

EVALUATION OF INFECTION CONTROL PRACTICES AT KAMPALA
INTERNATIONAL UNIVERSITY TEACHING HOSPITAL SURGICAL
DEPARTMENT

BY

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Declaration

I RASHIDA HEMED SALIM, hereby declare that this research report is my original work and has never been presented to any institution of higher learning or university for the purpose for award of any academic qualification other than the one for which it is now being submitted.

SignDate.....

Approval

This is to approve that this research report has been prepared under my direct supervision and guidance and is now ready to be submitted to the faculty of clinical medicine and dentistry of Kampala International University.

SignDate

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List of Acronyms

AIDS:	Acquired Immunodeficiency Syndrome
CDC:	Center for Disease Control and Prevention
ENT:	Ear Nose and Throat
HIV:	Human Immunodeficiency Virus
ICC	Infection Control Committee
ICP:	Infection Control Policy
IPD:	Inpatient Department
JCAHO:	Joint Commission for Accreditation of Hospitals
KIUTH:	Kampala International University Teaching Hospital
MoH:	Ministry of Health
MRSA:	Methicillin Resistant Staph Aureus
OBS & GYN:	Obstetrics and Gynecology
OPD:	Out Patient Department
SSI:	Surgical Site Infection
WHO:	World Health Organization

Definition of operation terms

Infection control is a discipline that applies epidemiologic and scientific principles and statistical analysis to the prevention or reduction in rates of nosocomial infections. Some experts in the field now prefer to use the phrase "infection prevention and hospital epidemiology" over the term infection control, as the words prevention and epidemiology more accurately define the discipline. Indeed, infection control is a key component of the broader discipline of hospital epidemiology. Effective infection control programs reduce rates of nosocomial infections and are cost-effective

In this document, the term *health care personnel* refers to all paid and unpaid persons working in health care settings who have the potential for exposure to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air. These personnel may include but are not limited to emergency medical service personnel, dental personnel, laboratory personnel, autopsy personnel, nurses, nursing assistants, physicians, technicians, therapists, pharmacists, students and trainees, contractual staff not employed by the health care facility, and persons not directly involved in patient care but potentially exposed to infectious agents (e.g., clerical, dietary, housekeeping, maintenance, and volunteer personnel

Abstract

Certain elements are necessary to attain the infection control goals of personnel health service: coordination with other departments, medical evaluations, health and safety education, immunization programs, management of job-related illnesses and exposures to infectious diseases, through policies according to the CDC.

In light of the above, study was designed to evaluate the infection control practices at KIUTH using the surgical department as a model. The study aimed at determining the staff protection practices, surgical site infection procedures and practices and the availability and usability of infection control policies and the way it's implementation arrangements .

The study design was descriptive with mixed method of data collections including interview with key staff (2 staff were interviewed) using a non-structured interview guide; observation was done by the researcher to supplement her findings and use of self-administered questionnaire for staff that generated quantitative and qualitative data.

The study found out that there was little information among related to the availability of infections control policy and the arrangements for its implementations, only 11 staff from the surgical ward reported the availability of IC policy in their departments, and that only, 12(23.08%) of the staff were trained, and 24(42.86%) reported administration of glucose a surgical infection control technique, 16(28.57%) reported administration of Oxygen and 12(21.43%) reported hand washing using 4% chlorexidine and shaving hair 4(7.14%)

In the view of the above findings, this study concluded that infection control is not given the attention it deserves at surgical department of KIUTH. The infection control committee which manages the infection control activities seemed to be malfunctions, rendering the whole process ineffective. The staff protection mechanisms are inadequate and non-routine.

Institute infection control committees in all the departments and units, and appoint an infection control manager, the staff should be trained in the basic principles of infection control and how to avoid staff patient's infection transfers, staff should be vaccinated against the most infectious organisms routinely like Hepatitis and Yellow fever and that the hospital should design ward specific infection control techniques with the help of senior staff in order to avoid infections among patients

CHAPTER ONE

INTRODUCTION

1.0 General Introduction

In this chapter, the researcher has presented the background to the cause and consequences of hospital acquired infections, the problems and its perceived cause of the problem locally, justifications, objectives and scope of the study are also presented and finally, the study also highlighted the conceptual framework to this study

1.1 Background

Certain elements are necessary to attain the infection control goals of a personnel health service: coordination with other departments, medical evaluations, health and safety education, immunization programs, management of job-related illnesses and exposures to infectious diseases, including policies for work restrictions for infected or exposed personnel, counseling services for personnel on infection risks related to employment or special conditions, and maintenance and confidentiality of personnel health records.

The recognition that infectious agents can be transmitted within hospitals to susceptible patients and health care workers began in the 1840s when Semmelweis noted that puerperal fever was associated with the lack of hand washing among clinicians performing autopsies(Hall, 2007)

This discovery, in turn, led to the introduction of hand dips with chlorinated lime at Vienna General Hospital(Harbarth, 2000). Eventually these ideas evolved into current guidelines about hand washing, although Semmelweis promoted hand cleansing and, paradoxically, was opposed to hand washing with soap and water(Harbarth, 2000).

Infection control programs became a requirement in the United States largely as a result of the mandates of the Joint Commission for Accreditation of Hospitals (JCAHO) and the leadership guidelines and definitions of the Centers for Disease Control and Prevention ((CDC)).

In order to achieve the main goal of preventing or reducing the risk of hospital-acquired infections, a hospital epidemiology program should have the following oversight functions and responsibilities(Edmond, 2005): surveillance, either hospital-wide or targeted, education about prevention of infections (e.g., by hand disinfection),outbreak investigations, cleaning,

disinfection, and sterilization of equipment and disposal of infectious waste, hospital employee health, specifically after exposure to either blood borne or respiratory pathogens, review of antibiotic utilization and its relationship to local antibiotic resistance patterns, prevention of infections due to intravascular devices, Development of infection control policies and procedures, oversight on the use of new products that directly or indirectly relate to the risk of nosocomial infections

Hospital infection control departments usually derive authority and communicate with other administrative components of hospitals via an infection control committee. This committee typically includes representatives from medical and surgical services, nursing, microbiology, hospital administration, and employee health.

In order to be successful, infection control programs must have administrative support, resources, and an organizational commitment to a safety culture (Siegel JD, 2007).

The authority of infection control personnel to direct policies and ensure compliance should be documented in writing and supported by the administrative leadership. Four major areas of infection control will be reviewed here: Standard precautions, including hand hygiene, isolation precautions, environmental cleaning and Surveillance

1.2 Problem Statement

Nosocomial, or hospital-acquired, infections (more appropriately called health care-associated infections) are today by far the most common complications affecting hospitalized patients. A designated ICP and an Infection Control Committee (ICC) are fundamental components of an infection control program. The program requires interdisciplinary cooperation, with contributions from the facility administration, medical director, the staff and the local health department(Smith PW, 1991).

Standard infection control procedures are designed to protect both the health care worker and the client from infection with a range of blood and other body infections. By assuming everyone is potentially infectious and by treating all clients in the same way through following standard procedures and protocol.

In the United States, the Centers for Disease Control and Prevention estimated roughly 1.7 million hospital-associated infections, from all types of microorganisms, including bacteria, combined, cause or contribute to 99,000 deaths each year. In Europe, gram-negative infections are estimated to account for two-thirds of the 25,000 deaths each year.

The exact number of hospital acquired in Uganda is not known. According to the Cochrane review 2013, about 10.4% of hospital acquired infection occurs in Uganda on an annual basis. In the absence of standard national guidelines for the prevention of surgical infections in Uganda, this study is therefore being designed to determine the infection control procedures at KIUTH surgical department.

1.3 Justification of Study

Results from the study will provide additional resources and reference for future researchers in the same areas of interest, and results will be subjected to further evaluations to improve understandings of infection control procedures in KIUTH. Besides, its results will be subjected to further evaluation to improve understanding about the practices and this will aid the advocacy and improvement in the practice of infection control practice at the department and

1.4 Research objectives

1.4.1 Broad Objectives

The broad objective is to determine the infection control procedures at KIUTH surgical department

1.4.2 Specific Objectives

- 1) To determine the applicability of hospital infection control guidelines at KIUTH surgical department
- 2) To determine the staff protection procedures at KIUTH surgical department
- 3) To determine the surgical procedures to minimize surgical site infections among patients undergoing surgery at KIUTH surgical department

1.5 Research Questions

- 1) Which policy (ies) of infection control prevention is being applied to the surgical department of KIUTH?
- 2) What are the staff protection procedures being practices at KIUTH surgical department?
- 3) What surgical site infection control procedures are being practices at KIUTH surgical department?

1.6 Scope of the Study

1.6.1 Time Scope

The study was conducted between the months of September 2014 to October 2014 as showed by the detailed working schedules during this time scope is illustrated in appendix I (work schedule)

1.6.2 Content Scope

The study concentrated in describing the infection control procedures and practices within the surgical department of Kampala International University Teaching Hospital. The study described the major policy guidelines available, the procedure to prevent patient infections, the staff protection mechanisms and the role of surveillance in surgical site infections

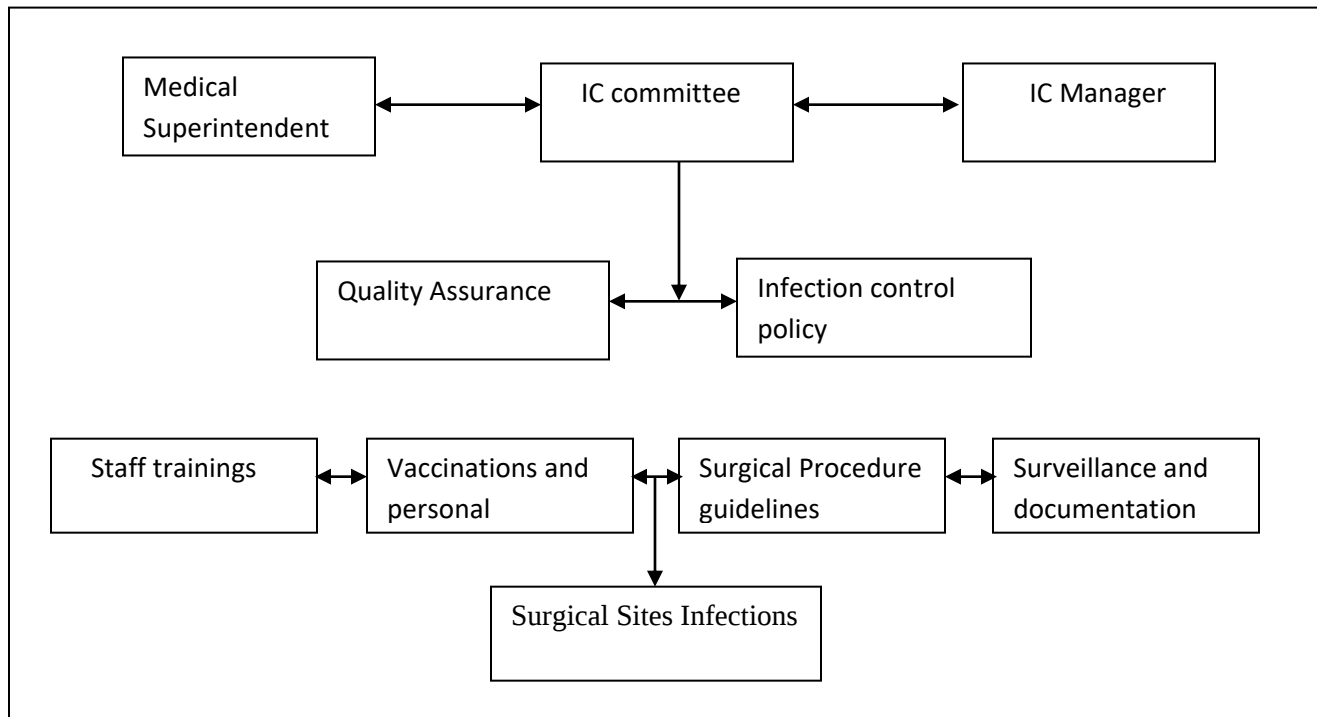
1.6.3 Geographical Scope

The study was conducted in Kampala International University Teaching Hospital, Bushenyi district, western Uganda, and the respondents included all staff attached to the surgical department of KIUTH. These will include the general surgery, theatre, Eye Clinic, radiology and ENT department.

1.7 Conceptual Framework

1.7.1 Diagrammatic Framework

Figure 1: The Conceptual Framework



Adapted from CDC guidelines for Hospital Infection Control 2008

1.7.2 Description of the Conceptual Framework

The conceptual framework above shows that infection control practices and procedures are influenced by a number of factors such as presence and applicability of infection control policies and commitment of the management to improve quality through maintain quality assurance.

This in turn affects the hospital practices of staff trainings, vaccinations and personal protection activities, in the surgical departments; these also include the procedure and surveillance of the team to follow surgical infections

CHAPTER TWO

LITERATURE REVIEW

2.0 General Introductions

In this chapter, the researcher has exhaustively discussed the major procedures employed by the surgical teams around the world in a bid to mitigate the challenges of surgical site infection on patients and described the approach taken by hospitals to ensure the staff are well protected against infections from surgical patients. The literature is based on the objectives that were highlighted in the previous literature

2.1 Previous Literature

Rates of SSIs for individual procedures vary widely depending upon the patient population, size of hospital, experience of the surgeon, and methods used for surveillance. Nonteaching hospitals generally have the lowest rates of SSI compared to small (<500 beds) or large (>500 beds) teaching hospitals (4.6 versus 6.4 and 8.2 percent, respectively) (Harbarth, 2000)]. Several studies have noted an increased risk of SSI in patients with cancer who undergo surgical procedures (Siegel JD, 2007).

Indeed, the Harvard Medical Practice Study II found that a single type of nosocomial infection; surgical-wound infection constituted the second-largest category of adverse events(Leape LL, 1991).

Several authors have reported the fact that non-adherence to infection control behaviors such as putting on and changing gloves for every patient is typically multifaceted and extends beyond a lack of knowledge or forgetfulness (Bencko V, 2006; Farr, 2000).

There are controversial reports that have shown doctors as being more complacent than nurses about infection control (Adinma ED, 2009; Mears A, 2009). Unfortunately, this seems to stem from medical training. In fact, a study on hand hygiene among final-year medical students suggested that poor compliance may have its roots in a failure to learn this behavior at medical school. This was attributed to the negative influence of consultants and other role models(Lankford MG, 2003). Reasons for poor compliance vary from time pressures, lack of

sinks, poor knowledge regarding clinical effectiveness of hand hygiene in reducing the spread of infection, and a negative influence of senior doctors as role models(Lankford MG, 2003)

Physicians must be astute in identifying patients who may have active TB, both to benefit the patient and to minimize exposure to HCWs and to other patients. Evaluation should start with a thorough history and physical examination, with attention to epidemiologic risk factors, travel history, and complaints suspicious for active TB, such as persistent cough and constitutional symptoms. Any hospitalized patient for whom active pulmonary or laryngeal TB is suspected should be placed immediately in an isolation room((CDC), 2005)

Among surgical patients, SSIs are the most common nosocomial infection, accounting for 38 percent of nosocomial infections. It is estimated that SSIs develop in 2 to 5 percent of the more than 30 million patients undergoing surgical procedures each year (i.e., one out of every 24 patients who have inpatient surgery in the United States has a postoperative SSI) (Horan TC, 1992)

Surgical hand hygiene consists of preoperative cleansing of hands and forearms with an antiseptic agent; this practice is universally accepted. Cleansing with aqueous alcoholic solution may be as effective as traditional hand scrubbing with antiseptic soap for prevention of surgical site infections(Edmond, 2005; Hall, 2007). Guidelines support using either an antimicrobial soap or an alcohol-based hand rubs for surgical hand antisepsis. The recommended duration of scrubbing with alcohol based hand rubs is shorter than with antimicrobial soap and scrub brushes are not required for preoperative hand cleaning by surgical staff

The primary role for barrier devices (masks, caps, gowns, drapes, and shoe covers) is to protect operating room personnel from exposure to infectious blood or body fluids. Their role in SSI prevention is not supported by rigorous study, but their routine use is universally accepted in hospitals where such equipment is available

The type of procedure is also associated with different rates of SSIs. The highest rates occur after abdominal surgery: small bowel surgery (5.3 to 10.6 percent), colon surgery (4.3 to 10.5 percent), gastric surgery (2.8 to 12.3 percent), liver/pancreas surgery (2.8 to 10.2 percent), exploratory laparotomy (1.9 to 6.9 percent), and appendectomy (1.3 to 3.1 percent). High volume

surgeries associated with higher rates of SSI and therefore more common infections include: coronary bypass surgery (3.3 to 3.7 percent), cesarean section (3.4 to 4.4 percent), vascular surgery (1.3 to 5.2 percent), joint prosthesis (0.7 to 1.7 percent), and spinal fusion (1.3 to 3.1 percent). Eye surgery is associated with an extremely low rate of SSI (0.14 percent) (David P Kateete, 2011)

Hair removal is commonly performed before many surgical procedures in order to provide the surgeon with a "clean" field and to prevent hair from falling into the surgical site. However, most studies have shown an increased risk for SSIs in patients undergoing preoperative hair removal (Mishriki SF, 1990). In one study, the rates of SSI were highest when shaving was performed compared with clipping the hair or use of depilatory creams (5.6 compared with 1.7 and 0.6 percent, respectively)(Cruse PJ, 1980). In another study, scanning electron micrographs showed that razors caused gross skin cuts, clippers caused less injury, and depilatory agents caused no injury to the skin surface(Hamilton HW, 1977). The timing of hair removal is also important. The lowest rates of SSI were reported when hair was removed just prior to the surgical incision(Seropian R, 1971).

Several studies in neurosurgical patients have questioned the need for hair shaving. One study evaluated 1038 cranial procedures without hair removal, and compared the rate of infection with 980 patients whose heads were shaven(Bekar A, 2001).

Patients had their hair washed with shampoo and 4 percent chlorhexidine within 24 hours of their operation. In the operating room, the surgical site was scrubbed for 8 to 10 minutes with 4 percent chlorhexidine diluted with water, and then cleansed with 10 percent povidone-iodine solution. Prophylactic antibiotics were administered for three days.

The investigators observed 13 postoperative wound infections (1.3 percent), including nine deep (0.9 percent) and four superficial (0.4 percent) infections. There was no significant difference between the rates of infection in patients whose heads were shaven or not (12 of 980 versus 13 of 1038). Two small prospective trials in highly selected, non-emergency cases have also supported not shaving hair in neurosurgical operations (Tang K, 2001)

A meta-analysis that examined 11 randomized controlled trials concluded that there was no difference in rate of SSIs among patients who have had hair removed prior to surgery and those

who have not(Tanner J, 2006). If hair needs to be removed, patients should be clipped rather than shaved, as patients who were shaved were more likely to develop SSI

Oxygen is important for wound healing, including collagen deposition and proper immune function(Allen DB, 1997). Superoxide production, the primary leukocyte bacterial killing method in wounds, is proportional to the amount of oxygen present in the tissue. Tissue hypoxia is a risk factor for wound infection and dehiscence. In addition, tissue hypoxia is probably the primary reason that cigarette smoking is associated with increased risk of SSI. (Mangram AJ, 1999)

In theory, based on these observations, the use of supplemental oxygen therapy might be expected to reduce the risk of SSI by increasing oxygen pressure in surgical wound tissue. Several randomized controlled trials compared high inspired oxygen fraction (FiO₂ of 80 percent) to “standard care” (an FiO₂ of 30 percent) in surgical patients(Greif R, 2000).

Some studies demonstrated that patients who received FiO₂ of 80 percent had lower rates of SSI than patients who received FiO₂ of 30 percent(Greif R, 2000), one study demonstrated that patients who received a FiO₂ of 80 percent had higher rates of SSI (Pryor KO, 2004), and one study showed no difference between the two groups(Meyhoff CS, 2009). A meta-analysis of five trials concluded that the weight of available evidence favors the use of high inspired oxygen, in spite of insufficient control for antimicrobial prophylaxis and significant heterogeneity(Qadan M, 2009). It was calculated that the use of high inspired oxygen preoperatively led to a 25 percent relative risk reduction.

Subsequently, a randomized controlled trial of 1400 patients randomized to receive FiO₂ of 80 or 30 percent concluded that high inspired oxygen was not associated with lower rates of SSI(Meyhoff CS, 2009). In fact, rates of SSI were high in both groups (approximately 20 percent). There were also no differences in frequency of respiratory adverse events, such as atelectasis, pneumonia, respiratory failure, or other complications in the two treatment groups

Hyperglycemia and diabetes have been identified as risk factors for deep sternal site infection after CABG(Trick WE, 2000).These studies have suggested that a preoperative blood glucose level of 200 mg/dL or more or postoperative hyperglycemia (OR, 2.0) is associated with an increased risk of SSIs.

A historic cohort study of 1574 patients who had undergone coronary artery bypass grafting between 1998 and 1999 demonstrated that each 50 mg/dL (2.8 mmol/L) blood glucose increase may be associated with higher mortality. Each 50 mg/dL (2.8 mmol/L) blood glucose increase was associated with a longer postoperative hospital stay by 0.76 days and increased hospitalization cost by \$1769 (Estrada CA, 2003).

A prospective study of 2467 consecutive diabetic patients who underwent open heart surgical procedures between 1987 and 1997 demonstrated that continuous intravenous insulin infusion led to a significant reduction in perioperative blood glucose levels and incidence of deep sternal wound compared with subcutaneous insulin injections (0.8 versus 2.0 percent)(Furnary AP, 1999).

Further prospective controlled trials are needed to validate the benefits of intensive glucose control on the incidence of SSIs in the perioperative period.

The efficacy of antibiotic prophylaxis for reducing surgical SSI has been clearly established. Preoperative antibiotics are warranted if there is a high risk of infection or if there high risk of deleterious outcomes should infection develop at the surgical site (such in the setting of immune compromise, cardiac surgery, and/or implantation of a foreign device).

Patients who receive prophylactic antibiotics within one to two hours before the initial incision have lower rates of SSI than patients who receive antibiotics sooner or later than this window (Classen DC, 1992)Antimicrobial therapy administered in the setting of contaminated wounds is not considered prophylactic; in such cases a therapeutic course of antimicrobial therapy is warranted.

Errors in selection or dose of prophylactic antimicrobials are common. Among 34,133 patients undergoing surgery in centers around the United States, an antimicrobial was administered within one hour before incision to only 56 percent of patients, and antimicrobials were discontinued within 24 hours of surgery in only 41 percent of patients(Bratzler DW, 2005). Initiatives such as the Surgical Care Improvement Project have improved the rates of compliance since these earlier studies were performed(Dellinger EP, 2005)

Nasal carriage of *S. aureus* is a risk factor for SSI(Kluytmans JA, 1995). In regions with high MRSA prevalence, the efficacy of *S. aureus* decolonization is uncertain, and nares screening may miss as many as 20 percent of patients with *S. aureus* colonization(S. D. Anderson DJ, Kanafani

ZA, et al, 2007). Nasopharyngeal decontamination may be effective for reducing the risk of postoperative infection in some situations. Agents include mupirocin nasal ointment and chlorhexidine soap(Segers P, 2006).

For circumstances in which the presence of nasal *S. aureus* carriage can be accessed via rapid screening, decolonization with mupirocin nasal ointment and chlorhexidine soap may reduce the risk of hospital-associated *S. aureus* infection(Bode LG, 2010). This was illustrated in a trial of 6771 patients undergoing surgery with anticipated hospital stay ≥ 4 days who were screened on admission for *S. aureus* with a real-time polymerase-chain-reaction (PCR) assay; 1251 patients were positive for *S. aureus* and all strains were susceptible to methicillin and mupirocin(Bode LG, 2010). Of these, 918 patients were randomized to receive either placebo or decolonization with intranasal mupirocin twice a day for 5 days and daily baths with chlorhexidine soap. The intervention reduced the rate of *S. aureus* infection from 7.7 to 3.4 percent

In the accompanying editorial it was suggested that *S. aureus* decolonization with intranasal mupirocin and chlorhexidine baths may be appropriate for surgical patients known to be nasal carriers of *S. aureus* with a high risk of deleterious outcomes should *S. aureus* infection develop at the surgical site. This includes patients who are immunocompromised, undergoing cardiac surgery, and/or undergoing implantation of a foreign device. There is no role for routine decolonization.

Both high-level and low-level mupirocin resistance have been associated with decolonization failure. In a case control study of 150 patients, carriage of MRSA with low-level mupirocin and chlorhexidine resistance was independently associated with persistent carriage of MRSA after treatment (Lee AS, 2010).

An effective infection control program is an essential part of SSI prevention. The SENIC study reported that an effective infection prevention program reduced the rate of SSIs by 41 percent in low risk patients and by 35 percent in high risk patients(Haley RW, 1980).In addition, active surveillance and reporting of rates of SSIs to individual surgeons consistently resulted in a progressive decline in infection rates(Condon RE, 1983)

Thus, SSI rates should be presented to surgeons and the chief of staff at regular intervals. These rates should be reported as surgeon-specific, service-specific, and hospital-wide and categorized within discrete risk index scores. Precautions need to be taken to ensure the confidentiality of

these results. How such feedback brings about changes in surgeons' behavior is not known, but the benefits of its use are well supported.

With the increased popularity of same day and ambulatory surgical procedures, the ability to identify and monitor rates for all types of SSI has decreased. This was illustrated in a study of post discharge surveillance in 1324 patients undergoing CABG over a 27 month period; 88 SSIs were identified, only 28 percent of which would have been detected during the initial hospitalization (Avato JL, 2002).

Efforts to track these infections have included patient and surgeon questionnaires and nurse observation of the wounds at the patient's home or during a routine postoperative visit. One report identified SSIs from an automated pharmacy system combined with computerized patient data; this methodology detected 96 SSIs in 4086 operations (2.3 percent) for an overall sensitivity of 74 percent, specificity of 98 percent, and positive predictive value of 48 percent(Sands K, 1999). This performance was superior to patient or physician surveys.

A second study directly compared this type of surveillance with hospital-based surveillance in determining SSIs in patients who had undergone CABG(Sands KE, 2003). Health plan and automated pharmacy information detected more patients with SSI than hospital surveillance including pre-discharge infections. One or both methods identified 167 infected patients; the sensitivity of surveillance based upon health plan data was 72 percent compared with 50 percent for hospital surveillance.

A prospective cohort study from a tertiary hospital in Spain utilized telephone follow-up one month after surgery to successfully contact 98 percent of 1506 patients(Delgado-Rodríguez M, 2001). The investigators suggested that predictors of SSI were not the same for patients in the immediate postoperative period while still hospitalized and for those who developed infection following discharge. The only predictors of a post-discharge SSI were body mass index, age, and improperly timed prophylactic antibiotics.

The diagnosis of a superficial incisional SSI has a lower sensitivity than the diagnosis of a complex (i.e., non-superficial-incisional) SSI(Yokoe DS, 2004). Most superficial incisional SSIs are diagnosed after hospital discharge and rarely require re-hospitalization. In contrast, complex SSIs routinely result in re-hospitalization and additional surgery. In addition, no specific recommendations are available regarding the best method for post discharge

surveillance(Mangram AJ, 1999). In fact, a systematic review of methods for post discharge surveillance concluded that existing research has not identified a valid and reliable method(Petherick ES, 2006).

The likelihood that superficial incisional SSIs will be reported is highly dependent on the systems that hospitals use to perform surveillance. Thus, interhospital comparisons of rates of SSI are not likely to be meaningful to surgeons if the surveillance systems for these SSIs are not consistent. Hospitals that perform rigorous post discharge surveillance will inevitably find higher numbers of SSIs than hospitals that do not(Barnes S, 2006). For example, the rates of SSI in The Netherlands were much higher than the rates of SSI in Germany when all the SSIs were evaluated; this difference was minimal, however, when only complex SSIs were analyzed(Manniën J, 2007).

As a result of all of the above considerations, we recommended that surveillance for SSIs be limited to "complex" (i.e., non-superficial incisional) SSIs diagnosed in inpatient settings(C. L. Anderson DJ, Sexton DJ, Kaye KS et al, 2008). Our review of more than 180,000 surgical patients and 2257 SSIs demonstrated that the NHSN Risk Index could be used to risk-stratify "complex" SSIs(C. L. Anderson DJ, Sexton DJ, Kaye KS et al, 2008).

CHAPTER THREE

STUDY METHODOLOGY

3.0 General Introductions

The study was cross sectional, descriptive and quantitative and qualitative in nature. This study design was preferably selected because it involves a systematic collection of numerical information often under conditions of considerable control and the analysis of that information using statistical procedures and requires a low number of samples

3.1 Study Design

This study was conducted in Kampala International University Teaching Hospital located in Ishaka-Bushenyi municipality along Mbarara Kasese highway, the hospital consists of the following departments, pediatric, antenatal clinic, postnatal clinic family planning, young child clinic, Obstetrics and Gynecology (OBS & GYN) and surgical department among others. The surgical department also consists of surgical OPD, theatre, ENT, radiology and surgical ward.

3.4 Study Population

The study population consisted of health professionals and students (only senior Clarks) directly or indirectly involved in surgical wards and surgical OPD, theater and radiology.

3.4.1 Sample Size Determination

The sample size was determined by modified fisher's formula for a small finite population (less 5000) (Garaez, 2013), given by:

$$n = \frac{Nz^2pq}{E^2(N-1) + z^2pq}$$

Where:

N= Population Size (80 KIU-TH Medical Staff)

z = confidence interval

P= proportion of staff involved in child care (treating pneumonia) estimated at the standard i.e.
0.5

$$q= 1-p$$

E= degree of error = 0.05

So when substituted in the above formula

$$n = \frac{80 \times 1.96^2 \times 0.5 \times 0.5}{0.05^2(80 - 1) + 1.96^2 \times 0.5 \times 0.5}$$

$$n= 67$$

3.4.2 Sampling Procedure

All staff involved in surgical department and all units handling surgical cases were purposefully selected. The researcher was available at the units during break times to interview the various respondents that are meant to respond in this study.

3.4.3 Inclusion Criteria

For any respondent who was included in this study, he/she was at least a staff of any department handling surgical cases where issues of infection and SSIs are handles.

3.4.4 Exclusion Criteria

All the staff who were on leave at the time of data collections were excluded in the study.

All staff who declined to participate in the study were excluded from the study

3.6 Research Instruments

These comprised of questionnaires and observation guides.

- i. The researcher used the interviewer-administered questionnaires printed in English language in easy to read and understand format. This contained closed and open ended

questions and were administered personally by the researcher. This instrument yielded quantitative data.

- ii. The study also adopted the Center for disease control and prevention guidelines for infection control in hospital settings as observation guide for assessment of selected variables. This yielded qualitative data obtain through direct observation by the researcher.

3.7 Data Collection Procedures

The primary data was obtained from the firsthand information directly obtained from the various respondents. By way of observation, comments, and use of self-administered questionnaires that were distributed to respondents for filling.

3.7.1 Data Management

Data obtained were kept in safe custody and treated with respect, confidentiality, reorganized, and were sorted at the end of data collection process to ensure adequacy, competence, and correctness of information collected.

3.7.2 Data Analysis

Editing involved manual checking for errors and omission in the filled tools to ensure consistency, completeness, validity, relevancy and accuracy of data collected. The analyzed information was presented as frequency distribution tables, graphs, and pie charts.

3.8 Ethical Considerations

Permission to conduct the study was sought from KIU-TH director, after submitting an introductory letter from the faculty of clinical medicine and dentistry. The researcher then introduced herself to the in-charge and other staffs of the unit. The staffs were informed that the participation was voluntary and that any one has a choice to obtain withdraw from participation and each participant who were willing to be part of the study then signed a consent form.

3.8 Limitations of the study

The researcher faced the following limitations;-

The researcher faced the challenge of inadequate response especially on areas where the staff were not informed especially issues to do with policies and most of the times was referred to the senior surgeon and not all the staff are adequately informed about the rational of the procedure. Some respondents did not cooperate to give the information. This was solved by proper explanation of the purpose of the study and assuring them of privacy and confidentiality some respondents returned incompletely filled questionnaires. This was catered for in sample size determination to include of errors

CHAPTER FOUR

STUDY RESULT

The study recruited participants from Surgical Out Patient Department (SOPD), 15(22.4%). Surgical Ward 14(20.9%), Ear, Nose and Throat Departments ((CDC)), 13(19.4%), Theater 13(19.4%), Accident and Emergency (A and E), 12(17.9%). As shown in table one below.

Table 1: Departments Surveyed

		Frequency	Percent
Departments	SOPD	15	22.4
	Surgical Ward	14	20.9
	ENT	13	19.4
	Theater	13	19.4
	A and E	12	17.9
	Total	67	100.0

The study found out that most of the staff had not been trained in infection controls in surgical department as shown in figure one below, 12(23.08%) of the staff were trained, 40(76.92%) were not trained

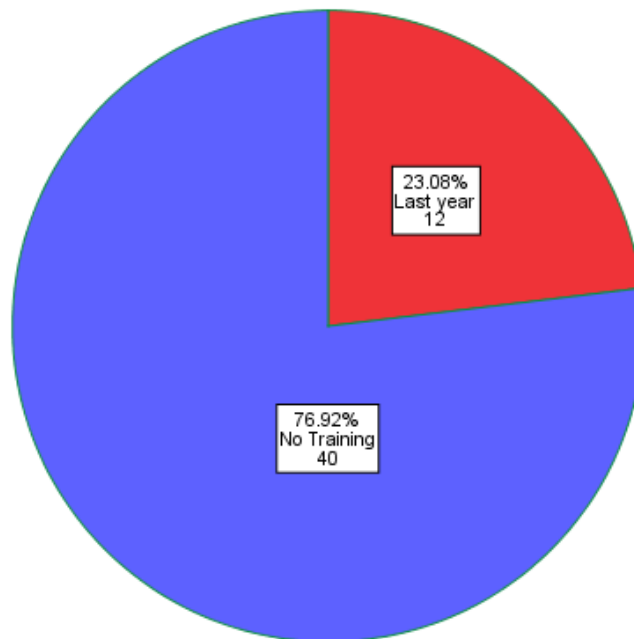


Figure 2: Last training given to Staff

CHAPTER FOUR

Most of the staff from theatre agreed that there was infection control committee in their departments, 11, followed by A and E department 7, SOPD, 5 and Surgical ward and ENT, 2 respondents from each departments respectively. As shown in table 2.

Table 2: Availability of Infection Control Committee

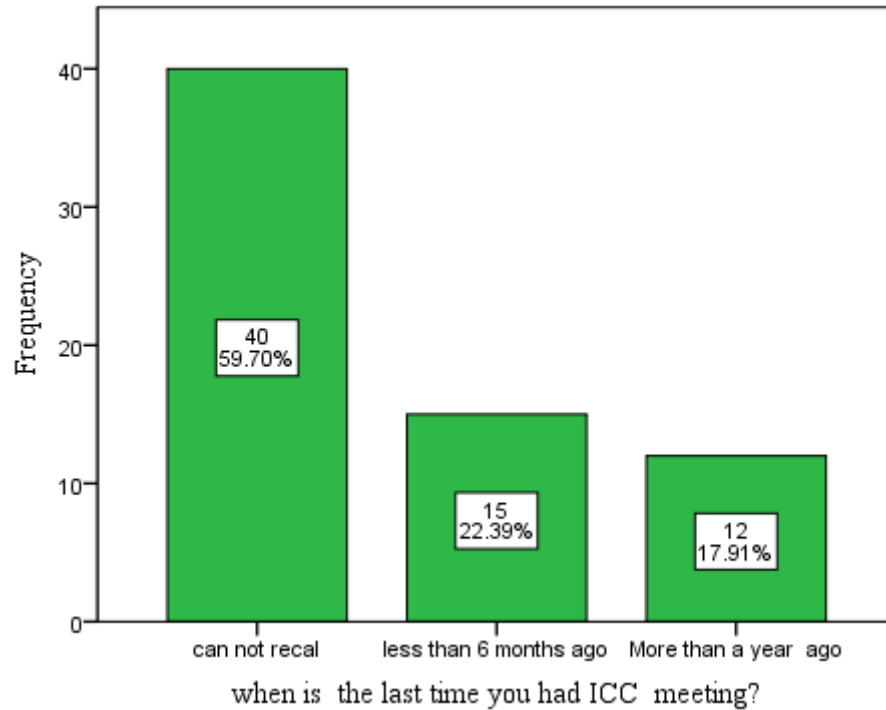
		Is there infection control committee in your department?		Total
		Yes	No	
Department of attachment	SOPD	5	9	14
	Surgical Ward	2	9	11
	ENT	2	6	8
	Theater	11	11	22
	A and E	7	5	12
Total		27	40	67

Table 3 showed that most of the departments reported availability of infection control policy, 11 staff from the surgical ward reported the availability of IC policy in their departments, 9 from ENT, 8 from theater, 7 from A and E and 5 staff from SOPD.

Table 3: Availability of Infection control Policy

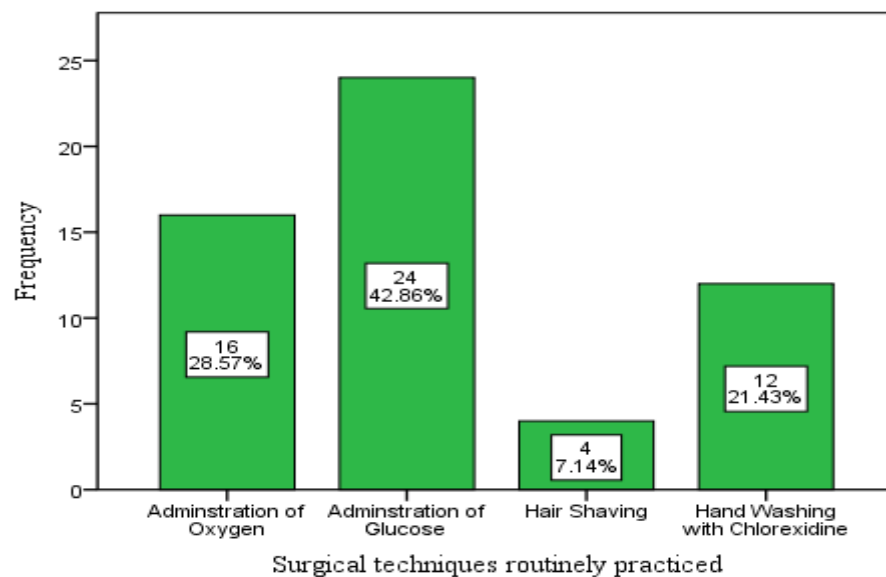
		Does your department have a copy of the IC policy?		Total
		No	Yes	
Department of attachment	SOPD	10	5	15
	Surgical Ward	3	11	14
	ENT	4	9	13
	Theater	5	8	13
	A and E	5	7	12
Total		27	40	67

Table4: Last Infection control committee meeting



In the figure below (figure 3), most of the respondents 24(42.86%) reported administration of glucose as a surgical infection control technique, 16(28.57%) reported administration of Oxygen and 12(21.43%) reported hand washing using 4% chlorhexidine and the least numbers reported shaving hair as an infection control procedure 4(7.14%)

Figure 3: Surgical techniques applied



CHAPTER FIVE

DISCUSSION

5.1 Discussions

This study showed most of the departments reported availability of infection control policy, 11 staff from the surgical ward reported the availability of IC policy in their departments, 9 from ENT, 8 from theater, 7 from A and E and 5 staff from SOPD.

This showed that there was little knowledge about the availability of infection control policy among staff as most of the staff could not tell whether their departments had infection control policies or not.

Another reason for this could be that most of the staff interviewed were new in the departments they were interviewed from as the hospital policy encourages rotating staff across departments frequently and it could also be due to the fact that the departments rarely organizes infection control meetings where staff do not know all that they are supposed to follow in infection controls.

The implications of such findings is that most of the staff may not practice the correct infection control practices recommended by the hospital and hence may prefer to take personal approaches in infection control that may lead to high rates of infections among staff or cross infection from staff to patients.

The infections controls commonly applied in the surgical departments included SSI control where staffs are regularly keen in avoiding infections according to the observations of the researcher. Other practices seems to be applied in discrete arrangement without policy implications, for example, the researcher showed quite a large number of staff change gloves between patients but could not wash their hands, the researcher believed that control like MRSA would not be prevented.

Admiration of oxygen, glucose and hand washings practices as routine surgical techniques were lacking in the department during the time of this study.

Oxygen is important for wound healing, including collagen deposition and proper immune function (Greif R, 2000). Superoxide production, the primary leukocyte bacterial killing method in wounds, is proportional to the amount of oxygen present in the tissue. Tissue hypoxia is a risk factor for wound infection and dehiscence. In addition, tissue hypoxia is probably the primary reason that cigarette smoking is associated with increased risk of SSI.

In theory, based on these observations, the use of supplemental oxygen therapy might be expected to reduce the risk of SSI by increasing oxygen pressure in surgical wound tissue. Several randomized controlled trials compared high inspired oxygen fraction (FiO₂ of 80 percent) to “standard care” (an FiO₂ of 30 percent) in surgical patients (Greif R, 2000)

Some studies demonstrated that patients who received FiO₂ of 80 percent had lower rates of SSI than patients who received FiO₂ of 30 percent (Qadan M, 2009), one study demonstrated that patients who received a FiO₂ of 80 percent had higher rates of SSI, and one study showed no difference between the two groups (Meyhoff CS, 2009). A meta-analysis of five trials concluded that the weight of available evidence favors the use of high inspired oxygen, in spite of insufficient control for antimicrobial prophylaxis and significant heterogeneity. It was calculated that the use of high inspired oxygen peri-operatively led to a 25 percent relative risk reduction (RR=0.74; 95% CI 0.60-0.92).

The majority of the staff 24 reported administration of glucose (58.26%). The staffs however were not specific whether glucose was being given for the prevention of surgical site infections or in the treatment of hypoglycemia or even in the management of drugs side effects.

The administration of glucose is recommended in many studies. Hyperglycemia and diabetes have been identified as risk factors for deep sternal site infection after CABG. This is not commonly studied in Uganda, this study did not discuss enough with the staff to identify infection control in special groups like the HIV positives and diabetic patients, and the scope was rather general.

Several other studies have suggested that a preoperative blood glucose level of 200 mg/dL or more (odds ratio [OR] 10.2) or postoperative hyperglycemia (OR, 2.0) is associated with an increased risk of SSIs. What was clear in this study was that glucose levels was not routinely recorded implying that preoperative glucose management is not routinely taken care of at KIUTH.

A historic cohort study of 1574 patients who had undergone coronary artery bypass grafting between 1998 and 1999 demonstrated that each 50 mg/dL (2.8 mmol/L) blood glucose increase may be associated with higher mortality (odds ratio 1.37; 95 percent CI, 0.98 to 1.92) and higher infection rate (odds ratio 1.23, 95 percent CI 0.94 to 1.60). Each 50 mg/dL (2.8 mmol/L) blood glucose increase was associated with a longer postoperative hospital stay by 0.76 days (95 percent CI, 0.36 to 1.17 days) and increased hospitalization cost by \$1769 (95 percent CI, \$928 to \$2610) in that specific group of patients studied.

There is general agreement that good surgical technique reduces the risk of SSIs. Such practices include gentle traction, effective hemostasis, removal of devitalized tissues, obliteration of dead space, irrigation of tissues with saline to avoid excessive drying, use of fine, non-absorbed monofilament suture material, judicious use of closed suction drains, and wound closure without tension. These practices were common and in practice within the surgical department. The precise role or proportional benefit of each of these techniques in SSI prevention has not been discussed with the ward staff during the course of this study, as they were quite specific in their own scopes.

This study found that 12(23.08%) of the staff were trained, 40(76.92%) were not trained, the study. The findings to a similar finding published by the WHO, which implied that most of the staff are not protected against nosocomial infections in principle. One similar study in Mulago showed that a survey done in the surgical ward found all the staffs were infected by MRSA. This study warranted hospitals to train and equip their staff in order to be protected (David P Kateete, 2011). However, several years after such a finding, research in this area still shows that there are lacking elements of trainings among most of the staff in different health facilities.

The WHO addendum of infection control 2012 revealed staff training protects the staff by upto 70% from acquired hospital infections from patients and minimized staff to patient transmission by up to 54%. Whether this is happening in KIUTH or not was not evaluated by the researcher as it was shown to be beyond the scope of this study. However, its important that another study of a wider scope look at that in details and explain the how and why staff training is not routinely conducted here at KIUTH.

The vaccination against staff at KIUTH was not being practice at KIUTH surgical ward. The researcher believes that this is dangerous for the staff, vaccinations against Hepatitis, yellow

fever and other viral infections are critical for staff protections, none of the staff who participated in this study reported having being vaccinated.

The CDC guidelines for hospital care infection control recommended at least seven different vaccinations for health staff including the fore mentioned. The Uganda ministry of health also recommended that staff should be vaccinated against yellow fever and hepatitis and yet this is critically lacking.

What this implies is that most of the staff may be infected. There is an urgent need to screen all the staff in this hospital against nosocomial infections as thus would help the staff to become conscious and prevent infections within themselves. There are currently very few studies from this I situation which has amplified the importance of this practice and the researcher sees that its urgent.

5.2 Conclusion

In the view of the above findings, this study concluded that infection control is not given the attention it deserves at surgical department of KIUTH. The infection control committee which manages the infection control activities seemed to be malfunctions, rendering the whole process ineffective. The staff protection mechanisms are inadequate and non-routine.

5.3 Recommendations

This study recommended that in order to improve infection control practices at KIUTH, the hospital should:

1. Institute infection control committees in all the departments and units, and appoint an infection control manager
2. The staff should be trained in the basic principles of infection control and how to avoid staff patient's infection transfers.
3. Staff should be vaccinated against the most infectious organisms routinely like Hepatitis and Yellow fever.
4. The hospital should design ward specific infection control techniques with the help of senior staff in order to avoid infections among patients

APPENDICES

Appendix I: Research Questionnaires

RESEARCH QUESTIONNAIRE SHEET

RESEARCH TOPIC: EVALUATION OF INFECTION CONTROL PRACTICES AT
KAMALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL SURGICAL
DEPARTMENT

SELF ADMINISTERED QUESTIONNAIRE.

Date Place of interview.....

Introduction

This questionnaire is developed as a data collection tool to be filled in by selected respondents. The data will be used for the research purpose for the partial fulfillment for the requirement leading to award of a Bachelor Degree of Medicine and Bachelor of Surgery of Kampala International University. You have been identified by the researcher as a resourceful person basing on your position and experience on the subject of study. The data collected will be treated with utmost confidentiality it deserves and will not be released to any anyone except for academic purposes

Department:

Qualification:

1. Medical Doctor
2. Clinical Officer
3. Nursing Officer
4. Others (specify).....

Have you got any of these vaccinations from KIUTH?

Hepatitis B	1. No	2. Yes
Influenza	1. No	2. Yes
Measles	1. No	2. Yes
Mumps	1. No	2. Yes
Rubella	1. No	2. Yes
Hepatitis A	1. No	2. Yes
Varicella Zoster	1. No	2. Yes
Meningococcal polysaccharide	1. No	2. Yes
Rabies Vaccines	1. No	2. Yes
Typhoid Vaccines	1. No	2. Yes

When was the last time you attended infection control trainings at this department?

.....

What was the topic covered in the training?

.....

Is there an infection control committee member in your department?

1. Yes
2. No

If yes, was he/she appointed in that position?

1. Elected
2. Appointed
3. Seconded
4. Others

When is the last time you have had an infection control committee meeting in this department?

.....
Which surgical techniques are being routinely practiced in the surgical department?

Does the department have a copy of the hospital infection control policy?

1. Yes
2. No

If yes, is it routinely being used?

1. Yes
2. No

Do you agree that surgical department is carrying out an effective infection control measures?

1. Strongly agree
2. Agree
3. I can't say
4. Disagree
5. Strongly disagree

Give reasons for your choice above

.....
How does the surgical department do surveillance for surgical infections among discharged patients?

.....
When the last time SSI surveillance was conducted by the department?

.....
At what time (before surgery) are pre- operative antibiotic prophylaxis given to surgical patients?

At what time (after surgery) is post- operative antibiotic prophylaxis discontinued from surgical patients?

.....

Which of these techniques are routinely practiced in surgical department?

1. Administration of oxygen post-operative
2. Administration of glucose to post-operative patients
3. Hair saving
4. Hair washing with 4% chlorhexidine(no saving done)

Appendix II: Work Schedule

Activity	Responsible person	September 2014	Week 1 and 2 of October 2014	Week 3 and 4 of October 2014
Report development ▪ Preparation of first draft ▪ Consultation with supervisor ▪ Preparation of second draft ▪ Consultation with supervisor ▪ Writing of final report	Researcher and Supervisor			
Field work/data collection ▪ Obtaining approval letter ▪ Data collection/interviews ▪ Data entry	Researcher,			
Writing of dissertation Report ▪ Data analysis ▪ Writing of report ▪ Submission of Report	Researcher and supervisor			

Appendix III: Research Budget

BUDGET			
S/N	ACTIVITY	AMOUNT	BRIEF DESCRIPTION
1	Services	200,000ugx	This amount will be required for transport for data collection and Photocopying and binding of research report (3 copies), flash disk and file folders.
2	Non-Reusable	43,000ugx	This will be used to purchase one realm of typing sheets, 2 realms of photocopying sheets, 5 pens, 2 pencils
3	Others	50,000ugx	Lunch for research team for 5 days during data collection and provision for depreciation
	TOTAL	293,000UGX	Five million three hundred and eighty-three thousand shillings.

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