hornby, 2010).

1.11. OPERATIONAL DEFINITONS OF TERMS

1.11.1 Knowledge of Postoperative wound infection

Knowledge of determinants of postoperative wound infection was assessed by a self-administered questionnaire comprising 12 knowledge questions. The levels of knowledge were categorised into three levels namely high, medium and low levels of knowledge.

1.11.2 Infection prevention practices

Infection prevention practices were measured by a self-administered questionnaire that had 13 items on infection prevention practice. Practice levels were also categorised as good and bad practices.

1.12 STUDY VARIABLES

Variables are qualities, properties or characteristic or attributes of a person, things or situations that change or vary in a study (Burns & Grove, 2001:168). This study will consider two main variables which are: the Dependant and Independent variables.

1.12.1 Dependant Variables

A dependent variable is a variable that is used to describe or measure the problem (core problem) under study. This is the outcome variable of interest, the variable that is hypothesised to depend on or to be the cause by another variable (Independent variable), sometimes referred to as the criteria variable according to (Burns & Grove, 2001:168). The dependent variables for this study are knowledge of determinants of post operative wound infection and infection prevention practices.

1.12.2 Independent Variables

The Independent variable is a variable that is assumed to cause or at least influences the problem. This is a variable that is believed to cause or influence the dependent variable, in experimental research, the manipulated variable, (Burns & Grove, 2001:168). The independent variables for this study were:-

1. Training in IP
2. Availability of IP guidelines
3. Staff shortage
4. Protocols
5. Supervision
6. Medical – surgical supplies
7. Medical equipment
8. Regular hand washing
9. Demographic data

TABLE 2:   VARIABLES, CUT-OFF POINTS AND INDICATORS

VARIABLES	CUT OFF POINTS	INDICATORS	QUESTION Nos
INDEPENDENT VARIABLE			
Availability of Protocols on wound infection management	Available	Protocol available	12
	Not available	No protocol available	
Availability of IP guidelines	Yes	Infection prevention guidelines available	13
	No	Infection prevention guidelines not available	
Washes hands regularly before and after the procedure	Yes	Washes hands regularly before and after the procedure	15
	No	Does not Wash hands regularly before and after the procedure	
Staff shortage	Adequate	One nurse to 10 patients	19
	Not adequate	One nurse to 20 or more patients	
Availability of medical equipment	Yes	Medical equipment available	21
	No	Medical equipment not available	
Supervision of students	Yes	Students supervised	23
	No	Students not supervised	
Availability of medical equipment	Yes	Medical equipment available	24
	No	Medical equipment not available	
Availability of surgical supplies	Yes	Surgical supplies available	26
	No	Surgical supplies not available	
DEPENDENT VARIABLE			
Knowledge of determinants of post operative wound infection	High level Knowledge	If one scores 9-12 or above questions on knowledge	6-15
	Medium level of Knowledge	If one scores 6-8 questions on knowledge	
	Low level of knowledge	If one scores 5 and below questions on knowledge	
Infection Prevention practices	Good practices	If one scores 7-13 questions on Infection Prevention practices	16-36
		If one scores 6 and below questions on Infection Prevention Practices	

<p style="text-align:center">**CHAPTER TWO**</p>

2.0   LITERATURE REVIEW

2.1.   INTRODUCTION

The Literature review for this study focused on Nurses knowledge on post-operative wound infection and Compliance with IP guidelines. The review of literature is an organised critique of the important scholarly literature that supports a study and a key step in the research process (LoBiondo -Wood and Haber, 2006). The overall purpose of the literature review in a research study is to present the knowledge base for the conduct of the research project (LoBiondo-Wood and Haber, 2006). This Chapter focuses on literature on knowledge of determinants of post operative wound infection and infection prevention practices of nurses and other health care providers. The information was obtained from published and unpublished books, articles, policy papers, procedure manuals, scientific journals, dissertations and discussions with topic experts.

The Literature review has been presented in two categories namely: Knowledge of determinants of post operative wound infection and Infection Prevention practices (Compliance with Infection Prevention guidelines).

2.2 KNOWLEDGE OF DETERMINANTS OF POST- OPERATIVE WOUND
**   INFECTION**

Mohammed et al. (2008) found that twenty (20) median sternotomy wound infections or endocarditis occurred during a 30 month period in 20 out of 1204 (1.7%) cardiac surgery procedures in adults at the University of Maryland Hospital. Four risk factors of age, sex, index of obesity and presence of diabetes mellitus related to the individual undergoing surgery were examined. It was found that obesity and diabetes mellitus had 10% contribution towards the postoperative wound infection.

The findings suggest that knowledge of determinants of post-operative wound infection such as obesity and diabetes mellitus by the health care providers can help in planning the care required by the clients undergoing surgical procedures.

In a similar study (as above) conducted by Mohammed et al. (2008) whose objective was to investigate factors that predict sternal wound complications in patients after Coronary Artery Bypass Graft (CABG), the results showed that the risk factors that significantly predicted sternal wound complications after CABG surgery included older age, diabetes mellitus and increased Body Mass Index (BMI). The conclusion was that advanced age, diabetes and obesity high score were the important risk factors identified, and as such more attention should be paid to these patients. Modifying the risk factors and making decisions according to risk factor such as appropriate administration of prophylactic antibiotics in patients with poor physical status, good control of diabetes are recommended. This result revealed that the health care provider did not know the risk factors identified in the study to be the cause of post-operative would infection until it was studied.

In a study conducted by Stephen et al. (2000) at the Medical University of South Carolina, USA to estimate the maximum vertical depths of tissue at the surgical site on abdominal wound infection after caesarean delivery, results revealed that, wound infection occurred in 11 of 140 women (7.8%) who delivered by caesarean section. The risk factors identified as significantly associated with wound infection by univariate analysis were thickness of subcutaneous tissue, maternal weight and BMI. Multiple logistic regression analysis confirmed subcutaneous tissue thickness as the only significant risk factor for wound infection with relative risk of 2.8 (95% confidence interval 1.3, 5.9). The study showed no significant differences between women who developed wound infection and those without infections in terms of selected demographics, duration of ruptured membranes, number of vaginal examinations, type of skin or duration of surgery. It was therefore, concluded that thickness of subcutaneous tissue appears to be the only significant risk factor associated with abdominal wound infection after caesarean delivery.

A retrospective case control study was performed in Chicago in 2008 to determine the risk and outcomes associated with Paediatric cardiothoracic surgical site infection. The study revealed that undergoing more than one cardiothoracic operation, having preoperative infection, and undergoing surgery on a Monday were significant risk factors (results 2.5% to 5.0%).

It was found that cardiothoracic surgical site infection increased hospital and paediatric intensive care unit length of stay and that deep surgical site infection significantly increased mortality. The above study confirms the fact that the length of stay in hospital and the deep surgical site infection increased mortality.

Whitelaw (2009) conducted a study at the University of Cape Town, Department of Microbiology in South Africa on risk factors for wound infection. The study revealed that the nature and extent of the surgery could be a risk factor for developing wound sepsis. The study also revealed that the severity of the patient's illness, state of the immunity and length of stay in hospital created a higher risk of post-operative wound infection. It further showed that elderly patients and children were more vulnerable to infections due to low immunity response to infection (Whitelaw, 2009).

It can also be observed that knowledge of these factors associated with post-operative wound infection by the health care provider can be used in reducing the case of post-operative patients

Another study conducted by Karl et al. (2008) in the Eastern Cape, South Africa among the Xhosa initiates who had traditional male circumcision showed that 40 (20.8%) of the circumcised patients had developed mild delayed wound healing by the end of the 14th day post operative 31(16.2%) had wound infection, 22(10.5%) experienced mild pain and 20 (10.4%) had insufficient skin removed. The high infection rates were attributed to unhygienic conditions in which traditional male circumcision was conducted. This high infection rate recorded during male circumcision among the Xhosa demonstrated lack of knowledge of determinants of post-operative wound infection on the part of the Xhosa.

The studies reviewed on knowledge of determinants of post-operative wound infection showed that lack of adequate knowledge of determinants of post operative wound infection increased the risk of developing post-operative wound infection and another area of concern is infection prevention practice in the clinical area.

2.3.   INFECTION PREVENTION PRACTICES

Jain et al. (2012) conducted a study to assess the knowledge and practice of 400 health care personnel regarding hospital infection control practices in New Delhi, India. A structured questionnaire was distributed to the study respondents and collected the same day. Knowledge and practices of 329 nurses and 71 doctors regarding hand hygiene, standard precautions, hospital environment cleaning and needle stick injury were collected and analysed. The findings revealed that 55.3% of the respondents' had knowledge regarding standard precautions and 31.8% had knowledge on risks associated with needle stick injuries. The lack of knowledge and practices regarding basic infection control protocols revealed in this study should be improved by way of educational intervention, in the form of formal training of doctors and nurses IP practices and reinforcement of the same.

In an observational study conducted by Didier et al. (1999) on compliance with IP guideline of hand washing in a Teaching Hospital in Geneva, Switzerland, it was established that compliance was moderate with an average compliance of 48%. Compliance varied across types of health care workers with the highest level of non-compliance being among physicians with an Odds Ratio (OR) of 2.8, Nurse Assistant OR of 1.3 and other health workers OR 2.1. These findings suggested that targeted education programmes may be useful in tackling the problem of non-compliance with IP guidelines.

In Cairo, Egypt, Abdelazi and Bakr (2009) assessed health care workers knowledge, attitude and practice of hand washing at Ain Shams University hospital. The study revealed that Doctors showed a significant higher compliance (37.5%) than other groups of health care workers; however, only 11.6% of the opportunities observed for doctors were done appropriately. the most common type of hand washing practiced among health care workers was the routine hand washing (64.2%) and the least was the use of the antiseptic hand rub (3.9%). Having a short contact time and improper drying (23.2%) were the most common errors that lead to inappropriate hand washing. Most of the wards had available sinks (80%) but none of them had available paper towels. The mean knowledge score was higher in nurses compared to Doctors. Most nurses believed that continuous administrative orders and continuous observation can improve hand washing practices.

This finding suggest the need for implementation of multifaceted interventional behavioural hand hygiene program with continuous monitoring and performance feedback, increasing the supplies necessary for hand washing and institutional support are very important for improving the compliance of hand hygiene guidelines. Similar studies on hand hygiene practices among health care workers also revealed inadequate compliance to hand washing guidelines (Anargh et al., 2013 and Partarukul et al., 2005). However, a study by Creedon (2006) observed a significant shift (32%) in health care workers compliance with hand washing guidelines following the interventional hand-hygiene program.

A study entitled Trails of Improved Practices conducted by the Central Board of Health and the Prevention of Medical Transmission of Infection project in Ndola and Chipata in 2004 revealed that there were a number of gaps in the availability of Infection Prevention supplies. In Ndola, for example, supply availability was below 50% while in Chipata it was slightly above 50%. Literature has shown that shortage of IP materials is a major contributor to poor infection prevention practices (compliance with IP guidelines).

A study conducted by Hamomba (2006) on adherence to the Universal Precautions (UP) with reference to HIV infection among midwives and trained traditional birth attendants during home and health centre deliveries in Siavonga and Mazabuka districts. The study revealed that the proportion of midwives and nurses adhering to Ups was 63.5%. The most significant factors related to adherence for nurses and midwives were the availability of medical supplies and the inclusion of UP in their training. Respondents who were trained in Ups were 24.89 times more likely to adhere. Respondents who received weekly medical supplies were 11.89 times more likely to adhere to UP compared to respondents who received monthly supplies.
This study has shown that availability of medical supplies in a health institution motivates health care providers to comply or adhere to IP practices

Libetwa's (1997) study on the knowledge, practices and attitude of midwives on infection control in Lusaka Urban clinics revealed that 63.6% of Registered Midwives were motivated to wash their hands by the HIV status of the client.

This shows that knowledge of the client you are caring for can help to improve compliance and influence practice towards a particular factor (Libetwa, 1997).

The results of this study demonstrate that practice (Compliance to IP guidelines) is linked to knowledge of determinants of post-operative wound infections by the health worker. If the health care provider has more knowledge of determinants of post-operative wound infection it will positively impact on the number of cases of post-operative wound infection being reported in health facilities.

A study conducted in Mufulira at Ronald Ross General Hospital by Mukwato (2008) on health-care worker's compliance with the IP guidelines and factors that influence compliance. The main objective of the study was to determine level of health-care worker's compliance with the IP guidelines and factors that influence compliance. The study showed that levels of compliance differed among the health care workers however, it is clear that post-operative wound infection may be directly or indirectly be impacted by many determinants such as knowledge of post-operative wound infections and others.

In Nepal, Paudyal et al (2008) conducted a study to assess infection control knowledge, attitudes and practices among health care workers. A total of 158 doctors and 166 nurses participated, 27% of whom had received infection control training. The findings revealed that only 16%, 14% and 0.3% of the respondents' achieved maximum scores for knowledge, attitude and practice items respectively. Staff had good knowledge and positive attitudes toward most aspects of infection control, although only half had heard of methicillin-resistant staphylococcus aureus. Logistic regression revealed that profession, age, and having studied abroad significantly predicted markers of infection control knowledge, attitudes and practice.

2.4 CONCLUSION

From the reviewed literature so far, it is evident that there is knowledge deficit about post operative wound infection and lack of compliance with infection prevention practices among health workers. However few studies have been conducted on IP practices from the USA, South Africa and Zambia.

The Ministry of Health does not compile data on compliance with infection prevention practices. A few studies conducted on IP practice in Zambia have been conducted in other districts and not in Solwezi. Therefore, the researcher is compelled to conduct the study to determine levels of compliance with infection prevention practices and knowledge of determinants of post operative wound infection among the nurses at Solwezi General Hospital.

CHAPTER THREE

3.0.   RESEARCH METHODOLOGY

3.1.   INTRODUCTION

This chapter describes the research methodology used to investigate knowledge of the determinants of post-operative wound infection at Solwezi General Hospital in North-Western Province. The study design, study setting and study population used are described. The sampling techniques and procedures for data collection are outlined. The research tool used and issues of reliability are described. Furthermore, ethical consideration and measures taken to protect the rights of the study participants, pre-testing, dissemination and utilization of the results and limitation of the study are explained.

3.2   RESEARCH DESIGN

Basavanthappa (2007) describes a research design as a plan, structure, and strategy of investigations of answering the research question. It is the overall plan or blue print the researchers select to carry out their study. In order to achieve the objectives of the study, a descriptive cross-sectional design was used.

Dempsey and Dempsey (2009) state that a descriptive study sets out to discover new meaning when little is known about a phenomenon of interest. This design was chosen due to lack of adequate information on wound infection at Solwezi General Hospital. The study is a cross-sectional study because it involved the collection of data at one point (Snap-shot). It involved collection of data at the same time. Polit and Hungler (2001) suggest that this approach helps to describe the status of the phenomena or relationships among phenomena at a fixed point.

3.3   RESEARCH SETTING

Research setting is the physical location and conditions in which data collection takes place (Polit & Hungler, 200). This study was conducted at Solwezi General Hospital. Solwezi General Hospital is situated in Solwezi District which is the Provincial headquarters of the North Western Province of Zambia. It is 600 km by road from Lusaka the capital city of Zambia. The major health services offered at this hospital are Internal Medicine, Gynaecology and Obstetrics, Surgery and Paediatrics. The

Hospital, being a second level referral, has a catchment area of the entire province with a population of 785,751(CSO, 2007).

Although Solwezi General Hospital is a second level hospital, most of the cases attended to are first level because Solwezi District has no District Hospital. This means that some of the Hospital beds are reserved for the first level services of Solwezi District Health Management (DHMT, 2013). North-western Province has a population of about 785,751 according to Demographic Health Survey (DHS, 2007) of the Central Statistics Office. About 87% of the population lives in the rural area while about 13% is in the urban. About 48% of the population is male while 52% is female. It is however anticipated that the population could be higher than indicated above due to high influx of job seekers which has resulted from the opening of Kansanshi, Lumwana and now Kalumbila mines in the province.

As a result of the influx of people into the Province, and Solwezi in particular, th ere has been marked increase in the disease burden especially communicable diseases such as HIV and AID and conditions arising from road traffic and mine accidents. These patients with wounds are nursed by Nurses at Solwezi General Hospital. It was for this reason that the researcher chose Solwezi General Hospital as a study site with the view of determining Nurses' knowledge of post-operative wound infection and compliance with IP guidelines.

TABLE 3: CLINICAL CARE SERVICES

Type of Ward	Number	Comments
Medical: Female (Kifufwa Ward)	1.	56 beds 34 beds are for Medical cases 12 beds are for Surgical cases 10 beds are reserved for TB cases in side wards
Medical: Male (Mutanda Ward)	1	56 beds 46 beds are for Medical cases 10 beds are reserved for TB cases in side wards
Paediatric (Lunga Ward)	1	58 beds 13 beds for Surgical 37 Medical cases 8 beds for PCM cases
Male Surgical (Zambezi Ward)	1	56 beds 6 beds are for Orthopaedic cases
High Cost (KabompoWard)	1	26 beds – subdivided into male, female and paediatrics wings
ANC Ward		Consists of 8 beds within gynaecology ward
Labour Ward		6 beds – a room located within Gynaecology
Post Natal Ward		7 beds – a room located within Gynaecology
Gynaecology (Mumbezhi ward)		28 beds
Neonatology		Located within Obstetric/Gynae Ward consisting of :- i) Incubators for the premature babies in the hospital ii) Incubators for premature babies born before arrival (BBA)
Operating theatre	1	Consisting 2 operating rooms, one used for clean cases and the other for dirty cases One room has been renovated within the theatre for circumcision.

3.4   STUDY POPULATION

A study population is the entire set of individuals (or objects) having same common characteristics (Polit & Hungler, 2001). The study population (unit analysis) comprised Nurses and student nurses who worked or were working in Surgical wards and Theatre (wards with post operative patients) at the time of the study.

This population was targeted because they are in contact with patients having surgical conditions 24 hours of the day and are expected to have acquired knowledge about postoperative wound infection. Their knowledge and practices can either minimise or promote postoperative wound infection.

3.5   SAMPLE SELECTION

Sample selection is the process of selecting a portion of the population to represent the entire population (Polit & Hungler, 2001). In order to have a representative sample of the study population. In this study, a total of 90 participants (Forty-five qualified nurses and forty-five student nurses) were selected to participate in the study.

Firstly, the Nurses and student nurses were selected by obtaining a sample frame from the Hospital nurses and nursing school students. Convenience sampling was used to select study units (nurses and student nurses). Convenient sampling is also called accidental sampling where study units are included in the study because they happen to be in the right place at the right time (Burns & Grove, 2001). In convenient sampling available study units are simply entered into the study until the desired sample size is reached. However, convenient sampling is considered a weak approach to sampling because it provides little opportunity to control for biases.

In order to minimise biases, the researcher identified and described known biases in the sample by thinking through the sample criteria to determine the target population. The use of sampling qualified nurses and student nurses as study units minimised the bias that is caused by education level. The other reason for using convenience sampling is that it is inexpensive and accessible (Burns & Grove, 2005).

3.5.1. Inclusion criteria

- All Nurses and Student nurses who worked or were working in surgical wards or the Operating theatre (wards with post operative patients) for a period of 4-12 weeks.

3.5.2 Exclusion criteria

- All Nurses and Student nurses who did not work in surgical wards or operating theatre (ward without post operative patients) for a period of 4-12 weeks.

3.6   SAMPLE SIZE

The sample size was calculated using the following formula:

$$N = \frac{Z^2PQ}{D^2}$$

n= Sample size

p = prevalence

Q = 100 – p

D = margin of error $\pm$ 5%

Z = 1.96 from normal distribution

$$n= \frac{1.96 \times 1.96 \times 18 \ (100-18)}{5 \times 5}$$

N = 90

With this formula a sample of 90 was calculated using epi-info version 6.
The adjustment was made since a 95% response rate was expected.

3.7   DATA COLLECTION TOOL

Data were collected over a period of 4 weeks. The data collection tool used to collect data from the respondents was a self administered questionnaire.

3.7.1. Self administered questionnaire

A self-administered questionnaire is a paper and pencil instrument designed to gather data from individuals (LoBiondo - Wood & Haber, 2006). A self administered questionnaire was used to collect data because it gave the respondents liberty to answer questions without interference from the researcher. The questionnaire consisted of all the study variables. It consisted of three sections. Section A comprised of questions on the respondents demographic data and section B questions elicited data on knowledge of determinants of post operative wound infection and section C comprised of questions on infection prevention practices.

The self-administered questionnaire consisted of closed and open-ended questions. According to Polit and Beck (2008), closed ended-questions offer respondents a number of alternative replies, from which they must choose the one that most closely matches the appropriate answer (quantitative data). Open-ended questions were asked to allow participants to respond to questions in their own words (qualitative data). The advantages of closed ended questions are that they are easier to administer efficiently as respondents can manage to complete more closed-ended questions than open-ended ones within a short period of time (Polit & Becks, 2008). Closed-ended questions are also easier to analyse.

The open-ended questions allow obtaining richer and fuller information if the respondents are verbally expressive and co-operative. The disadvantage of open-ended questions is that respondents may be unwilling to compose lengthy written responses and they are difficult to analyze (Polit & Hungler, 2001). The advantages of using a self-administered questionnaire is that it's easy to design and can be distributed to large samples either directly or through the mail. Questions in a questionnaire are presented in a consistent manner and there is less opportunity for bias.

The other advantages of using a self-administered questionnaire are that the information obtained from the respondents tends to have less depth. The respondent is unable to elaborate on responses or ask for clarification of questions and the data collected cannot use probe strategies.

The questionnaires can only be used to collect data from literate respondents. Well designed items on the questionnaire require considerable effort.

3.7.1.1 Validity

To ensure the quality of a data collection tool, it is important to establish its validity. Validity is defined as the degree to which an instrument measures what it is intended to measure (Polit & Hunger, 2001). To ensure validity of the data collection tool, a comprehensive and relevant literature review was conducted on the concepts used in the questionnaire and experts in infection prevention (within the School of Medicine and the University Teaching Hospital) checked the questions. The content in the questionnaires was further compared to similar surveys in Zambia such as Libetwa et al. (1997) and the World Health Organisation (2002) research instrument on infection prevention.

The Cronbach (reliability) coefficient for the questionnaire as a whole was a=0.875. According to Burns and Grove (2005) an alpha coefficient of 0.70 is sufficient for newly designed instruments.

3.7.1.2 Reliability

Reliability is the stability of the measuring instrument over time (Dempsey & Dempsey, 2000). To ensure the reliability of the research instrument, a pre-test was conducted. During the pre-test, respondents were asked if there were any questions they did not understand. Changes were made according to the results of the pilot study. The open-ended questions in the questionnaires provided an opportunity to clients to add their own ideas and thereby bringing out issues not thought of during the designing of the questionnaire.

3.8 DATA COLLECTION TECHNIQUE

Data collection technique is a procedure of collection of data or information needed to address a research problem (Polit & Hungler, 2001).

The investigator used a self-administered questionnaire to collect data. Questionnaires were handed out to individual respondents and were collected three hours later.

Individual distribution of questionnaires in clinical settings is often inexpensive and efficient and can yield a relatively high rate of response according to Polit & Beck, 2008.

3.9   PRE-TEST

Pre-test is the trial administration of a newly developed instrument to identify flaws or assess time requirements (Polit & Hungler, 2001). Pre-testing of the data collecting tool was done at Mukinge Mission General Hospital. This is one of the two general hospitals in North-western province. Nine (9) respondents were selected using convenience sampling. The purpose of the pre-test was to ,identify any part of the instrument that was difficult to understand or misinterpreted by the respondent, determine clarity of the instrument, determine whether the sequencing of the questions was logical, determine acceptability of the questions and willingness to respond or answer questions, detect any errors in the questionnaire for the main study and assess the appropriateness and clarity of questions.

3.10   ETHICAL CLEARANCE

Ethics can be defined as a system of moral values that are concerned with the degree to which research procedures adhere to professional, legal and social obligations to the study participants (Polit & Hungler, 2001). Ethical clearance was obtained from the University of Zambia, Biomedical Research and Ethics Committee (UNZABREC). Written permission to conduct the study was obtained from the Medical Superintendent of Solwezi General Hospital. The purpose and nature of the study was explained to the study participants. Written informed consents were obtained from the respondents before administering the research instruments. The respondents who agreed to take part in the study were requested to sign a consent form. Respondents who declined to participate were reassured that no privileges would be taken away from them. These respondents were in the usual work environment and hence were not exposed to any physical and emotional danger or harm.

Confidentiality and anonymity were maintained in that the respondents' names were not recorded on the questionnaires. Instead numbers were written on the completed questionnaires and these were kept under lock and ke

TABLE 4: SUMMARY OF RESEARCH METHODOLOGY

Research design and approach	**Descriptive cross sectional study with quantitative approach**
Study population	Qualified nurses and students working in surgical wards at Solwezi general hospital will be population for the study
Study setting	The study was conducted in the surgical at Solwezi general hospital
Sample and sample size	45 Nurses and 45 student Nurses (90 respondents)
Sampling technique	Convenient sampling method was used to select the staff nurses and student nurses working in surgical wards at Solwezi general hospital
Inclusion criteria	All Nurses and Student nurses who worked or were working in surgical wards or the Operating theatre (wards with post operative patients) for a period of 4-12 weeks.
Exclusion criteria	All Nurses and Student nurses who did not work in surgical wards or operating theatre (ward without post operative patients) for a period of 4-12 weeks.
Data collection tool	A self-administered questionnaire was used to assess nurses and student nurses knowledge and practices towards infection prevention. It had three parts as follow: Part A: Related to demographic variables of the nurses and student nurses.
	Part B: Related to knowledge of determinants of postoperative wound infection among nurses and students nurses. Part C: assessed nurses and student nurses infection prevention practices.
Method of data collection	1. The written permission was obtained prior to data collection from concerned authority of Solwezi general hospital. 2. Consent was obtained from the nurses and student nurses and confidentiality was assured. 3. The investigator himself visited the hospital to distribute the questionnaires and 90 were collected.
Data analysis and data presentation	The collected data was organized by : **Descriptive statistics** Frequency distributions, percentage, mean, and standard deviation was used to assess the demographic variables and knowledge and practices. **Inferential statistics** Chi-square test was used to determine the association between the knowledge and Practices variables and demographic variables of nurses and student nurses. Analyzed data has been presented in the form of tables, diagrams, graphs based on the findings.

CHAPTER FOUR

4.0. DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 INTRODUCTION

Chapter four (4) provides a discussion on data analysis and presents the findings from the data gathered. The findings are presented in details according to sections. Section A presents information on the respondents socio-demographic data and section B provides information on respondents' knowledge of determinants of post operative wound infection. The information on the respondents' infection prevention practices is provided in section C.

4.2 DATA ANALYSIS

Data analysis is defined as "the systematic organization and synthesis of research data and testing of research hypothesis using the same data" (Polit &Hungler, 2001). During data collection in the field and immediately thereafter, data were sorted out for completeness, consistency, legibility, accuracy and recorded accordingly. Responses to closed-end questions were checked for completeness and entered on a data master sheet for easy recording whilst responses to open-ended questions were categorised into different groups and coded then also entered on a Data master sheet. Following categorization and coding, the codes were then entered and analyzed using Epi-info version 6 soft ware and SPSS computer package version 16.

In order to cater for non-responses a total of 100 questionnaires were distributed and 90 questionnaires were returned giving a response rate of 100%. Data were carefully scrutinised by placing it in categories, calculating the mean and applying statistical procedures in order to show variable associations, the researcher applied the chi-square test. The chi-square test was used to compare association between the dependent variables (knowledge of the determinants post operative wound infection and infection prevention practices among nurses and student nurses) and independent variables (Training in IP, availability of IP guidelines, staff shortage, availability of protocols, supervision, availability of medical supplies, availability of medical equipment and regular hand washing).

The chi-square tests the hypothesis that two variables are related only by chance, the confidence interval was set at 95%, that is being 95% confident that the sample mean represented the population mean. The level of significance was set at 5%, only P value of 0.05 or less was considered statistically significant thereby rejecting the null hypothesis.

4.3   PRESENTATION OF FINDINGS

The raw data from the questionnaires were recorded, analysed and interpreted. The data therefore, is presented in such a way that meaning can be inferred from it. This aids in easy accessibility of information and summarizing of facts.

In this study, data is presented in form of frequency tables, cross tabulation, pie charts and percentages which are an effective way of communicating research results. The cross tabulations are helpful in showing relationships between variables. The pie charts and bar charts provide a variety of ways in which to present data and thus prevent the monotony of narrative presentation.

SECTION A: **SOCIO-DEMOGRAPHIC DATA**

Section A consists of the respondents' socio-demographic data. Table 5 represents the demographic characteristic of the respondents.

TABLE 5:   **SOCIAL-DEMOGRAPHIC DATA (N=90)**

Demographics	Frequency	Percent
	n	**(%)**
Designation		
Qualified Nurse	45	(50.0)
Student Nurse	45	(50.0)
How Long has Worked in the surgical ward		
4 – 12 Weeks	47	(52.2)
>12 Weeks	43	(47.8)
Age		
18 - 28	58	(64.4)
29 - 38	32	(35.6)
Gender		
Females	58	(64.4)
Male	32	(35.6)
Marital Status		
Single	55	(61.1)
Married	33	(36.7)
Divorced	1	(1.1)
Widowed	1	(1.1)

Table 5 shows that 50.0% (45) of the respondents interviewed were qualified nurses and (45) 50.0% were student nurses. Both qualified and student nurses had worked in the surgical units for at least 4 weeks or more. Most of the respondents 58 (64.4%) were within the age of 18 – 28 years while only 32 (35.6%) The mean age of the respondents was 21 and Standard Deviation 8.

The majority of the respondents 58 (64.4%) interviewed were females while 32 (35.6%) were males. Most of the respondents 55(61%) were single, 33 (36.7%) were married, 1 (1.1%) and 1 (1.1%) were divorced and widowed respectively.

SECTION B: KNOWLEDGE OF DETERMINANTS OF POST OPERATIVE WOUND INFECTION

Section B represents the respondents' information on knowledge of determinants of post operative wound infection. The section consisted of 5 questions on the determinants of post-operative wound infection. The information is presented in pie charts and tables.

TABLE 6:   DEFINITION OF POSTOPERATIVE WOUND INFECTION (N= 90)

Variable	Frequency	Percent
Definition of post operative wound infection		
Correct response	88	97.8
Incorrect response	2	2.2
Total	**90**	**100**

Table 6 shows that majority (97.8%) of respondents gave a correct definition of postoperative wound infection and only 2 (2 %) did not. The correct response is that "Post-operative wound infection is an infection in the tissues of either an incision or organ occurring within thirty (30) days after an operation or within one (1) year if an implant is present in the body (Tietjen et al 2004).

TABLE 7: PREDISPOSING DISEASES TO POSTOPERATIVE WOUND INFECTION (N=90)

Predisposing diseases	Frequency	Percent
Correct response	81	90
Incorrect response	4	4.4
missing	5	5.6
Total	**90**	**100%**

The findings in table 7 show that most of the respondents (90%) stated the correct predisposing factor to post operative wound infection while 4 (4.4%) stated it incorrectly and 5 (5.6%) did not state the predisposing factors. The correct predisposing factors are individual or service delivery related.

TABLE 8: CAUSATIVE ORGANISMS FOR POSTOPERATIVE WOUND INFECTIONS (N=90)

Causative organisms	Frequency	Percent
Correct response	77	85.6
Incorrect response	7	7.8
Missing	6	6.7
Total	90	100%

As indicated in table 8, the majority of the respondents (85.6%) stated the correct causative organism for post operative wound infection, 7 (7.8%) incorrectly and 6 (6.7) % did not answer the question on the causative organism. The correct response are Staphylococcal Aureus and Escherichia Coli as the most common causative organisms.

TABLE 9:   DRUGS OF CHOICE USED TO TREAT THE CAUSATIVE ORGANISMS FOR POST OPERATIVE WOUND INFECTION (N=90)

Drugs of choice	Frequency	Percent
Correct response	76	84
Incorrect response	14	16
Total	90	100%

Table 9 show that most respondents (84%) correctly stated the drug of choice used to treat causative organisms for post operative wound infection while 14 (16%) incorrectly stated the drugs of choice. The most common drugs of choice are Cloxaccilin and Ampiccilin.

TABLE 10: SOLUTION USED FOR DECONTAMINATION OF INSTRUMENTS (N=90)

Solution	**Frequency**	**Percent**
Savlon	0	0
Sodium hypochloride	86	95.6
Others	4	4.4
Total	**90**	**100%**

The majority of the respondents (95.6%) said that Sodium Hypochloride solution was commonly used for decontamination if instruments while 4 (4.4%) stated other solution was used for decontamination.

TABLE 11: KNOWLEDGE LEVEL OF THE DETERMINANTS OF POST-OPERATIVE WOUND INFECTION (N = 90)

Knowledge	Frequency	Percent
High	16	17.8
Medium	52	57.8
Low	22	24.4
Total	90	100

Table 11 shows that more than half of the respondents (57.8%) had medium knowledge had 16 (17.8%) had high and 22 (24.4%) had low knowledge of determinants of post-operative wound infection.

SECTION C: INFECTION PREVENTION PRACTICES.

Section C represents data on the respondents' infection prevention practices.
The section comprised of 13 questions on infection prevention practices. Data is presented in tables.

TABLE 12: TRAINED IN INFECTION PREVENTION (N=90)

Adequately prepared in Infection Prevention	Frequency	Percent
Yes	85	94.4
No	3	3.4
Missing	2	2.2
Total	90	100

Table 12 shows that most of the respondents (94.4%) stated that they were adequately trained in infection prevention, 3 (3.4%) stated that they are not adequately trained and 2 (2.2%) did not respond.

FIGURE 3:   PROTOCOLS ON INFECTION PREVENTION DISPLAYED IN THE SURGICAL WARDS (N=90)
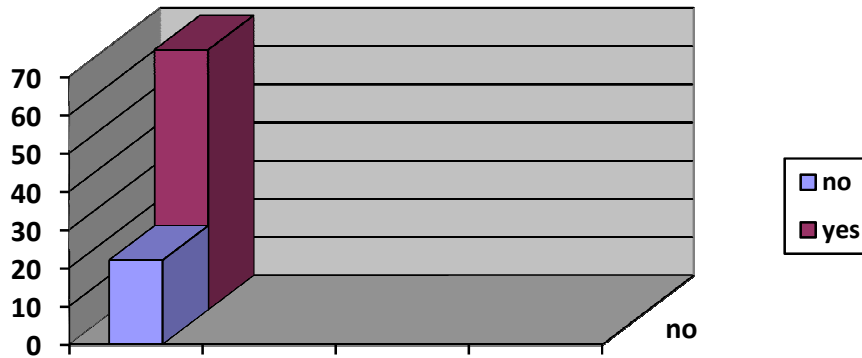

Figure 3 shows that the majority (68%) of the respondents said that the protocols on infection prevention were displayed in the surgical wards while 22% said they were not.

TABLE 13:   COMPLIANCE WITH INFECTION PREVENTION GUIDELINES BY STAFF (N=90)

Compliance	Frequency	Percent
Yes	27	30
No	63	70
Total	90	100

The majority (70%) of the respondents reported that they did not comply with the infection prevention guidelines while 27 (30%) reported that they did.

TABLE 14: TIME OF THE DAY WHEN WOUND CARE IS DONE IN THE WARD (N=90)

Time	Frequency	Percent
After damp dusting	88	97.8
After Doctor's round	2	2.2
Total	90	100%

Table 14 depicts the time of the day when wound infection care is done in the wards. The majority of the respondents (97.8%) said that wound care was done after damp dusting while 2 (2.2 %) said that it was done after the Doctor's round

TABLE 15: WASHES HANDS REGULARLY BEFORE AND AFTER PROCEDURE (N=90)

Washes hands regularly	Frequency	Percent
Yes	83	92.2
No	7	7.8
Total	90	100

Table 15 indicates that most respondents (92.2%) stated that they washed their hands regularly before and after the procedure while 7 (7.8 %) stated the opposite.

TABLE 16: USES STERILE TECHNIQUE WHEN AN INCISION DRESSING IS CHANGED (N=90)

Total	Frequency	Percent
Yes	74	82.2
No	14	15.6
missing	2	2.2
Total	90	100%

Table 16 illustrates that of the respondents (82.2%) always used sterile technique when they changed an incision dressing, 14 (15.6%) said they used sterile technique sometimes and 2 (2.2%) did not respond.

TABLE 17:   EDUCATES PATIENTS AND FAMILY ON WOUND INCISION CARE (N=90)

Patient educated	Frequency	Percent
Always	77	85.5%
Sometimes	19	21.1%
Not at all	4	4%
Total	90	100

As indicated in table 17, 85.5% of the respondents always gave patient and their families' health education about wound incision care, 19 (21.1%) gave health education sometimes and 4 (4%) said they do not give at all.

TABLE 18: ATTENDS TO POST OPERATIVE PATIENTS WHEN HAVING AN INFECTIOUS DISEASES (N=90)

Attends to postoperative patients when having an infectious disease	Frequency	Percent
Yes	44	48.9
No	38	42.2
Missing	8	8.9
Total	90	100%

Table 18 show that most (48.9%) said that Solwezi General Hospital had well defined policies concerning patient care responsibilities when personnel had potential transmissible infectious conditions, 38 (42.2%) said that hospital did not have well defined policies and 8 (8.9%) did not answer the question.

TABLE 19:   STUDENT NURSES ON THE WARD ARE SUPERVISED WHEN DOING DRESSING PROCEDURES (N=90)

Student nurses Supervised	Frequency	Percent
Always	32	35.6
Sometimes	54	60
Not at all	4	4.4
Total	90	100

The majority of the respondents (60%) said that students' nurses were sometimes supervised when performing dressing, 32 (35.6%) said they were always supervised and 4 (4.4%) said they did not supervise them at all.

TABLE 20:   UNTRAINED STAFF CONDUCT WOUND DRESSING ON THE WARDS (N=90)

| Untrained staff conduct Wound dressing	Frequency	Percent
Always	3	3.3
sometimes	11	12.2
Not at all	76	84.5
Total	90	100%

Table 20 indicates that majority of the respondents (84.4%) said that untrained staff did not conduct wound dressing on the wards, 11 (12.2 %) said that they did sometimes and 3 (3.3%) said they did always.

TABLE 21:   AVAILABILITY OF MEDICAL INSTRUMENTS ON THE SURGICAL WARDS

Availability of medical Instruments	Frequency	Percent
Yes	12	13.3
No	75	83.3
Missing	3	3.3
Total	90	100%

The majority of the respondents (83.3%) said that they were no medical instruments available in the wards to enable them to conduct a dressing while 12 (13.3%) said that instruments were available. The 3 (3.4%) remaining of the respondents did not state the availability of the medical instruments about their wards.

FIGURE 4:   AVAILABILITY OF MEDICAL EQUIPMENT (N=90)
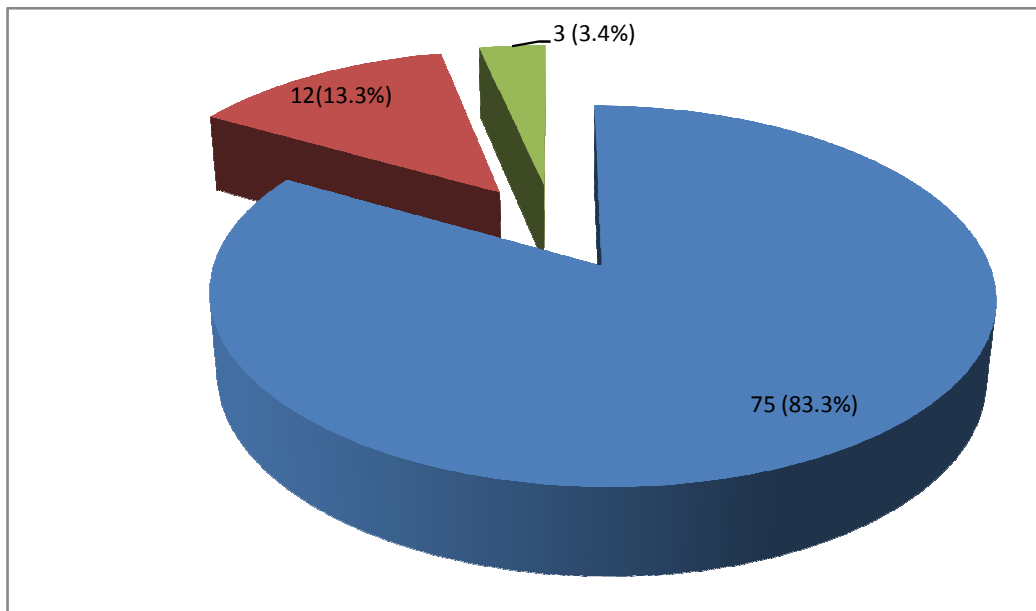
As indicated in figure 4, majority 75 (83.3%) of the respondents (83.3%) said that they did not have adequate equipment to use when attending to postoperative patients while 12 (13.3%) said that equipment were adequate. The remaining 3 (3.4%) is for respondents who did not respond to the question.

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TABLE 22: AVAILABILITY OF MEDICAL /SURGICAL SUPPLIES ON THE SURGICAL WARDS

AVAILABILITY OF MEDICAL/SURGICAL SUPPLIES	FREQUENCY	PERCENTAGE
Yes	18	20
No	72	80
Total	90	100%

The Majority of the respondents (80%) said that medical/surgical supplies were not available on the ward while 18 (20%) said they were available.

FIGURE 5: DECONTAMINATES INSTRUMENTS AFTER USE (n=90)
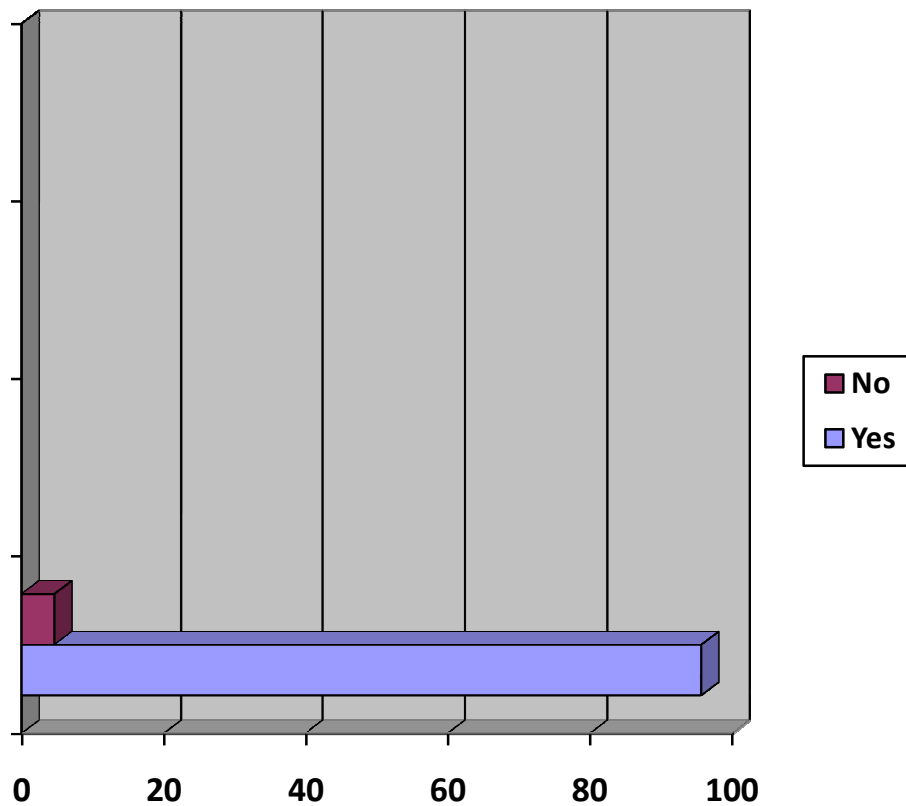
The majority of the respondents 95.6% reported that they knew how to decontaminate instruments after use while 4.4% did not know.

TABLE 23:   LEVELS OF INFECTION PREVENTION PRACTICES AMONG THE RESPONDENTS (N=90)

Infection prevention Practice	Frequency	Percent
	n	**%**
High	58	64.4
Medium	29	32.2
Low	3	3.3
Total	90	100%

Table 23 indicates that majority of the respondents (64.4%) had high level of infection prevention practice, 29 (32.2%) had medium level of infection prevention practice and 3 (3.3%) had low levels of practice.

SECTION D: ASSOCIATIONS BETWEEN THE DEPENDNET AND INDEPENDNET VARIABLES

Section D provides information on the associations between Knowledge of the determinants of post-operative wound infection and infection prevention practices among nurses and student nurses and the following independent variables.

TABLE 24:   ASSOCIATION BETWEEN THE RESPONDENTS KNOWLEDGE LEVELS AND DESIGNATION (N=90)

Knowledge levels	Nurses		Student Nurses		Total	Chi-square test	P Value
	n	%	n	%	n (%)		
High	12	26.1	7	15.6	19(21.1)	1.56	0.458
Medium	20	44.4	20	44.4	40(44.4)		
Low	13	28.9	18	40.0	31(34.4)		
Total	45	100.0	45	100.0	90 (100 %)		

As shown in Table 24, qualified nurses (26.1%) had high knowledge levels on infection prevention than student nurses (15.6%). An equal number (44.4%) of both qualified nurses and student nurses had medium level of knowledge on infection prevention.

However, more student nurses 40% had low levels of knowledge compared to qualified nurses (28.9%). The chi-square test was $x^2 = 1.56$, and p= 0.458. Therefore, there was no association found between knowledge of determinants of post-operative wound infection and the respondents' designation.

TABLE 25:   ASSOCIATION BETWEEN THE RESPONDENTS PRACTICE LEVELS AND DESIGNATION (N=90)

Practice levels	Nurses		Student Nurses		Total	Chi-square test	P Value
	n	%	n	%	n (%)		
Good	28	62.2	30	66.7	58(64.4)	0.19	0.660
Bad	17	37.8	15	33.3	15(35.6)		
Total	45	100.0	45	100.0	90(100.0)		

Table 25 shows that majority (66.7%) of student nurses had good practices compared to 28 (62.2%) of nurses. The chi-square valve was 0.19 and p value was 0.666, therefore, there was no significant association between infection prevention practices and level of professional designation. This means that the null hypothesis was rejected.

TABLE 26: ASSOCIATION BETWEEN PRACTICES AND KNOWLEDGE LEVELS OF THE RESPONDENTS (N=90)

Practice	Knowledge level						Total	Statistics	
	High		Medium		Low			x^2	P Value
	n	%	n	%	n	%			
Availability of equipment									
Yes	2	10.5	2	5.3	8	26.7	12(13.8)	6.67	0.035*
No	17	89.5	36	94.7	22	73.3	75(86.2)		
Total	19	100.0	38	100.0	30	10.0	87(100.0)		
Nurse patient ratio									
Yes	14	73.7	25	65.8	20	66.7	59(67.8)	0.39	0.823
No	5	26.3	13	34.2	10	33.3	28(32.2)		
Total	19	100.0	38	100.0	30	100.0	87(100.0)		
Staff shortage									
Yes	2	10.5	4	10.3	8	25.8	14(15.7)	3.64	0.162
No	17	89.5	35	89.7	23	74.2	75(84.3)		
Total	19	100.0	39	100.0	31	100	89(100.0)		
Availability of protocols									
Yes	13	72.2	27	71.1	24	80.0	64(74.4)	0.76	0.683
No	5	27.8	11	28.9	6	20.0	22(25.6)		
Total	18	100.0	38	100.0	30	100.0	86(100.0)		
Supervision of students									
Yes	18	100.0	37	94.9	31	100.0	86(97.7)	2.57	0.276
No	0	0.0	2	5.1	0	0.0	2(2.3)		
Total	18	100.0	39	100.0	31	100.0	88(100.0)		
Availability of medical/surgical supplies									
Yes	4	21.0	5	12.5	9	29.0	18(20.0)	3.64	0.162
No	15	79.0	35	87.5	22	71.0	72(80.0)		
Total	19	100.0	40	100.0	31	100	90(100.0)		
Availability of IP guidelines									
Yes	18	94.7	38	97.4	29	96.7	85(96.6)	0.28	0.873
No	1	5.3	1	2.6	1	3.3	3(3.4)		
Total	19	100.0	39	100.0	30	100.0	88(100.0)		
Washes hands regularly									
Yes	17	85	40	95	26	92	83(92.2)	0.29	0.882
No	3	15	2	5	2	8	7(7.8)		
Total	20	100.0	42	100.0	28	100.0	90(100.)		

Table 26 shows that almost all independent variables except for one on availability of medical equipment had no association with knowledge levels among the nurses and student nurses. The chi-square test for availability of equipment was 6.67 and p-value was 0.035.

The rest of the variables show that the p-value is more than 5%, meaning that the Null hypothesis was accepted.

TABLE 27: ASSOCIATION BETWEEN DEMOGRAPHIC CHARACTERISTICS AND PRACTICE LEVELS (N=90)

Demographic characteristic	Practice level		Total	Statistics	
	Good	Bad		x^2	P value
Designation					
Qualified Nurse	28(48.3)	17(53.1)	45(50.0)	0.48	0.660
Student Nurse	30(51.7)	15(46.9)	45(50.0)		
Total	58(100.0)	32(100.0)	90(100.0)		
Length of service in the surgical ward					
4 – 12 Weeks	29(50.0)	18(56.3)	47(52.2)	0.32	0.570
>12 Weeks	29(50.0)	14(43.8)	43(47.8)		
Total	58(100.0)	32(100.0)	90(100.0)		
Age					
18 - 28	35(60.3)	23(71.9)	58(64.4)	1.20	0.274
29 - 38	23(39.7)	9(28.1)	32(35.6)		
Total	58(100.0)	32(100.0)	90(100.0)		
Gender					
Females	25(43.1)	7(21.9)	32(35.6)	4.06	0.044
Male	33(56.9)	25(78.1)	58(64.4)		
Total	58(100.0)	32(100.0)	90(100.0)		
Marital Status					
Single	37(68.3)	18(56.3)	55(61.1)	1.98	0.578
Married	19(32.8)	14(43.8)	33(36.7)		

Divorced	1(1.7)	0(0.0)	1(1.1)			
Widowed	1(1.7)	0(0.0)	1(1.1)			

Table 27 shows that the majority demographic characteristics had no significant association with practice level since the p-value was more than 0.05, except for one on Gender which had p-value of 0.044 less than 0.05 p-value.

TABLE 28: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE LEVELS (N=90)

Demographic characteristic	Knowledge level			Total	Statistics	
	High	Medium	Low		x^2	P value
Designation						
Qualified Nurse	12(63.2)	20(50.0)	13(41.9)	45(50.0)	2.12	0.346
Student Nurse	7(36.8)	20(50.0)	18(58.1)	45(50.0)		
Total	19(100.0)	40(100.0)	31(100.0)	90(100.0)		
Length of service Worked in the surgical ward						
4 – 12 Weeks	8(42.1)	26(65.0)	13(41.9)	47(52.2)	4.71	0.095
>12 Weeks	11(57.9)	14(35.0)	18(58.1)	43(47.8)		
Total	19(100.0)	40(100.0)	31(100.0)	90(100.0)		
Age						
18 - 28	16(84.2)	24(60.0)	18(58.1)	58(64.4)	4.14	0.126
29 - 38	3(5.8)	16(40.0)	13(41.9)	32(35.6)		
Total	19(100.0)	40(100.0)	31(100.0)	90(100.0)		
Gender						
Male	13(68.4)	24(60.0)	21(67.7)	58(64.4)	0.62	0.732
Female	6(31.6)	16(40.0)	10(32.3)	32(35.6)		
Total	19(100.0)	40(100.0)	31(100.0)	90(100.0)		
Marital Status						
Single	11(57.9)	26(65.0)	18(58.1)	55(61.1)	5.88	0.436
Married	7(36.8)	14(35.0)	12(38.7)	33(36.7)		
Divorced	1(5.3)	0(0.0)	0(0.0)	1(1.1)		

Widowed	0(0.0)	0(0.0)	1(3.2)	1(1.1)		
Total	9(100.0)	40(100.0)	31(100.0)	90(100.0)		

Table 28 shows that most demographic characteristics of the respondents had p-value more than 0.05. Therefore, there was no significant association between demographic characteristics and knowledge levels since the p-value was more than 0.05. The Null hypothesis was therefore accepted.

4.4 SUMMARY

The study showed that both qualified nurses 44.4% and student nurses had medium level (44.4%). More student nurses 40% had low levels of knowledge as compared to qualified nurses (28.9%). The chi-square test was $x^2 = 1.56$, and p= 0.458. More student nurses (66.7%) exhibited high practice levels compared to nurses (62.2%). This finding however, was not statistically significant (Chi-square test 0.19 and p value was 0.660). Therefore, the hypothesis is accepted.

There was no association found between knowledge of the determinants of post operative wound infection and infection prevention practices among nurses and student nurse. All the independent variables on practice had no association with knowledge levels among the nurses and student nurses except the availability of medical equipment (chi-square test = 6.67, p-value =0.035). The study also showed no associations between the respondents' knowledge levels and the demographic and between practice levels and the demographic characteristics of the respondents.

CHAPTER FIVE

5.0   DISCUSSION OF FINDINGS

5.1   INTRODUCTION

This chapter discusses the study findings and emphases the trends and patterns that have emerged from the data. For easy reference, chapter five (5) is structured around the same subheading as used in Chapter four (4). The main objective of the study was to determine the knowledge of determinants of post operative wound infections and infection prevention practices among Nurses and Student Nurses at Solwezi General Hospital. Data were collected using a self administered questionnaire. The respondents' socio-demographic characteristics are discussed followed by determinants of post-operative wound infections and infection prevention practices among nurses and students at Solwezi general Hospital.

The findings show that 46.5% of the respondents had medium knowledge of post operative wound infection and 17.4% had high, while 36% with low knowledge level. The majority of the qualified and student nurses had medium (32.2%) to high (64.4%) compliance with infection prevention practices. Most nurses (81.5% ENs and 76.5%, RNs) and student nurses (88.6%) knew the correct use of sterile techniques when an incision dressing is to be changed.

5.2   SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

The socio-demographic characteristics of the study population are shown in the table 2. The findings showed that more than half of the respondents (64.4%)were within the age group of 18 – 28 years while only 32 (35.6%) fell within the age group 29 – 38 years. This could be attributed to the fact that most nurses working especially in government health institutions are young because older nurses either opted for voluntary separation or are retired. On the other hand, most of the student nurses admitted for training in schools of Nursing are school leavers who are mostly in their young. This finding is congruent with Mukwato (2008)'s study conducted in Mufulira district where the majority (61%) respondents were young.

The study sample was predominantly female (64.4%). This could be attributed to the fact that the General Nursing Council of Zambia recruitment guideline ratio is three (3) females to one (1) male, GNC (2010).

Therefore, there are more females than male in nursing. The other reason could be that traditionally nursing has been regarded as a female profession. However, a growing number of nursing scholars and organizations are advocating for greater gender diversity in nursing (American Association of Colleges of Nursing, 2001: O'Lynn and Chard, 2004). Most of the respondents (61.1%) in this study were not married. The explanation could be that the majority had just graduated from nursing colleges while others were still at college.

The study sample (unit analysis) of 90 respondents comprised of Nurses and student nurses who worked or were working in surgical wards and theatre (wards with post operative patients) at the time of the study. The population was targeted because they are in contact with patients having surgical conditions 24 hours in a day and are expected to have acquired knowledge about postoperative wound infection. Their knowledge and practices can either minimise or promote postoperative wound infection.

The respondents' were asked to state how long they had worked in the surgical ward. More than half (52.2%) worked between 4-12 weeks. The explanation to this is that most nurses and student nurses start from general wards before they are moved to speciality units. The hospital nursing department rotates nurses on a six (6) monthly basis in all the general wards except for midwives, theatre nurses and other specialities. The purpose for this rotation is to help nurses get experience and competences needed (GNC, 2010).

5.3   DISCUSION OF STUDY VARIABLES

5.3.1   KNOWLEDGE OF DETERMINANTS OF POST OPERATIVE WOUND INFECTION

The first specific objective of the study was to assess the Nurses and Student Nurses' level of knowledge of determinants of post operative wound infection. The findings revealed that almost all the respondents gave a correct definition of postoperative wound infection (Table 6) and 90 % were able to mention the correct predisposing factor to post operative wound infection (Table 7). This could be due to a lot of in house sensitisation that has been carried out among health care workers on infection

prevention. In addition, infection prevention guidelines have been incorporated in the nursing curriculum.

Knowledge of the causative organisms of post operative wound infection is vital so that corrective measures can be taken to prevent post-operative wound infection. As indicated in table 8, the majority (85.6%) of the respondents stated the correct causative organism for post operative wound infection such as Staphylococcal Aureus, Escherichia Coli as the most common organisms. This finding could also be attributed to in-house sensitisation workshops which the nurses could have attended. This finding is in line with the findings for Leigh et al (1994) in a study to isolate the organisms responsible for post operative wound infection where they found 79% was due to Staphylococcus Aureus.

According to this study, most respondents (84%) stated correctly the drugs of choice used to treat post operative wound infection such as Cloxaccilin and Ampicilin. This is attributed to the fact that nurses and student nurses handle these drugs frequently during administration of these drugs to patients with postoperative wound infection.

Cleaning, disinfecting and re-processing re-usable equipment appropriately before use with another patient is one of the infection control standard precautions in health care. It i,s therefore, imperative that nurses should have basic knowledge of solutions used to disinfect instruments. More than three quarters (95.6%) of the respondents stated that Sodium hypochloride solution was commonly used for decontamination of instruments (Table 10). The study is in agreement with the findings by Mukwato (2008) who found that sodium hypochloride was the most commonly used decontaminant. Furthermore, it is a national policy for all health institutions in Zambia to use Sodium hypochloride solution for decontaminating instruments used in surgical procedures (MoH, 2003).

Overall, the study findings showed that 57.8% of the respondents had medium knowledge levels of determinants of post-operative wound infection (Table 11). This could be attributed to the fact that post operative wound infection is part of the topics covered during training in surgery and surgical nursing and also from Zambia Infection Prevention Guidelines (2003) booklet distributed by Ministry of Health.

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This finding is in line with the findings by Mukwato (2008) who reported medium knowledge (44.2%) levels among her study respondents.

5.3.2   INFECTION PREVENTION PRACTICES

The second specific objective in this study was to determine Nurses and Student Nurses' infection prevention practices. Section C of the questionnaire contained questions on infection prevention practices among nurses and student nurses.

One of the most important recommendations made by WHO (2008) is that peri-operative and environmental services personnel should receive initial and ongoing education and competency verification on their understanding of the principles and the performance of the processes for environmental cleaning in peri-operative areas. Periodic education programs provide the opportunity to reinforce the principles and processes of environmental cleaning and to introduce relevant new practices. Most of the respondents (94.4%) reported that they were adequately prepared in infection prevention practices (Table 12). This is in line with General Nursing Council of Zambia regulation (Curriculum, 2010) that requires all nurses trained in Zambia to undergo the training in infection prevention before they qualify as nurses.

As shown in figure 3, majority 68% of the respondents said that the protocols on infection prevention were displayed in the surgical wards. Protocols serve as guide to nurses on what is expected of them when dealing with issues of infection prevention. This finding is in line with a requirement by the Ministry of Health performance requirement for all health institution in the country to have protocols displayed MoH, 2004).

Historically, Nurses working in surgical wards have played a critical role in providing a clean environment for patients in the surgical wards. Therefore, they are expected to understand the procedures that are supposed to be done first before the others so as to prevent the spread of infections. Table 14 depicts the time of the day when wound infection care is done in the wards. Almost all the study respondents (97.8%) that said that wound infection care was done after damp dusting. This finding is in line with GNC procedure manual (2010) where the nursing staff attending to patients with wounds should do so after damp dusting

Hand hygiene is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with health care. The finding showed that almost all of the respondents (92.2%) reported that they washed their hands regularly before and after performing the nursing procedures (Table 15). This figure is higher compared to a study done by Mukwato (2008) where only 61% of the respondents reported to have washed their hands regularly.

Wound dressing is a sterile procedure and therefore nurses should observe sterility throughout the procedure. Table 16 illustrates that 82.2% of the respondents reported that they always used sterile technique when changing an incision dressing. This does not correlate with the finding of a study done by Stott and Colleagues which found that only 51.4% of the respondents reported using sterile technique when dressing patients' wounds. Seventy-seven (77%) of the respondents mentioned that they always health educated patients and their families on care of the wound incision (Table 17). This result has shown that nurses and student nurse are aware that post operative wound infection can be as a result of patient and relative touching the incision wound and that educating them is important in the prevention of post operative wound infection. This is in line with GNC guidelines (2010) on wound care that information, education and communication be given to patients after wound dressing.

In this study, less than half (48%) of the respondents said that Solwezi General Hospital had well defined policies concerning patient care responsibilities when personnel had potential transmissible infectious conditions (Table 18). Studies have shown that most policies on staff attending to post operative patients are available but not followed due to inadequate nursing staff in some health institutions in the country (Libetwa, 1997; Hamomba, 2006; and Mukwato, 2008). Improvement on the human resource will help in implementing IP guidelines that are available in all health institutions

Supervision of nurses and student nurses by nurse managers in charge of the surgical wards is very important to ensure that they adhere to infection prevention guidelines. Majority (60%) of the respondents (table 19) said that student nurses were sometimes supervised when performing dressings.

This finding is different from Mukwato (2008) study where a large number the respondents indicated that the staff were not supervised by the management. Lack of staff supervision is one of the challenges faced with regard to compliance with IP guidelines.

The study has revealed that more than three quarters (84%) of the respondents said that untrained staff did not conduct wound dressing on the wards (Table 20) and 75% of the respondents said that they did not have adequate equipment to use when attending to postoperative patients (Figure 4). This result are in agreement with the findings by Kumar et al. (2002) who found that lack of necessary equipment to use was a major reason why nurses did not adhere to infection prevention practices. Furthermore, more than three quarters 83.3% of the respondents in this study said that there were no medical instruments available in the wards to enable them to conduct a dressing (Table 21). This result is still in agreement with Kumar et al (2002) findings as above.

This study had revealed that medical/surgical supplies were not available in the wards at Solwezi General Hospital (Table 22). This was reported by 80% of the respondents. Surprisingly, majority (74%) of the respondents reported that they decontaminated the instruments after use (Figure 5). This result is in line with the finding by Mukwato (2008) where 88% of the participants complied with the use of Sodium hypochloride solution for decontamination of used instruments.

5.4 COMPARISONS BETWEEN KNOWLEDGE OF DETERMINANTS OF POSTOPERATIVE WOUND INFECTION AND INFECTION PREVENTING PRACTICES AMONG NURSES AND STUDENT NURSES

The third specific objective of the study was to compare knowledge of determinants of postoperative wound infection and infection prevention practices among nurses and students nurse. The study showed that qualified nurses (44.4%) had medium knowledge level and similarly with student nurses (44.4%). However, student nurses (40%) had low levels of knowledge as compared to qualified nurses (28.9%). The chi-square test was x^2 = 1.56, and p= 0.458.

However, there was no significant association between knowledge of determinants of post-operative wound infection and respondents designation. This means that we accept the null hypothesis.

With regards to practice levels, more student nurses (66.7%) exhibited high practice levels compared to nurses (62.2%). This finding however, was not statistically significant (Chi-square test 0.19 and p value was 0.660). Therefore, the hypothesis is accepted which states that there is no association between knowledge of the determinants of post-operative wound infection and infection prevention practices among the nurses and student nurses.

In this study, there was no association found between knowledge of the determinants of post operative wound infection and infection prevention practices among nurses and student nurse. This shows that almost all independent practical variables except for one on availability of medical equipment had no association with knowledge levels among the nurses and student nurses. The chi-square test for availability of equipment was 6.67 and p-value was 0.035. The rest of the variables show that the p-value is more than 5%. Therefore, the Null hypothesis that states that there is no association between knowledge of the determinants of post operative wound infection and infection prevention practices among nurses and student nurses is accepted.

The associations between the respondents' knowledge levels and the demographic characteristics reveal no association among variables. This shows that the majority of the demographic characteristics had p-value more than 0.05. Therefore, there was no significant association between demographic characteristics and knowledge levels since the p-value was more than 0.05. The Null hypothesis is therefore accepted

5.5   IMPLICATIONS TO NURSING
The findings of this study have implications to the following four domains of nursing as follows:

5.5.1   Nursing Practice
The findings revealed that the respondents (32.2% to 64.5% respectively) had medium to high knowledge levels of infection prevention practices.

Only 3.3 % of the respondents had low practice level. The study revealed that the majority of the respondents reported that the hospital had a policy on infection prevention; however, there is a need for Nurse Managers to provide regular supervision to the Nurses and students in order maintain practice levels constant. Medical and surgical supplies as well as necessary equipment should be availed to Nurses and students on the wards to enable them to provide quality care to Clients. Nurses and students with good practices should be commended for the job well done.

5.5.2   Nursing Education

The study showed that most of the respondents (57.8%) had medium levels of knowledge on the determinants of postoperative wound infection. There is a need therefore to strengthen the component of infection prevention in the nursing curriculum. Continued in-service training should also be undertaken by the Hospital managements to keep the nurses updated on infection prevention practices.

5.5.3   Nursing Research

Good infection prevention practices are undoubtedly important in the prevention of hospital acquired infections. Literature review showed that limited research has been done in the area of infection prevention especially locally. Nurse researchers therefore, need to explore and investigate different aspects of infection prevention in order to improve IP practices in the Health institutions in the Country.

5.5.4   Nursing Administration

The analysis of findings showed that student nurses (97.7%) had better infection prevention practices that qualified nurses (77.8%). Therefore, Nurse Managers should reinforce infection prevention practices among the qualified nurses in the Clinical areas by conducting regular supervision and retraining of nurses in Infection Prevention. In addition, Nurse Managers should ensure that the working environment for nurses and students is conducive for infection prevention practice.

5.6.   CONCLUSION AND RECOMENDATIONS

5.6.1   CONCLUSION

The study was carried out to determine knowledge of determinants of post operative wound infection and compliance with infection prevention practices among the nurses and student nurse. The study revealed that some of the respondents had medium level of knowledge of determinants of post operative wound infection while most of them had high level of compliance to infection prevention guidelines. Compliance to IP guidelines by Nurses and student nurses should be encouraged by continued education and strengthening the component of infection prevention in the nurses curricular.

Compliance to infection prevention guidelines can lead to reduce rates of infections among operative patients. The data from this study will help to initiate educational programs to promote Nurses compliance to infection prevention guidelines.

5.6.2   RECOMMENDATIONS

Based on the study findings, the following recommendations were made to:

5.6.2.1   The Government

1. The Government through the Ministry of Health to provide adequate funding to Health Institutions to enable them purchase necessary equipment and supplies.

2. The Government through the Ministry of Health needs to increase funding for research programmes dealing with post-operative wound infection prevention in order to improve the quality of life for the patients.

5.6.2.2   The Management of Solwezi General Hospital

1. The management needs to plan and allocate funds for the purchase of equipment and materials necessary to prevent post operative wound infection such as sterilizing machine, Chital forceps, drums for sterilised cotton wool and gauze, forceps, hypo trays, gall pots and other logistics.

2. The management should re-organize the Infection Prevention Committee that has been inactive to deal with issues of infections prevention and compliance with infection prevention practices.

3. The management should be conducting quarterly evaluation of the performance of the Infection Prevention Committee to ensure its function is adding value to the care of post operative patients.

5.6.2.3. For further research

There is need to replicate the study with a large sample using probability method of sampling to warrant generalization of the results.

5.7   LIMITATIONS OF THE STUDY

The following are the limitations of this study:

1. The small sample size and the convenient sampling method used in this study limit the generalization of the findings to other settings.

2. Use of self report method to collect data from the respondents' is subject to bias.

3. A self-administered questionnaire did not collect data on observable infection prevention practices. More information might have been obtained by if individuals were observed.

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APPENDIX 1: SELF ADMINISTERED QUESTIONNAIRE FOR QUALIFIED NURSE

TOPIC: Knowledge of determinants of post-operative wound infection and

Infection prevention practices at Solwezi General Hospital in North Western Province

DATE..

PLACE...

QUESTIONNAIRE NUMBER...........................

INSTRUCTIONS TO THE RESPONDENT

1. Answer all the questions in the questionnaire

2. Please do not write your name on the questionnaire

3. Tick the most appropriate response to the question or write your answer on the space provided.

SECTION A: BACKGROUND INFORMATION

1. How old were you on your last birthday?

    1. 18 – 28 years

    2. 29 – 38 years

    3. 39 – 48 years

    4. 49 and above

2. What is your sex?

    1. Female

    2. Male

3. What is your marital status?

    1. Single

    2. Married

    3. Divorced

    4. Separated

    5. Widowed

4. How long have you worked in the surgical ward?

    1. 4 weeks – 12 weeks

    2. 13 weeks or more

5. What is your highest professional qualification?

   1. Certificate

   2. Diploma

   3. Degree

   4. Masters

   5. PHD

   6. Any other, specify...

SECTION B: KNOWLEDGE OF DETERMINANTS OF POST OPERATIVE WOUND INFECTION

1. In your own words define the term post-operative wound infection?

   ....

2. Mention three common diseases that you know that compromise to post-operative wound infection.

3. What are the causative organisms of postoperative wound infection (Mention 3)

4. State two (2) drugs used to treat postoperative wound infection

5. What solution do you use for decontamination instruments?
   a) Savlon
   b) Sodium Hypocloride
   c) Other (specify)...

SECTION C: INFECTION PREVENTION PRACTICES

6. Are you trained in infection prevention?
   a) Yes
   b) No
7. Are protocols on Infection Prevention guidelines displayed in the surgical wards?
   a) Yes
   b) No

8. Do you always comply with Infection Prevention guidelines in your ward?
   a) Yes
   b) No

9. What time of the day do you carry out wound care in your ward?
   a) Any time of the day
   b) Before dump dusting and cleaning
   c) After dump dusting and cleaning
   d) After Doctor's round

10. Do you always wash hands before and after dressing changes and any contact with the surgical site?
    a) Yes
    b) No

11. Do you use sterile technique when an incision dressing is to be changed?
    a) Yes
    b) No

12. Do you educate patient and family on incision care?
    a) Yes
    b) No

13. Should you attend to postoperative patients when you have an infection?
    a) Yes
    b) No

14. Are students on the ward supervised when doing dressing procedures?
    a) Yes
    b) No

15. Do untrained staff conduct wound dressing on the wards without supervision?
    a) Yes
    b) No

16. Do you have adequate medical equipment to use on the post-operative patients?
    a) Yes
    b) No

17. If the answer is No specify instruments needed...

18. Do you have adequate medical and surgical supplies in your ward?

    a) Yes
    b) No

19. Do you have adequate staffing in your ward?
    a) Yes
    b) No

31. Do you know how to decontaminate instruments?
    a) Yes
    b) No

32. If No to question"31", briefly explain why you do not do decontamination.
_____
_____

THANK YOU FOR SPARING TIME TO ANSWER THIS QUESTIONNAIRE

APPENDIX 2: **SELF-ADMINISTERED QUESTIONNAIRE FOR STUDENT NURSES**

TOPIC: Knowledge of Determinants of post-operative wound infection and Infection Prevention Practices at Solwezi General Hospital in North Western Province

DATE...

PLACE...

QUESTIONNAIRE NUMBER...........................

INSTRUCTIONS TO THE RESPONDENT

4. Answer all the questions in the questionnaire

5. Please do not write your name on the questionnaire

6. Tick the most appropriate response to the question or write your answer on the space provided.

SECTION A: **BACKGROUND INFORMATION**

6   How old were you on your last birthday?

   a) 18 – 28 years

   b) 29 – 38 years

   c) 39 – 48 years

   d) 49 and above

7   What is your sex?

   a) Female

   b) Male

8   What is your marital status?

   a) Single

   b) Married

   c) Divorced

   d) Separated

   e) Widowed

9   How long have you worked in the surgical ward?

   a) 4 weeks – 12 weeks

   b) 13 weeks or more

10   What is your year of study?

   a) First year

   b) Second year

SECTION B: KNOWLEDGE OF DETERMINANTS OF POST OPERATIVE WOUND INFECTION

11   In your own words define the term post-operative wound infection?

   ....

   ....

12   Mention three common diseases that you know that compromise to post-operative wound infection.

13   What are the causative organisms of postoperative wound infection (Mention 3)

14   State two (2) drugs used to treat postoperative wound infection

15   What solutions do you use for decontamination instruments?
   d) Savlon
   e) Sodium Hypocloride
   f) Other (specify)..

SECTION C: INFECTION PREVENTION PRACTICES

16   Are you trained in infection prevention?
   a) Yes
   b) No
17   Are protocols on Infection Prevention guidelines displayed in the surgical wards?
   a)   Yes
   b)   No

18   Do you always comply with Infection Prevention guidelines in your ward?
   a) Yes
   b) No

19   What time of the day do you carry out wound care in your ward?
   e) Any time of the day
   f) Before damp dusting and cleaning
   g) After damp dusting and cleaning
   h) After Doctor's round

20 Do you always wash hands before and after dressing changes and any contact with the surgical site?
    a)Yes
    b) No

21 Do you use sterile technique when an incision dressing is to be changed?
    a) Yes
    b) No

22 Do you educate patient and family on incision care?
    a) Yes
    b) No

23 Should you attend to postoperative patients when you have an infection?
    a) Yes
    b) No

24 Are students on the ward supervised when doing dressing procedures?
    c) Yes
    d) No

25 Do untrained staff conduct wound dressing on the wards without supervision?
    c) Yes
    d) No

26 Do you have adequate medical equipment to use on the post-operative patients?
    c) Yes
    d) No

27 If the answer is No specify instruments needed...

28 Do you have adequate medical and surgical supplies in your ward?

    c) Yes
    d) No

29 Do you have adequate staffing in your ward?
    c) Yes
    d) No

31. Do you know how to decontaminate instruments?
    a) Yes
    b) No

32. If No to question"31", briefly explain why you do not do decontamination.

_____

_____

THANK YOU FOR SPARING TIME TO ANSWER THIS QUESTIONNAIRE

APPENDIX 3:　　　**INFORMED CONSENT**

STUDY TITLE

Knowledge of determinants of post operative wound infection and Infection prevention practices by nurses and student nurses in surgical wards at Solwezi General Hospital of North western province.

INTRODUCTION

I, Masiye Pumulo; a Master of Science in Nursing student in the Department of Nursing Sciences of the School of Medicine, University of Zambia is kindly requesting your participation in the research study mentioned above, because it is important to investigate determinants of post-operative wound infection in order to find lasting solutions to this problem at Solwezi General Hospital. You are under no obligation to participate: you may choose to participate or not to participate. This study is part of the requirements for the degree.

PURPOSE OF THE STUDY

The purpose of the study is to assess knowledge of determinants of post operative wound infection and infection prevention practices by nurses and student nurses at Solwezi General Hospital. The findings of this study will provide information necessary to design nursing care interventions at the General Hospital.

PROCEDURE

The study procedure involves completion of a structured questionnaire. After signing the consent form a questionnaire will be given to you to complete and the Researcher will collect it from you. Approximated time for the completion is about 20 to 30 minutes.

BENEFITS

There is no direct benefit to you by participating in this study, but the information that will be obtained will help the policy makers to take measures to curb the increase of post operative wound infection. No monetary favours will be given in exchange for the information.

CONFIDENTIALITY

The information you will provide will remain confidential and will not be released without your permission except when required by law. Your research record will not be available to anyone who is not connected with the study. You will be identified by a number. Your name will not be written on the questionnaire for the purpose of confidentiality. The Ministry of Health, University of Zambia, Biomedical Research Ethics Committee at the School of Medicine may review your records again but this will be done confidentially.

PARTICIPATION

Your participation in this study is personal and voluntary. You are not under obligation to participate. You are at liberty to refuse participation and are free to withdraw. If you decline to participate, no privileges will be taken away from you. If you agree to participate, you will be ked to sign a consent form in the presence of a witness

APPENDIX 4:   **CONSENT FORM**

The purpose of the study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study. I further understand that:

If I agree to take part in the study, I can withdraw at any time without having to give an explanation and that taking part in the study is purely voluntary

I _____ Agree to take part in the study
(Names)

Sign..   Date............................. (Participant)
Participant's Signature or Thumb

Sign ....Date............................. (Witness)

Sign...   Date.............................. (Researcher)

PERSONS TO CONTACT FOR PROBLEMS OR QUESTIONS

1. The Head, Department of Nursing Sciences, School of Medicine, P. O. Box 50110, Lusaka
2. The Chairman, Biomedical Research Ethics Committee, School of Medicine, P. O. Box 50110, Lusaka

I herby give consent to participate in the study of Knowledge of determinants of Post Operative Wound Infection and Infection Prevention practices at Solwezi General Hospital

Signature: ....

Date: ....

APPENDIX 5:   WORK PLAN

ACTIVITIES		MONTHS											
		S	O	N	D	J	F	M	A	M	J	J	A
1	Proposal writing	■	■	■	■	■	■	■					
2	Proposal finalizing						■	■					
3	Ethics Committee clearance to conduct study						■	■	■				
4	Pilot Study						■	■	■	■			
5	Data Collection								■	■			
6	Data Analysis								■	■			
7	Report writing								■	■			
8	Submission of final report									■	■		
9	Dissemination of research findings										■	■	■

APPENDIX 6:   BUDGET

No	BUDGET CATEGORY	UNIT COST (ZK)	QUANTITY	TOTAL (ZK)
1	STATIONERY			
	a) Flash Disc	500,000.00	1	500,000:00
	b) Bond paper	40,000.00	x10	400,000.00
	c) Pens	1,000.00	x5	5,000.00
	d) Pencils	500.00	x5	1,000.00
	e) Rubbers	1,000.00	x1	1,000.00
	f) Note book	10,000.00	x1	10,000.00
	g) Correction fluid	15,000.00	x1	15,000.00
	h) Bag for questionnaires	300,000.00	x1	300,000.00
	i) Stapler	150,000.00	x1	150,000.00
	j) Staples	10,000.00	x1 box	10,000.00
Subtotal				**1,392,000.00**
2	personnel			
	a) Lunch allowance			
	i. Principal Researcher	50,000.00	x1x10	500,000.00
	ii. Research Assistant	50,000.00	x1x10	500,000.00
	b) Transport allowance			
	i. Principal Researcher	80,000.00	x1x10 days	800,000.00
	ii. Assistant Researcher	80,000.00	x2x2 days	320,000.00
Subtotal				**2,120,000.00**
3	SERVICES			
	a) Ethics committee	250,000.00	1	250,000.00
	b) Data entry	1,000,000.00	1	1,000,000.00
	c) Data analysis	2,500,000.00	1	2,500,000.00
	d) Toner cartridge for proposal	1,000,000.00	3	3,000,000.00
	& report	1,500,000.00,	1	1,500,000.00
	e) Secretarial services	200,000.00	5	1,000,000.00
	f) Binding			
Subtotal				**9,250,000.00**
Total				**12,762,000.00**
Contingency fund 10%				**1,276,200.00**
GRAND TOTAL				**14,038,200.00**

JUSTIFICATION FOR THE BUDGET

STATIONERY

The 10 reams of bond paper were used during the research proposal development and to print questionnaires and the final report. Bond paper was also used to make extra copies of the proposal for submission to the Biomedical Research Ethics and the Board of graduate studies. The bag was used to carry the interview schedules by the researcher to ensure that they are kept safe. The flash disc was used for copying, storage and safe keeping of research data. Other accessories such as pens, pencils, rubbers, staplers, staples and note book were used during for the routine collection of research data.

PERSONNEL

Data collection was conducted throughout the day as such the researcher needed transport and lunch allowance.

SECRETARIAL SERVICES

Some funds were allocated for typing services and binding of the research proposal and the dissertation. A toner cartridge was used by the researcher to make print outs of literature on internet. This was done in order to cut down on the cost of photocopying. The researcher also printed five copies of the proposal that were submitted to the Biomedical and Research Ethics Committee for review. Another five copies of the dissertation were printed out before binding.

CONTINGENCY

Contingency fund (10% of the budget) was required in case of any extra costs due to inflation and other unexpected incidental.

APPENDIX 7: MARKING KEY FOR KNOWLEDGE OF DETERMINANTS OF POST OPERATIVE WOUND INFECTION

Variable	Score	Correct answers
Definition of post operative wound infection	2	Post-operative wound infection is an infection in the tissues of either an incision or organ occurring within thirty (30) days after an operation or within one year if an implant is present in the body
Predisposing diseases to postoperative wound infection	3	Obesity, Diabetes Mellitus and HIV & AIDS,
Causative organs for post operative wound infection	3	Staphylococcal Aureus, Escherichia Coli
Drugs used to treat post operative wound infection	2	Cloxaccilin and Ampicillin
Solution used for decontamination	2	Sodium Hypochloride
Total	**12**	

APPENDIX 8:   MARKING KEY FOR INFECTION PREVENTION PRACTICES

Variable	Score
Infection prevention training	1
Infection prevention protocols	1
Complies with infection prevention guidelines	1
Time of the day when to do wound care	1
Uses sterile equipment technique	1
Washes hands regularly before and after each procedure	1
Educates patients and families on incision care	1
Should you attend to clients when you have an infectious disease	1
Student nurses supervised when conducting a dressing on the ward	1
Untrained staff conduct dressing on the ward without supervision	1
Adequate medical surgical supplies	1
Adequate medical equipment	1
Caries out decontamination of instruments	1
Total	**13**