PREVALENCE OF WOUND SEPSIS AND ASSOCIATED FACTORS AMONG POST-OPERATIVE PATIENTS IN KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL, ISHAKA, BUSHENYI-WESTERN UGANDA

BY

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A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF ALLIED HEALTH SCIENCES IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DIPLOMA IN CLINICAL MEDICINE AND COMMUNITY HEALTH AT KAMPALA INTERNATIONAL UNIVERSITY WSESTERN CAMPUS

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DECLARATION

I SSEBINTU MICHEAL, hereby declare that this is my original work, and that this research report has never been submitted either wholly or in part to any institution for any academic award. I am therefore submitting it to Kampala international university for the award of a diploma in clinical medicine and community health.

NAME OF RESEARCHER: SSEBINTU MICHEAL

Signature……. Date……

APPROVAL

This research report write up has been prepared under supervision and approval of my supervisor, Dr. Odongo Samuel Oledo,

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Special regards to Dr. Kagabo Twaha for his supportive effort throughout the whole course of my training, my sincere friend Kabatesi Sylvia and the entire staff of Salaama Memorial Medical Centre; your effort during this training is indeed very remarkable.

DEDICATION

I dedicate this research to my sister ROSSETTE, for the love and care, financial and social support. Your contribution towards my academics will always remain in count.

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LIST OF ACRONYMS

AMP	Antimicrobial prophylaxis
BMI	Body mass index
C-SECTION	Caesarean section
GOPD	General Out Patient Department.
ICU	Intensive Care Unit
KIUTH	Kampala International University Teaching Hospital
MBRRH	Mbarara Regional Referral Hospital
MOH	Ministry Of Health
NHSN	National Health Science Association.
SAHS	School of Allied Health Sciences
SSI	Surgical Site Infection.
UNICEF	United Nations International Children's E mergence Fund
WHO	World Health Organization

ABSTRACT

Background of the study; Post-operative wound sepsis is among the commonest complications of surgery, especially in developing countries. This complication often increases the burden on patients; increases hospitalization duration, painful wound dressings and other procedures like debridement and secondary closure, drugs burden, and the associated increased hospital bills.

Objective; To obtain the prevalence, and factors associated with wound sepsis among post-operative patients in KIUTH.

Methods: A cross-sectional study design that is both descriptive and analytical was used. The study was carried out between August and December 2017 in Kampala international university teaching hospital, where participants were chosen according to our inclusion and exclusion criteria.

Results; The prevalence of post-operative wound sepsis in KIUTH was found at 25.3%, with a higher prevalence in Emergency compared to Elective surgeries (cOR 2.552, P=0.016, 95% CI, 1.194-5.456)

Post-operative wound sepsis was found to be significantly associated with ineffective use of antimicrobial prophylaxis pre-operatively (aOR 0.176, P=0.010 95% CI 0.120-0.751).

There was also noted a high association between post-operative wound sepsis and long Midline incisions, (cOR 2.308, P=0.116 95% CI 0.812-6.555), although this factor wasn't statistically significant. The condition was however not found to be associated with Age and Patients underlying illness in this study, as it had been reported in many previous studies.

Conclusion: The study found a high prevalence of wound sepsis among post-operative patients, which was dependent ineffective use of Antimicrobial prophylaxis pre-operatively, and the use long midline incisions during surgery.

CHAPTER ONE

1.1. INTRODUCTION:

This chapter addresses the Background of the study, Problem Statement, Purpose of the study, Objectives of the Study, Research questions, Significance of the Study, Conceptual framework, Scope of the study, Hypotheses and Justification of the study:

Post-operative wound sepsis, also referred to as surgical site infection (SSI) is an infection that develops within 30 days after an operation or within one year if an implant was placed, and the infection appears to be related to the surgery(Lubega et al, 2017).

Wound sepsis, (locally, wound infection) may be defined as invasion of organisms through tissues following a breakdown of local and systemic host defenses. Major wound infection is seen when a wound discharges pus and may need a secondary procedure to be sure of adequate drainage; there may be systemic signs or delay in return home.
In minor wound infection there is discharge of pus or serous fluid without associated excessive discomfort or systemic signs.
Wound infection is the commonest and most troublesome disorder of wound healing. (Ahmed, Alam, Khan, & Manzar, 2007)

This study aims at assessing the risk factors that are associated with surgical site infections and to identify the rate of surgical wound infections developed by post-operative patients in KIUTH.

1.2. BACKGROUND:

Post-operative wound infection has been a problem since surgery was started as a treatment modality. Advancement in medicine has resulted in the prevention and control of this infection. The introduction of antiseptics is considered to be an important milestone on route to safe surgery. The discovery of the antimicrobial agents also enables us to perform surgery in many conditions that were previously thought to be impossible in the pre-antibiotic era due to the risk of infection. Infection in a wound is a manifestation of disturbed host-bacteria equilibrium that is in favor of bacteria.
This not only elicits a systemic septic response but also inhibits the multiple processes that are involved in the wound healing i.e. each of these processes is affected when bacteria proliferate in

a wound. The absolute prevention of surgical wound infection seems to be an impossible goal. It is the second commonest nosocomial infection and causes patient discomfort, prolonged hospital stay, more days off work and increased cost of therapy; the cost of an operation increase by 300% to 400%.(Ahmed et al., 2007)

Postoperative wound infection is predominantly caused not by bacteria, but by surgeons. Moreover, in Africa, as elsewhere, most of the bacteria implicated are endogenous in origin. Poor surgical technique and inappropriate materials - thick silk and catgut sutures in the main – are the principal reasons for the high postoperative infection rate. Subsidiary reasons are of several kinds: severe wound contamination caused by the lack of theatre discipline (in spite of the rituals); the enthusiastic misuse of disinfectants; inadequate or non-existent lavage; a predilection for drains; unshakable trust in dressings; the reluctance to leave soiled wounds open; and the universal hope that, ultimately, antibiotics will eliminate and cure infections (Society & Britain, 2017)

SSIs is among the major causes of morbidity and death among the operated patients and continue to represent about a fifth of all healthcare associated infections. Although at least 5% of patients develop a SSI after surgery, these infections seem to cause remarkably little concern, remaining largely unreported in the media.

Despite improvements in operating room practices, instrument sterilization methods, better surgical technique, and the best efforts of infection prevention strategies, surgical site infections remain a major cause of hospital-acquired infections and rates are increasing globally even in hospitals with most modern facilities and standard protocols of preoperative preparation and antibiotic prophylaxis.

Moreover, in developing countries where resources are limited, even basic life-saving operations, such as appendectomies and cesarean sections, are associated with high infection rates and mortality.(Lubega et al., 2017b)

In the developed countries, SSI has been reported to affect from 5% to 15% of hospitalized patients in regular wards and as many as 50% or more of patients in intensive care units (ICUs), while in developing countries the magnitude of the problem remains largely underestimated.

In Uganda, data about SSI is still scarce and the true incidence and cost per patient are unknown. In MRRH, research done to determine the incidence of SSI among elective surgeries on the surgical ward in 2007 found the postoperative incidence density to be 15.9% and no risk factors were associated with SSIs.(Lubega et al., 2017b)

The risk of SSIs continues after discharge; SSIs develop in almost 2 percent of patients after discharge from the hospital and these patients are two to five times as likely to be readmitted to the hospital.

In KIUTH; a medical training hospital that serves a big number of local population in Bushenyi District, western Uganda, many postoperative wounds complicate to sepsis when the patients are still on ward, while many others return to GOPD shortly after discharge due to the same problem.
Though a number of factors have been pointed out to be the cause of this debilitation, no single factor has been pointed out to be the outstanding cause, and the attempts to eradicate the problem are unsatisfactory. (KIUTH GOPD Records.)

Therefore, the aim of this research is to study the prevalence and factors responsible for Post-operative wound sepsis in KIUTH

1.3. PROBLEM STATEMENT:

There's little knowledge on the magnitude, consequences and the related risk factors of SSI in countries with fewer resources. (Osakwe et al., 2014)

In 2012, major emergency operations contributed more than 43% of the total surgical operations in MRRH (theater records, 2012). Most of these patients are at risk of getting SSIs postoperatively because of the nature of their disease pre operatively, surgical aseptic technique, and underlying comorbidities among others. (Lubega et al., 2017b)

In KIUTH, a number post laparotomy and some of post caesarian section patients have developed a life threatening SSI, and the causes of this debilitation are attributed to be patient

factors, iatrogenic errors, while others are environment related factors.(KIUTH-Patient Records Surgical ward)

The iatrogenic errors pointed out include; Poor surgical techniques (inappropriate wound closure), Poor postoperative wound management, and Inappropriate drug prescriptions.

Patient factors include; Poor adherence to postoperative treatment/drugs by the patient, Poor patient hygiene, underlying disease conditions such as Diabetes and Malignancies, and Patients' age (common in elderly patients)

Environmental factors such as congestion in the hospital, poor hygiene (that may attract flies) are also contributory towards this problem.

The resulting SSIs have led to a number of complications such as; Incisional hernias, extra-peritoneal adhesions, abscess formation and generalized systemic infections due to bacteremia.

In all major operations, aseptic techniques are obscured to reduce the risk of infections during surgery (KIU-TH Theatre records), however, no satisfactory study has been carried out to point out the leading factors associated with this problem, and therefore no appropriate attempts have been made to eradicate this life threatening complication.

Therefore, this study will assess for the prevalence and factors associated with Post-operative wound sepsis in KIU-TH.

1.4. PURPOSE OF THE STUDY:

This study is typically academic for the attainment of Diploma in Clinical Medicine and Community health, unless if deemed necessary for other use(s) by any other agencies or authority.

1.5.0. RESEARCH OBJECTIVES:

1.5.1. General objectives:

To determine the prevalence of wound sepsis and the associated factors among postoperative patients in KIUTH

1.5.2 Specific objectives:

I. To obtain the prevalence of surgical wound infections developed during hospital stay and after discharge.
II. To identify the risk factors associated with wound sepsis among postoperative patients in KIUTH.

1.6. RESEARCH QUESTIONS;

1. How may post-operative patients out of the total number that undergoes surgery in KIUTH get sepsis?
2. Which factors contribute to the development of wound sepsis among post-operative patients in KIUTH?
3. Which group of patients is most vulnerable to surgical wound sepsis among the patients that undergo surgery in KIUTH?

1.7. JUSTIFICATION;

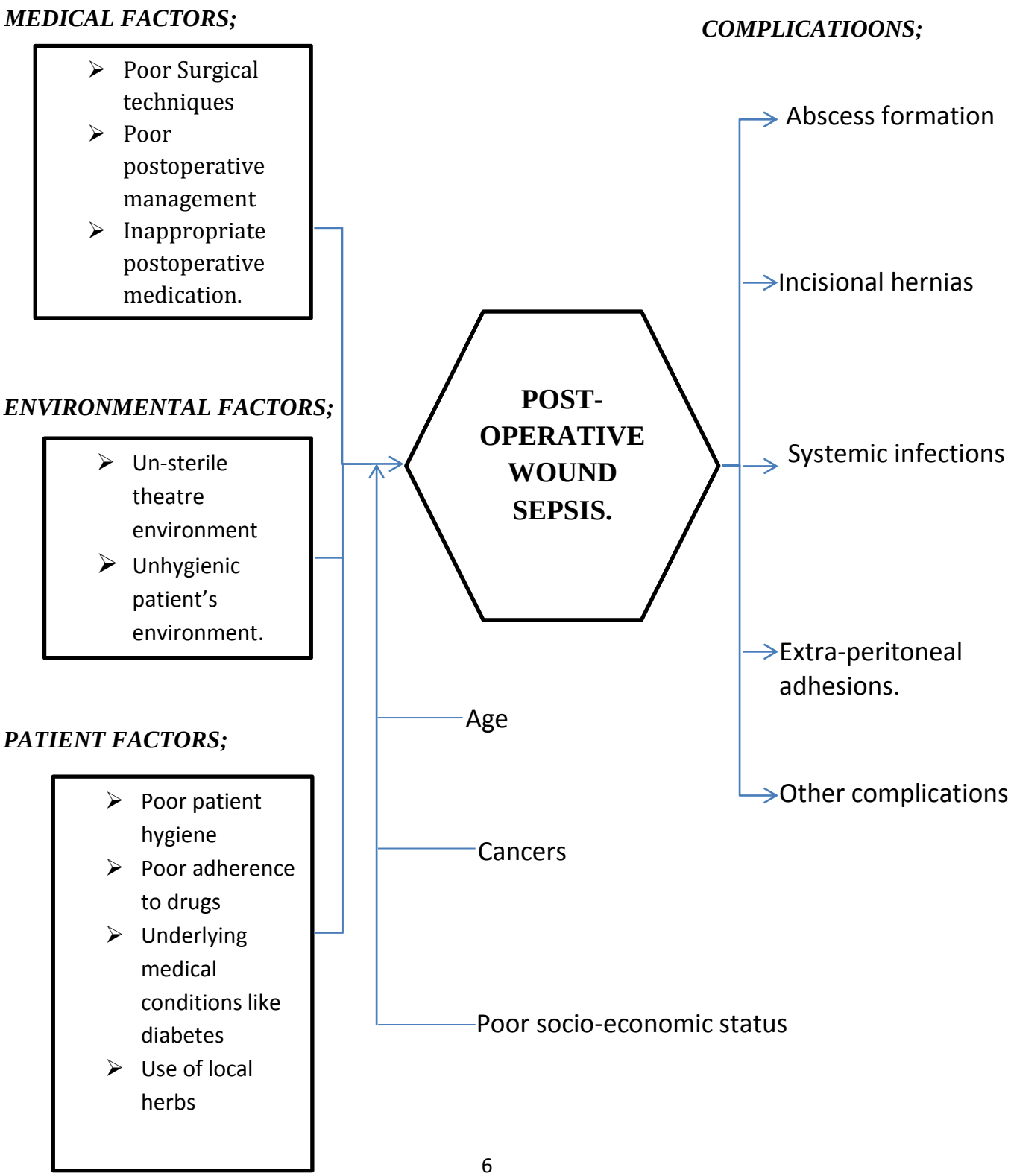
In all major and minor surgeries in KIUTH, aseptic techniques are obscured.

Surgeons always advise periodic wound dressing post operatively, using sterile gauze in order to prevent inoculation of microbes in the wound.

However, the patient factors that contribute to Post-operative wound sepsis have not been addressed.

Therefore, the purpose of this study was to address the patient factors that are associated with Post-operative wound sepsis.

1.8. CONCEPTUAL FRAMEWORK



1.9. 0. SCOPE OF THE STUDY:

1.9.1. Content scope: In this research, the independent variables, that is; the medical factors, patient factors and environmental factors that predispose post-operative patients to wound sepsis were studied. However, the early and late complications of post-operative wound sepsis were not considered in this study.

1.9.2. Geographic scope: The study was carried in Kampala International hospital with special emphasis on the surgical areas of Accident and Emergency department, Surgical ward, Orthopedics ward Obstetrics, Gynecology ward and GOPD.

1.9.3. Time scope: The study was carried out between August 2017 and December 2017.

CHAPTER TWO

LITERATURE REVEW

2.1. INTRODUCTION;

Post-operative wound infection remains a common and widespread problem contributing to significant morbidity and mortality. It is widely accepted that it prolongs hospital stay and increases the cost of hospitalization. It is also the third most frequently reported type of nosocomial infection. Morbidity and mortality is partly attributed to increase in infections due to antimicrobial resistant bacterial pathogens which make the choice of empirical therapy more difficult. (Manyahi, 2012)

In 1992, CDC revised its definition of 'wound infection', by creating the definition, 'surgical site infection', to prevent the confusion between the infection of a surgical incision and the infection of a traumatic wound.

Surgical site infections (SSIs) are defined as infections of skin or underlying soft tissues at the surgical site, occurring within 30 days following National Healthcare Safety Network (NHSN) operative procedure in which an incision was closed primarily.(Singh, Singla, & Chaudhary, 2014)

Postoperative infectious complications impose substantial costs on patients, increase the length of hospitalization and adversely affect patient outcomes. Several predisposing factors have been suggested for the development of infections after elective surgeries. (Naderi & Zadeh, 2014)

2.2. DEMOGRAPHICS;

The general impression is that the infection rates vary, but in well controlled large studies during the last 15 years they have been about 7-8 %. There does not seem to have been any substantial improvement during this period. (Bengtsson, Hambraeus, & Laurell, 1979)

The SSI rates reported from countries with more resources are often below 5%. In Brazil and Mexico the SSI rates are usually between 10% and 15%. Reported rates from African countries

range from about 16% to 38.7%. In an international survey arranged by the World Health Organization (WHO) in 1988 the SSI rates varied between 5.2% and 34.4%(Eriksen, 2001)

In a study from the Central African Republic, three of 51 patients who developed surgical site infections were identified after discharge. Of note, only 25% of all patients who were asked to return for a follow-up visit on the 30th day after surgery actually attended.(Nejad, Allegranzi, Syed, Ellis, & Pittet, 2011)

Although a large number of reports on SSI are available in adult literature, reports for children are few, and most are from developed countries with an overall incidence of 2.5–20%.

In most of Africa, incidence data are not available, but one hospital-based prospective report suggests an incidence of 23.6%. (Ameh, 1964)

2.3. FACTORS ASSOCIATED WITH SURGICAL SITE INFECTION;

The factors that contribute to the occurrence of SSI can be patient factors, medical factors, or environmental factors.

2.3.1. Medical-surgical factors;

The surgical patient is exposed to potentially harmful microorganisms prior to admission, during admission and after discharge. The outside surfaces of the body, including the aero digestive tract, are normally colonized with bacteria – a defense mechanism that is disrupted by stress and antibiotic therapy (Surgery, n.d.)

According to several studies, surgical factors more commonly lead to the development of SSIs compared to patient factors. (Naderi & Zadeh, 2014)

Any error therefore by the Surgical, medical and Nursing team in regards to the observation of proper preventive measures can cause the patient to suffer SSI.

Intraoperative surgical technique contributes a large part to the postoperative surgical site infection and post-operative sepsis rate. Implementation of correct skin incision, tissue handling, surgical drains, and wound closure is crucial. Other surgical and anesthetic modifiable factors implicated in postoperative immune suppression include hemorrhage and blood transfusion and perioperative bacterial contamination. (Monkhouse, 2006)

According to the study carried out in Mbarara Regional referral hospital-western Uganda, by Lubega, Joel, & Lucy, 2017, the property of suture material used on skin is significantly associated with SSI. The risk of SSI was high when an absorbable suture was used than when a non-absorbable suture was used. The risk ratio was also true when a braided was used. (Lubega, Joel, & Lucy, 2017a)

Duration of operation; there is a direct relationship between length of operation and wound infection. An infection rate roughly doubles with every hour of surgery. If the duration of operative procedure is less than 2 hours there is no significant rise in infection rates. (Rao & Chakravarthy, 2016)

A prolonged operative time leads to fatigue, resulting in a decline in the use of aseptic measures during surgery and may also be associated with advanced disease, reoperation, or intraoperative difficulties. Additionally, a prolonged operative time is often related to increased blood loss which contributes to tissue hypoxia .(Lubega et al., 2017a)

In addition, the study carried out by (Rao & Chakravarthy, 2016) indicated that the infection rate was higher in emergency operative procedures (19.97%) when compared to elective surgeries (9.87%).(Rao & Chakravarthy, 2016)

Inadequacy and inappropriate use of preoperative AMP is known to be a major risk factor associated with increased incidence of SSI. However, when applied properly it can significantly prevent occurrence of SSI. For example, a study at a rural hospital in Tanzania showed dramatically decreased rate of SSI from 21.6% to 4% after implementation of appropriate use of preoperative AMP (Manyahi, 2012)

Surgical wound classification has long been established as an important predictor of the postoperative surgical site infections. In the study carried out by Lubega et al, 2017, the risk of SSI was statistically higher in dirty and contaminated wounds than in clean and clean contaminated wounds.

Use of drains; Cruse and Food found that use of drains is associated with higher infection rates. This study was confirmed by increased incidence of wound infection in operations where drains were used. (Rao & Chakravarthy, 2016)

Apart from reluctance, lack of knowledge, lack of policies and protocols of infection control in facilities, lack of resources would also contribute to poor infection control practices.(Muchina, 2006)

2.3.2. Patient factors;

It is well known that several host factors such as underlying disease, e.g. malignancy and diabetes, pre-operative treatment with antibiotics, central venous catheter, etc., may increase the risk for a post-operative wound infection. (Bengtsson et al., 1979)

Certain conditions which diminish the efficacy of the immune response and delays wound healing such as:

Diabetes, Malnutrition, Smoking, Obesity, Alcoholism, Extremes of age, Steroid therapy, Chemotherapy, radiotherapy, Peripheral vascular disease, skin disease at operation site, pre-existing infection, chronic inflammatory conditions increase the risk of acquiring SSI.(Singh et al., 2014)

The association between SSI and premorbid status is statistically significant p=0.007. The patients that have other co-morbid status of sickle cell disease, cancer, anemia, hepatitis, asthma, etc., have the highest rate of SSI. Diabetes and HIV have severally been documented as a risk factor for surgical site infections .The reason for this includes depression of the patient's immunity, thus bacteria colonization of surgical site easily transforms into established infection (Osakwe et al., 2014)

Obesity is known to be a well-established risk factor for postoperative wound infection. In this study a Body Mass Index of more than 40kg/m2 was associated with a higher rate of postoperative wound infection(Masood Ahmed, Shams Nadeem Alam, Obaidullah Khan, & S. Manzar, 2007)

Age; Most of the studies reported age above 50 years has been associated with an increased risk of SSI. One study did show that this factor was not significant. In an international study organized by WHO children under one year of age and those over 64 years had an increased risk for hospital infection. (Eriksen, 2001)

Anemia increases the infection rate through hypoxia and by deranged tissue perfusion. Infection rate is very high when hemoglobin levels are less than 10 %.(Rao & Chakravarthy, 2016)

Other factors such as Poor nutritional status, immunosuppression before surgery, a single dose of steroids, emergency procedures, and multiple operations are all associated with higher rates of sepsis (Monkhouse, 2006)

Smoking has been shown to be an independent risk factor for SSI. Smoking delays the healing of SSIs by causing local and systemic vasoconstriction. This results in tissue hypoxia and hypovolemic, an environment conducive to SSI.

Heavy alcohol consumption weakens immunity and increases the risk of SSI; although this effect is dose-dependent (Lubega et al., 2017a)

2.3.3. Environmental factors; occasionally, the patients environment may predispose him/her to the risk of SSI.

Poor environmental hygiene; especially to patients who come from Refugee camps and patients who work in farms. Often these may develop sepsis in two weeks after discharge from the hospital. (Surgery, Surgery, & Surgery, n.d.)

Overcrowding in the hospital wards may also to some extent put the patient at risk of sepsis. The many patients on ward with different medical/surgical conditions plus the associated high number of attendants creates a “micro-organism rich” environment that puts the patient at risk of getting infected. (Monkhouse, 2006)

CHAPTER THREE

METHODOLOGY

3.1.0. Introduction:

This chapter addresses the research methodology that will be employed in the project. Key areas include the study area, study design, study population, Inclusion criteria, Exclusion criteria, Sampling technique, sample size determination, study variables, data collection tools, data analysis and presentation, quality control , limitations and ethical considerations shall be discussed.

3.2.0. Study Area

The study was carried out in Kampala International University- Teaching Hospital which is situated in Bushenyi District in the Western region of Uganda. The hospital has a bed capacity of 500 beds. It has outpatient, accidents and emergencies, in-patients, theatre, special clinics, psychiatry and intensive care unit departments. Data however will be collected from the Surgical ward, obstetrics and gynecology ward, General outpatient records and accident and emergency department.

3.3.0 Study design

A Cross-sectional study design that is both descriptive and analytical was used. The descriptive study was used to get the prevalence while analytical was used to assess for associated factors.

The design was appropriate for this study because of its affordability and its ability to be used to study a vast number of factors.

3.4.0. Sample size determination

The sample size was calculated using Fisher et al formula, which is:

$N= Z^2pq/d^2$, where,

N is the derived size of the population.

Z is the standard deviation at 95% of the degree of confidence which is 1.96

P is the proportion of the target group is estimated to be 15%

q is 1-p= 1-0.15= 0.85

d is the measure of anticipated error as a proportion of standard deviation about 0.05

z =95% = 1.96, **p**= 15% (0.15) **q**=1-0.15=0.85 **d**=0.05

$N= (1.96)^2 x\ 0.15\ x\ 0.85 / (0.05)^2 = 196$

Therefore, N (sample size) = 196

Due to financial constraints and limited time, a sample size of 150 was used (because N was too large.)

3.5.0. Study Population

The study population was obtained according to selection criteria i.e. inclusion and exclusion criteria. A population of 150 respondents will be used

3.5.1. Inclusion criteria

All patients who get surgical wound sepsis in a period less than 30 days after surgery, in Surgical ward, Obstetrics and gynecology ward, Orthopedics ward and Pediatrics ward in KIUTH.

3.5.2. Exclusion criteria

- Patients who have been admitted on wards for Post-operative wound sepsis but were not operated from KIUTH will not be considered in this study.
- Patients who have got wound sepsis secondary to skin/tissue grafting as a result of severe tissue injury such as major thermal burns.
- Also, patients who develop wound complications in a period beyond 30 days and have already been discharged in good condition.
- All the patients on these wards/department who have not undergone surgery.

3.6.0. Sampling method

Consecutive enrollment of participants was used.

3.8.0 Study variables

These include the dependent variable and independent variables.

3.8.1 Dependent variable

The dependent variable in this research study is post-operative wound sepsis.

3.8.2 Independent variables

These include,

1. Patient factors; (Poor patient hygiene, Poor adherence to drugs, Underlying medical conditions like diabetes, Socio-cultural practices.)
2. Environmental factors; (Overcrowding in hospitals. Unhygienic environment.)
3. Medical/surgical factors; (Poor Surgical techniques, Poor postoperative management, Inappropriate postoperative medication)

3.9.0 Data collection

A structured questionnaire which is prepared in line with the objectives of the study and the conceptual frame work was employed to collect primary data from the respondents. Secondary data was obtained from the pre-existing medical records/files of the participants using a check list.

3.10.0 Pre-testing:

In order to ensure quality control and detection of possible sources of error in the research, a half-day pre-testing data collection was carried out in the study area. This greatly helped in anticipation and creation of an avenue for possible precautions against the preventable errors.

3.11.0 Data analysis and presentation

Data estimated in excel was exported to statistical package for social science [SPSS] for analysis, and presented inform of tables.

3.12.0 Quality control

It was obtained in consultation with experienced doctors and colleagues.

3.13.0. Limitations

Post-operative patients who get wound sepsis in less than 30 days after discharge and don't return to the hospital were hardly reached or followed up.

Time factor-The anticipated time for Proposal writing wasn't correctly matched and so limited time was available for data collection.

Language barrier- The details of the socio-cultural life of the patients who don't speak English, neither Luganda were hard to obtain due to language barrier.

3.14.0. Ethical consideration

Permission to carry out the study will be was got from the KIU administrator school of allied health sciences and KIUTH in charges of the respective departments. Approval was obtained from the KIU research and ethical committee. Written informed consent was obtained from all participants and there will be no personal identification on the data collection instruments for confidentiality.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of participants in the study population

A total of 150 participants were included in this study, and majority; 85(56.67%) were males compared to 65(43.33%) females.

Their ages ranged from 8-71 years, with majority (29.33%) being Moslems.

Participants were predominantly peasants; 34%, and majority (50%) were of a primary level of education. The biggest percentage (96.67%) had a normal body mass index for age, as summarized in the table below.

Table 1; socio-demographic characteristics of study population;

Variable	**Frequency**	**Percentage (%)**
Age (Years)		
1-10	2	1.33
10-20	26	17.33
20-50	94	62.67
Above 50.	28	18.67
Gender		
Female	65	43.33
Male	85	56.67
Occupation		
Student	20	13.33
Business	39	26.0

Doctor	0	0
Engineer	3	2.0
Peasant	51	34.0
Civil servant	13	8.67
Boda-boda	12	8.0
Housewife	7	4.67
Teacher	5	3.33
BMI		
Underweight	0	0
Normal weight	145	96.67
Overweight	5	3.33
Religion		
Catholic	41	27.33
Moslem	44	29.33
Protestant	26	17.33
Pentecostal	39	26.0
Education level		
Primary	75	50
Secondary	54	36
Post-secondary	19	12.67
Never went to School	2	1.33
Total	**150**	**100**

4.2. Bivariate analysis of the socio-demographic factors associated with wound sepsis among post-operative patients in KIUTH.

The prevalence of post-operative wound sepsis in KIU-TH was 25.3%. Unexpectedly, wound sepsis was 0.221 times higher among patients between 21-50 years of age, compared to those above 50 years, and this was statistically significant (P=0.001, 95% CI; 0.089-0.547). The condition was more prevalent among males compare to females (cOR 1.237), and more predominant among peasants (cOR 1.514), though this was not statistically significant; P=0.579 95% CI 0.0584-2.617 and P=0.888 95% CI 0.135-14.738 respectively. The prevalence was also unexpectedly high among patients with Normal BMI (cOR 4.714) compared to those with a high BMI (Overweight).

A summary of this is shown in the table below;

Table 2; Bivariate analysis of Socio-demographic factors associated with Post-operative wound sepsis;

Variable	**Number of participants, n(%)**	**Wound got healed n(%)**	**Got Wound sepsis n(%)**	**Crude OR (95% CI)**	**P-value**
Age(years)					
1-10	2(1.33)	2(100)	0(0.00.)	5.952E8(0.000-0.000)	0.999
11-20	26(17.33)	19(73.08)	7(26.92)	0.368(0.118-1.152)	0.086
21-50	94(62.67)	77(81.91)	17(18.09)	0.221(0.089-0.547)	0.001*
>50	28(18.67)	14(50)	14(50)	1.000	
Sex					

Male	85(56.57)	62(72.94)	23(27.06)	1.237(0.0584-2.617)	0.579
Female	65(43.33)	50(76.92)	15(23.08)	1.000	
Occupation					
Student	20(13.33)	15(75.0)	5(25.0)	1.333(0.131-16.781)	0.815
Business	39(26.0)	34(87.18)	5(12.82)	0.588(0.054-6.381)	0.663
Engineer	3(2.0)	2(66.67)	1(33.33)	2.000(0.078-51.593)	0.721
Peasant	51(34.0)	37(72.55)	14(27.45)	1.514(0.135-14.738)	0.888
Civil servant	13(8.67)	10(76.9)	3(23.08)	1.200(0.094-15.260)	0.587
Bodaboda	12(8.0)	8(66.67)	4(33.33)	2.000(0.164-24.325)	0.99
Housewife	7(4.67)	2(28.57)	5(71.43)	10.00(0.648-154.317)	0.099
Teacher	5(3.33)	4(80)	1(20)	1.000	
Education level					
Primary	75(50)	56(74.67)	19(25.33)	0.339(0.020-5.693)	0.453
Secondary	54(36)	41(75.93)	13(24.07)	0.317(0.019-5.433)	0.428
Post-secondary	19(12.67)	14(73.68)	5(26.32)	0.357(0.019-6.850)	0.495
Uneducated	2(1.33)	1(50)	1(50)	1.000	
BMI					
Underweight	0(0.0)	0(0.0)	0(0.0)	0.000(0.000-0.000)	0.000
Normal weight	145(96.67)	110(75.86)	35(24.14)	4.714(0.757-29.364)	0.097
Over weight	5(3.33)	2(40)	3(60)	1.000	

*Statistically significant at 95% level of confidence

4.3. Patient factors associated with wound infection among post-operative patients.

Out of the 150 participants, 7(4.67%) had an underlying illness, including Diabetes (0.67%), HIV(1.33%), Anemia(1.33%), and other illnesses (1.33%) while the biggest number (95.33%) had no underlying illnesses.

Majority of the patients 146(97.33%) had good adherence to drugs as per prescription, though a few 4(2.67%) defaulted the treatment. Similarly, the largest percentage of the participants; 147(98.0%) never used herbs, but a few; 3(2.0%) applied local herbs on their wounds, as shown in the table below;

Table 3; bivariate analysis of patient factors associated with Post-operative wound sepsis.

Variable	**Number of participants, n(%)**	**Wound got healed n(%)**	**Got Wound sepsis n(%)**	**Crude OR (95% CI)**	**P-value**
Patient underlying illness					
Diabetes	1(0.67)	0(0)	1(100)	5.604E9(0.000-0.000)	1.000
HIV	2(1.33)	0(50)	2(50)	5.604E9(0.000-0.000)	0.999
Anemia	2(1.33)	0(0)	2(100)	5.604E9(0.000-0.000)	0.999
Any other illness	2(1.33)	1(50)	1(100)	3.469(0.211-57.018)	0.384
No illness	143(95.33)	111(77.62)	32(22.38)		
Drugs adherence;					

Good adherence	146(97.33)	111(76.03)	35(23.97)	0.105(0.011-1.043)	0.054
Poor adherence	4(2.67)	1(25)	3(75)		
Usage of local herbs					
Applied herbs	3(2.0)	3(100)	0(0.0)	1.486(0.131-16.781)	0.749
Never used herbs	147(98.0)	147(100)	0 (0.0)		

4.4. Medico-surgical factors associated with wound sepsis among post-operative patients.

The participants were post-operative patients, who underwent different surgeries, including Caesarian section (26.67%), Explorative Laparotomy (21.33%), Prostatectomy (98.87%), Herniorrhaphy (10.67%), Orthopedic surgeries (16.67%), Incision and drainage (6.67%), Appedicectomy (4.67%) and Hysterectomy (4.67%).

Majority of these; 41(27.33%) were operated through midline incisions, and others through Pfannestil incisions; 49(32.67%), inguinal incisions; 17(11.33%), MC-Burney's incision; 7(4.67) and other specific incisions; 36(24%).

69(46%) operations were emergency cases, whereas 81(54%) were elective Surgeries. Patients who underwent Emergency operations were 2.552 times more likely to develop sepsis compared to those who underwent elective Surgeries, this was statistically significant (P=0.016. 95% CI; 1.194-5.456).

In majority of the surgeries (84%), patients were given Prophylactic antibiotics prior to surgery, compared to 24% who were not given prophylactic antibiotics. Those patients (who were not given Prophylactic antibiotics) were 3.846 times more likely to develop wound sepsis compared to those who were given prophylaxis, this was statistically significant (P=0.04. 95% CI; 1.550-9.546) as summarized in the table below.

Table 4; Bivariate analysis of Medico-surgical factors associated with post-operative wound sepsis

Variable	Number of participants, n(%)	Wound got healed n(%)	Got Wound sepsis n(%)	Crude OR (95% CI)	P-value
Type of operation					
Laparotomy	32(21.33)	20(62.5)	12(37.5)	1.500(0.251-8.977)	0.657
C-Section	40(26.67)	33(82.5)	7(17.5)	0.530(0.085-3.311)	0.497
Prostatectomy	13(8.87)	8(61.54)	5(38.46)	1.563(0.215-8.977)	0.659
Herniorrhaphy	16(10.67)	13(81.25)	3(18.75)	0.577(0.73-4.550)	0.602
Orthopedics	25(16.67)	19(76)	6(24)	0.789(0.121-5.170)	0.805
I&D	10(6.67)	9(90)	1(10)	0.278(0.020-3.884)	0.341
Appendicectomy	7(4.67)	5(71.43)	2(28.57)	1.000(0.98-10.166)	1.000
Hysterectomy	7(4.67)	5(71.43)	2(28.57)		
Type of incision					
Midline	41(27.33)	26(63.41)	15(36.59)	2.308(0.812-6.555)	0.116
Pfannestil	49(32.67)	38(77.55)	11(22.45)	1.158(0.812-6.555)	0.788
MC-Burney	7(4.67)	5(71.43)	2(28.57)	1.600(0.255-10.045)	0.616
Inguinal	17(11.33)	14(82.35)	3(17.65)		0.840
Specific incisions	36(24)	29(80.56)	7(19.44)	0.857(0.192-3.830)	
Antimicrobial prophylaxis	24(16)	12(50)	12(50)	3.846(1.550-9.546)	0.04*
Not given					

Given	126(84)	100(79.37)	26(20.63)		
Operation plan					
Emergency	69(46)	45(65.22)	24(34.78)	2.552(1.194-5.456)	0.016*
Elective	81(54)	67(82.72)	14 (17.28)		

*Statistically significant at 95% level of confidence

4.5. Multivariate analysis of factors associated with wound sepsis among post-operative patients in KIUTH

Multivariate logistic regression analysis was done on factors that were statistically significant ($p< 0.05$) at bivariate analysis. The statistically significant factors associated with post-operative wound sepsis were; Age of the patient, Operation plan and Antimicrobial prophylaxis.

Patients who underwent elective surgeries were 76.1% less likely to get wound sepsis compared to those who underwent emergency surgeries, this was statistically significant (p=0.004, 95% CI; 0.091-0.628). The patients who were given prophylactic antibiotics preoperatively were 82.4% less likely to get wound sepsis compared to those who were not given Prophylactic antibiotics, this was statistically significant (p=0.001, 95% CI; 0.061-0.506) when other factors are held constant. However, there is no statistically significant relationship between postoperative wound sepsis and age on multivariate analytical regressions, as shown in table 4 below;

Table 4; Multivariate of risk factors affecting immunization status of children

Predictors	**Adjusted OR**	**95% CI**	**P-value**
Operation plan			
Emergency	0.239	0.091-0.628	0.004*
Elective	1.000		
Antimicrobial prophylaxis (AMP)			
AMP not given	0.176	0.061-0.506	0.001*
AMP given	1.000		
Age (Years)			
1-10	4.614E8	4.614E8-4.614E8	0.000
11-20	6.405	1.634-26.108	0.008
21-50	11.297	3.638-35.083	0.000
>50	1.000		

* Statistically significant factors at 95% level of confidence.

CHAPTER FIVE:

DISCUSSION

5.0. INTRODUCTION

In this chapter, findings of the prevalence, and the possible factors associated with wound sepsis among post-operative patients in KIUTH are discussed. Conclusion, strength and weaknesses in the study, and recommendations were also outlined.

5.1 THE PREVALENCE OF POST-OPERATIVE WOUND SEPSIS IN KIUTH;

Postoperative SSI remains one of the most important causes of morbidity in surgically treated patients. These patients incur higher cost because of longer hospitalizations, more nursing care, additional wound care, potential readmission to the hospital, and further surgical procedures.

In this study, basing on our inclusion criteria, a total of 150 operated patients were eligible for analysis (80 elective surgeries and 70 emergency surgeries) that underwent different kinds of major surgeries, including Abdominal surgeries, orthopedic surgeries, C-section, and others.

As in most studies in Africa and other developing continents, the incidence of SSI in our study was high at 25.3%.

This was however higher than 16.4% reported in Mbarara regional referral hospital by Lubega et al., 2017a, 15.5% by Osakwe et al., 2014 in Nigeria, and 13% by Amoran, Sogebi, & Fatugase, 2013.

The differences in the findings could be due to the differences in the Sample sizes used in the studies, methods used to generate data, and the time scope of the studies.

The prevalence was highest among post explorative laparotomy patients (37.5%), followed by post-caesarian section (17.5%) patients, compared to other operations.

The prevalence was also 0.239 times high in Emergency surgeries (24%) compared to Elective surgeries, and this was statistically significant in both bivariate and multivariate analytical regressions (P=0.004, 95% CI, 0.091-0.628). This was in agreement with the findings by Rao & Chakravarthy, 2016 who reported similar relationship.

5.2. Factors associated with wound sepsis among post-operative patients in KIUTH

Findings reflect a significant association between Antimicrobial prophylaxis and post-operative wound sepsis. The odds of developing sepsis in patients who were not given antimicrobial prophylaxis preoperatively were 0.176 times high, compared to those who were given prophylaxis, and this was statistically significant in both bivariate and multivariate analytical regressions (P=0.001, 95% CI 0.061-0.506).

This coincides with the findings by Manyahi, 2012 who also reported a significant relationship.

Antimicrobial prophylaxis helps to combat against infections that may complicate surgery and also cover un-identified infections such as Stapylococcal skin infections (like in cases of inadquate scrubbing of patient's skin), Streptococcal nose infections (from the surgical team or patient, and other infections that can un-noticebly complicate surgery-incase prophylactic treatment is not given.

Post-operative wound sepsis was also found to be associated with operation via long midline incisions (cOR 2.308) compared to other short incisions such as those used in I&D and appendicectomy, though this factor was however not statistically significant (P=0.116 95% CI 0.812-6.555).

Long midline incisions (often done in Explorative laparotomy) subject the patient to a risk of delayed tissue apposition/wound healing, and also increase the surface area for bacterial proliferation. About this factor however, no comparative studies were found.

In our study, there was no significant relationship between post-operative wound sepsis and premorbid illness as it had been reported before. This finding contradicts with that by Osakwe et al., 2014, who found out that this relationship was insignificant.

This difference may be due to a comparatively small number of the sample size in our study.

It had also been documented by Krishna, Tyagi, Vyas, & Sharma, 2015, that Age above 50 years was associated by post-operative wound sepsis. However, this was not so in our study.

The significant relationship shown on bivariate regression analysis was due to other factors that are mentioned above, as proved on multivariate regression analysis.

The difference in these findings is probably due to the difference in the Study design used, the study area and the comparatively less time scope for this study.

STRENGTH AND WEAKNESSES;

It was a little hard to conduct the data collection part of this study at the same time when I was supposed to be in Kilembe mines hospital for my community placement.

The cost of the study was also elevated beyond the estimated budget due to necessity of repeated travels from Kilembe to KIUTH.

With the help of research assistants however, I was able to get data from the individual patients, despite the gaps between my travels.

5.5 CONCLUSIONS

The prevalence of wound sepsis among post-operative patients in KIUTH was high, at 25.3%, with a higher prevalence in Emergency operations (aOR 0.239) compared to Elective surgeries.

The condition was significantly associated with the ineffective use of antimicrobial prophylaxis (aOR 0.176, P=0.001, 95% CI 0.061-0.506), and operation via long midline incisions, although the former was not statistically significant. (P=0.116 95% CI 0.812-6.555).

There was no significant association between post-operative wound sepsis and Patients Age, BMI and pre-morbid illnesses as it had been reported in previous studies.

5.6 RECOMMENDATIONS

Basing on the findings of this study, I recommend that quality assurance should be improved, with emphasis on the use of antimicrobial prophylaxis prior to all major surgeries.

Also, surgeons should employ the best skills possible out their knowledge, in order to avoid the risk of long midline incisions.

There is also need for a further study about post-operative sepsis, for a longer duration of time and a wider sample size, in order to find out other associated factors.

REFERENCES:

Ahmed, M., Alam, S. N., Khan, O., & Manzar, S. (2007). POST-OPERATIVE WOUND INFECTION : A SURGEON ' S DILEMMA, *23*(1).

Ameh, E. a. (1964). Surgical Site Infection, *160*(Supp 1), 98–102.

Amoran, O. E., Sogebi, A. O., & Fatugase, O. M. (2013). Rates and Risk Factors Associated with Surgical Site Infections in a Tertiary Care Center in South-Western Nigeria. *International Journal of TROPIAL DISEASE & Health*, *3*(1), 25–36.

Bengtsson, S., Hambraeus, A., & Laurell, G. (1979). Wound infections after surgery in a modern operating suite: clinical, bacteriological and epidemiological findings. *The Journal of Hygiene*, *83*, 41–57. https://doi.org/10.1017/S002217240002581X

Eriksen, H. (2001). SURGICAL SITE INFECTION AT KILIMANJARO CHRISTIAN MEDICAL Hanne-Merete Eriksen ADVISOR : Salum Kondo MD COLLABORATING CENTRE :, (May).

Krishna, R., Tyagi, G., Vyas, P., & Sharma, M. (2015). Post-operative Wound Infection in Cases operated in a Tertiary Level Hospital Jaipur (Rajasthan) India, (3), 1–5.

Lubega, A., Joel, B., & Lucy, N. J. (2017a). Incidence and Etiology of Surgical Site Infections among Emergency Postoperative Patients ,. *2 Surgery Research and Practice*, *2017*.

Lubega, A., Joel, B., & Lucy, N. J. (2017b). Incidence and Etiology of Surgical Site Infections among Emergency Postoperative Patients in Mbarara Regional Referral Hospital , South Western Uganda, *2017*.

Manyahi, J. (2012). Bacteriological Spectrum Of Post Operative Wound Infections And Their Antibiogram In A Tertiary Hospital , Dar Es Salaam , Tanzania Bacteriological Spectrum Of Post Operative Wound Infections And Their Antibiogram In A Tertiary Hospital , Dar Es Salaam , Tanzania.

Masood Ahmed, Shams Nadeem Alam, Obaidullah Khan, & S. Manzar. (2007). Post-Operative Wound Infection: a Surgeon'S Dilemma. *Pakistan Journal of Surgery*, *23*(1), 41–47. Retrieved from http://www.pjs.com.pk/journal_pdfs/jan_mar07/11.pdf

Monkhouse, D. (2006). Postoperative sepsis. *Current Anaesthesia and Critical Care*, *17*(1–2),

65–70. https://doi.org/10.1016/j.cacc.2006.05.005

Muchina, W. P. (2006). A Research Proposal Presented In Partial Fulfillment The University Of Nairobi . Factors Contributing Towards Post Surgical Infections In Kenyatta National Hospital , Lecturer School Of Nursing Science, (August).

Naderi, H. R., & Zadeh, M. E. (2014). Evaluation of Postoperative Infections in Patients Undergoing Abdominal Surgery : A Systematic Review Article type : Article history : Keywords :, *1*(Md), 2–5.

Nejad, S. B., Allegranzi, B., Syed, S., Ellis, B., & Pittet, D. (2011). Health-care-associated infection in Africa: a systematic review. *Bulletin of the World Health Organization*, *89*(10), 757–765. https://doi.org/10.2471/BLT.11.088179

Osakwe, J. O., Nnaji, G. A., Osakwe, R. C., Agu, U., & Chineke, H. N. (2014). Role of premorbid status and wound related factors in surgical site infection in a tertiary hospital in sub-saharan Africa. *Family Practice Reports*, *1*(1), 2. https://doi.org/10.7243/2056-5690-1-2

Rao, B. H., & Chakravarthy, K. S. (2016). The study on post-operative wound infections at Vizianagaram in Andhra Pradesh , India, *4*(12), 5351–5355.

Singh, R., Singla, P., & Chaudhary, U. (2014). Surgical Site Infections : Classification , Risk factors , Pathogenesis and Preventive Management. *International Journal of Pharma Research and Health Sciences*, *2*(3), 203–214.

Society, T. P., & Britain, G. (2017). Surgical wound infection in the Third World : the African experience, *47*(May), 46–48.

Surgery. (n.d.).

Surgery, P., Surgery, R., & Surgery, G. (n.d.). Head Injury.

APPENDICES

APPENDIX 1: CONSENT FORM

Invitation to Participate in Research Project

I am SSEBINTU MICHEAL from KIU-WC, undertaking an academic Research entitled, "Prevalence of Wound sepsis and associated factors among Post-operative patients in KIUTH Ishaka, Bushenyi district", here by calling upon your voluntary participation in this research.

Purposes, Procedures, and Duration of the Study

The purpose of the study is academic, to earn a university Diploma in Clinical medicine and community health. The findings from this study will also provide information regarding preventive measures wound sepsis among post-operative patients. So the information you provide will be very important.

The procedure of data collection will be by use of questionnaire and the time for this research (data collection) will be one month.

Possible Benefits to the participant;

The information you do provide will not help you directly but will assist the people that are single parents; and these are your relatives, brothers and sisters.

Your options Regarding Participation and Continuation

All post-operative patients who have got surgical site infection/ sepsis are requested to participate in this study. However, there is no offense if you decline to participate and in case you change your mind about participation in the study, there will be no penalty.

Confidentiality and Disclosure of Responses

Data will be captured using codes instead of names and will be kept under safe inaccessible to everyone apart from the researcher.

Agreement to Participation;

Having read this consent form, and having been answered all the questions that I had about the procedures, benefits, and/or risks of this study, I hereby agree to participate in this study with all understanding that I may withdraw from participation at any time without penalty.

My signature or thumb print also indicates that I have received a copy of this form.

…… ……/……/……

Signature or thumb print of the participant Date

…….. ……/……../.....

Signature of person administering the consent Date

APPENDIX 2: QUESTIONNAIRE

TOPIC: PREVALENCE OF WOUND SEPSIS AND ASSOCIATED FACTORS AMONG POSTOPERATIVE PATIENTS IN KAMPALA INTERRNATIONAL UNIVERSITY TEACHING HOSPITAL, ISHAKA, BUSHENYI

WESTERN UGANDA.

A. SOCIO-DEMOGRAPHIC CHARACTER/DATA

1. Gender

Male ☐

Female ☐

Age…….

2. Education level;

Primary level ☐

Secondary level ☐

Post-secondary level ☐

Never went to school ☐

Others

(specify).....

3. Marital status

Single ☐

Married ☐

Widow ☐

Others

(specify)…….

4. Occupation;

Student ☐

Business ☐

Doctor ☐

Engineer ☐

Peasant ☐

Civil servant ☐

Others (specify).....

5. BMI……

6. Religion

Catholic ☐

Protestant ☐

Muslim ☐

Pentecostal ☐

Others……

B. MEDICAL FACTORS;

a) Type of operation done……

……

b) Any Pre-operative care

……

…….....

c) Post-operative care;

I. Number of times for wound dressing in 24 hours…….

II. Any drugs given routinely **YES** **NO**

C. PATIENT FACTORS;

a) Did you miss out taking drugs you were given? **YES** **NO**

b) If yes in b) above, how many times? ....

c) Have you ever applied any local herbs to the wound? **YES** **NO**

d) If yes in c) above, which one……

……

e) Patients medical History,

i. Presence of any of the following conditions? Diabetes

Sickle Cell Disease

HIV

Any type of Cancer;

ii. If any of the above, are you on treatment **YES** **NO**

iii. If yes, for how long? .....

D. Signs of infection;

Purulent discharge

Non-purulent discharge

No discharge.

THANK YOU

APPENDIX 3. CHECKLIST

A. Preoperatively

Antibiotics given

YES

NO

If yes, which one?.....

.....

Sterile dressing used

YES

NO

B. Intra-operatively;

Type of operation;

Elective

Emergency

Aseptic technique observed,

YES

NO

C. Postoperatively

Antibiotics given

YES

NO

If yes , which one?.....

Duration of the operation……
……..

Type of incision made;……
……

D. Surgical site evaluation;

Wound dressing;

Clean dressing

Soiled dressing

No dressing

Signs of infection;

Purulent discharge

Non-purulent discharge

No discharge.

APPENDIX 4: RESEARCH WORK PLAN

ACTIVITY	Time frame							
MONTH	May 2017	June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017
Selection of topic								
Approval of topic								
Literature search								
Proposal development								
Approval of proposal								
Seeking permission								
Pretest questionnaire								
Data collection								
Data analysis								
Report writing								
Report approval								
Submission of report								
Defending of report								

APPENDIX 6: MAP OF LOCATION OF ISHAKA UGANDA

APPENDIX 7: MAP OF LOCATION OF ISHAKA BUSHENYI MUNICIPALITY