College of Medicine and Health Sciences

School of Health Science

NEEDLE STICK INJURIES AMONG NURSES AND MIDWIVES WORKING IN INPATIENTS DEPARTMENT AT KIZIGURO DISTRICT HOSPITAL

A dissertation submitted in partial fulfillment of the requirements for award of

Master of Hospital and Healthcare Administration (MHA)

By

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DECLARATION

I, MFITUMUKIZA Edison, hereby declare that this capstone dissertation entitled *"**Needle Stick Injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital** "is* my original work and it has not been submitted anywhere for the award of any degree.

Signature…….. Date ……..

MTIFUMUKIZA EDISON

DEDICATION

This dissertation is dedicated to:

My parents

My wife

My relatives

ACKNOWLEDGEMENTS

At the end of this dissertation, I would like to express my sincere gratitude to the Almighty God, to whom I owe life, wisdom and good faith in all my endeavors.

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ABSTRACT

Background

Despite published guidelines and training programs, needle stick injuries remain an ongoing problem. The report on incidents at Kiziguro District Hospital showed that in 2015, 49 incidents which occurred, 11 were needle stick injuries. Therefore, the study aimed at assessment of needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital, Rwanda.

Methods

The pre and post interventional study was conducted to measure the rate of needle stick injuries among nurses and midwives. Refresher training on prevention of needle stick injuries was the main intervention implemented, Chi-square tests were used to compare pre and post intervention needle stick injuries, Data collected was computed using a software SPSS at a significance level of $P<0.05$.

Results

The needle stick injuries among nurses and midwives reduced from 21% in pre-intervention to 4.7% in post intervention ($P <0.020$). Refresher training has increased in post-intervention to the level of 90.7% ($P<0.031$); recapping change was68.9% ($P<0.000$) in pre intervention; the lack of awareness onpolicy and procedures was 100% in pre-intervention reduced to 6.9% in post-intervention with change of 93.1% ($P<0.008$) and non-utilization of safety boxes during procedures was 84.2% in pre-intervention reduced to 9.3% in post-intervention with the change of 72.9% ($P<0.025$).

Conclusion

Our findings demonstrated that refresher training of nurses and midwives on needle stick injuries is an effective way to prevent and reduce the incidence of these injuries at Kiziguro District Hospital. Putting in place guidelines and mechanisms to monitor these injuries would help other comparable hospitals improve the situation.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS : Acquired Immune Deficiency Syndrome

ART : Anti Retro virus Treatment

ARVs : Anti-Retro-Virus Treatment

EPINet : Exposure prevention Information Network

HBIG : Hepatitis B Immune Globulin

HBV : Hepatitis B Virus

HCV : Hepatitis C Virus

HCWs : Health Care Workers

HIV : Human Immunodeficiency Virus

NSIs : Needle Stick Injuries

NSSIs : Needle Stick-Sharp Injuries

OPD : Out-patients Department

PEP : Post-Exposure Prophylaxis

SPSS : Statistical Packages for Social Sciences

US : United States

WHO : World Health Organization

DEFINITION OF KEY TERMS

Needle: It generally refers to a thin, cylindrical object, often with a sharp point on the end. In medicine, acupuncture needles, hypodermic needles, paresthesia, surgical needles and tuohy needles are found[(1)].

Needle stick injury is harmful incident on personnel at the workplace[(2)].

Needle stick injuries: They refer to wounds caused by needles that accidentally puncture the skin. They are normally hazard by people who work with hypodermic syringes and other needle equipment. They can occur at any time when people use, disassemble, or dispose of needles [(3, 4).]

InpatientsDepartment: It refers to one of the hospital departments where inpatients are kept and treated[(3)].

Hospital: It refers to a health care institution providing patients treatment with specialized medical and nursing staff and medical equipment. Hospitals are dynamic places where a lot of processes are continuously going on non-stop at all levels of structure, processes, and outcomes[(4)].

CHAPTER ONE: INTRODUCTION

1.1 Background

Kiziguro District Hospital is one of the two hospitals in Gatsibo District. It was built in 1985 by the Catholic Diocese of Byumbaand Kiziguro Sector, Gatsibo District, in Eastern Province of Rwanda. It is governed upon an agreement between the government of Rwanda and the Catholic Diocese of Byumba.

The hospital covers 11 Health Centers and five health posts with a catchment area of 300,704 inhabitants. It has 94 beds. The hospital has different services including Surgery ward, Internal Medicine, Paediatric ward; Maternity ward; Out-patients Department (OPD), Dental Department, Mental Health Department, Emergency Ambulance Service, Laboratory and Anti-Retro-Virus Treatment(ARVs) Service.

Kiziguro District Hospital has 119 staff including8 Physicians, 52 Nurses/Midwives, 12 Allied health Professionals**,** 6 Staff Administrators and 41 Support personnel.It is nurses and midwives working in Inpatients Department has six services including Internal Medicine, Pediatrics, Surgery, Emergency and Neonatology[(5)].

Table 1.1: Summary of Kiziguro District Hospital Nurses and midwives in Inpatients Department

Occupation	**Number**
Nurses	24
Midwives	14
Total	**38**

Source: Kiziguro District Hospital Administration Manuel, 2016.

In the above mentioned department, the bed occupancy was calculated as follows:

$$\text{Occupancy rate} = \frac{4820 \text{ x } 100}{365 \text{ x } 94} = \frac{482{,}000}{34{,}310} = 141{,}99 \cong 142\%$$ (6)

The bed occupancy rate in Inpatients Department at Kiziguro District Hospital is 142%. In the same department, the average daily admission is 23 patients.

From 2012, Kiziguro District Hospital is among District Hospitals that are going through accreditation process. This process helps to access the quality of services, employee satisfaction and patients' satisfaction. Thus, the main responsibilities of the Health and Safety Committee and Quality Improvement Committee include (7):

- Ensure that all incidents and all sentinel events are regularly reported and analysed;
- Promote, encourage and maintain active interests of all hospital staff on safety and health management and reporting;
- Ensure the development of tools/checklist, in order to perform an assessment of occupational hazardous and other incidents;

- Prioritize the risks identified during the comprehensive hospital survey according to the magnitude of the safety hazard and develop facility improvement plan to reduce the risks identified.

1.2 Problem Statement

There is High rate of needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital remain a big problem.

Needle stick injuries is a harmful incident on personnel at the workplace(6). Needle stick injuries (NSIs) are the most common occupational hazard that a health care worker (HCW) is exposed to in the work place.

In a WHO study, 35.7 million health care workers in the world are exposed to the risk of NSIs, the annual global estimated proportion of health care workers exposed to these infections were 0.5% for HIV, 2.6% for HBV and 5.95% for HCV(7). Despite published guidelines and training programs, needle stick injuries remain an ongoing problem, the report on incidents at Kiziguro District Hospital showed that in 2015, 49 incidents which occurred and were grouped into 12 types (Blood Borne pathogen, Slip slips/trips/falls Hazard chemical, Medication error, Glutaraldehyde, Fire hazards, Radiation, hazarders, TB, Work place violence, needle stick/sharps injuries, Electric hit, and Equipment hazards). Among these incidents, 11 (22.4%) were needle stick injuries which presented the higher rate (***appendix1***).

The evidence from the Inpatients Department indicated that among 46 health care workers, 38 of them were nurses and midwives. The eleven (11) needle stick injuries registered in Kiziguro District Hospital, eight (8) of them which represented (72.7%) occurred to nurses and midwives in inpatient Department. Therefore, the rate of needle stick injuries among nurses and midwives

working in Inpatients Department equals to$\frac{8}{38}\ x100 = 21.05\%$. This indicates that nurses and midwives are at high risk than other health professionals in Inpatients Department [8, 10].

1.3 Objective of the study

To reduce needle stick injuries among nurses and midwives in Inpatient Department at Kiziguro District Hospital from 21% to 7% from September 2016 to February 2017.

1.4 Hypothesisof the dissertation

Training on needle stick injuries prevention will reduce the rate of needle stick injuries among nurses and midwives in Inpatients Department at Kiziguro District Hospital.

1.5 Justification of the Project

Needle stick injuries among nurses and midwives working in inpatient department area is a big problem in Kiziguro District Hospital. We chose this topic because in this hospital, there is one of the staffs who got injured when she was at her work, lost her job and became a blind. The hospital terminated the contract of the employee after she got injured. Therefore, she accused the institution in High Court for negligence of this incidence (needle stick injury) which happened to her and brought to her a serious injury. Thereafter, the institution paid a lot of money in this case but also it lost an employee. That is why I was interested to know further about this in Kiziguro District Hospital.

1.6 Organization of the dissertation

The dissertation is structured into six chapters. Chapter one is a general introduction discussing the background, the problem statement, objectives of the study, hypothesis, justification of the study and gives the organization of the dissertation.

Chapter two is the literature review: analyzing the previous scientific research and theories about the subject and successful strategies from other countries.

Chapter three is devoted to the research methodology including the root cause analysis, sample size, sampling technique, data collection, data analysis, and the consideration of ethics.

Chapter four presents the results of the study .Chapter five discusses the results and;

Chapter six consists of the conclusion, recommendation and suggestions to different stakeholders and decision makers at Kiziguro District Hospital.

CHAPTER TWO: LITERATURE REVIEW

In this chapter, the researcher explores the factors of needle stick injuries and the empirical review from different countries talking about the needle stick injuries.

Needle stick injuries is a problem that most workers in health care domain face worldwide, there are many risks that are associated with that case of needle stick injuries therefore in this part of research, the researcher presents the situation of needle stick injuries in different countries of the world, the predisposing factors and the prevention[2,12].

Needle stick injuries is defined as: "an introduction into the body of health care providers during the routine performance of their duties, of blood or other potentially hazardous material by a hollow bore needle or sharp instruments e.g. needles, lancets and contaminated broken[13,14] glass". According to Khushdil et al.(4)needle stick and sharp injuries were considered as the single greatest serious occupational hazards threatening healthcare workers(11).

Needle stick and sharp injuries are very common to happen among healthcare providers, and it puts them under the risk of obtaining blood-borne pathogens like HIV, Hepatitis B Virus (HBV), or Hepatitis C Virus (HCV), which are serious threats to their wellbeing or even to their lives. Epidemiological data on needle stick and sharp injuries, including factors associated with occupational transmission of blood-borne pathogens, are essential for targeting, implementing, and evaluating interventions at the local and national levels. More than 80% of needle stick injuries are avoidable with the use of correct precautions measures[6,16,17]. There are numerous serious pathogens that can be transmitted by needle stick and sharp injuries, according to(4) there are more than 30known dangerous blood-borne pathogens that can be transmitted to healthcare workers through the incidence of a needle stick injury(14).

Factors of needle stick injuries

There are some factors that increase the risk of needle stick injuries inside hospitals; factors like re-capping needles after use, ignoring the use of needle-disposing containers, job stress, lack of experience, and emotional distress[4]. The factors of needle stick injuries in this comprises the recapping, lack refresher training on needle stick injuries prevention, lack of awareness on policy and procedures regarding the needle stick injuries and non-utilization of safety box during procedures.

Recapping

Most of the needle stick injuries happen during recapping, opening of ampoule or vial, during procedure or during disposal of syringes([15]).

Removing a cap from the needle generally increase the risk of needle stick injuries, so attempts have been made to develop safe needles and needle removers. It was found that the “no-touch" protocols, which include avoiding contact with needles during their use and disposal, is very effective in reducing the rate of needle stick injuries (5). In the operation room and other surgical settings, the use of blunt-tip suture needles reduced the rate of needle stick injuries by about half (5).

Lack of refresher training

According to CCOHS (2005) needle stick injuries can be prevented through application of a comprehensive NSI prevention program that include employee training and addressing risk of injury, potential hazards, and procedures of reporting injuries. Azadi et al (2011) agreed also that persistent staff training is the best preventive strategy, while standardizing post exposure procedures is highly recommended([16]).

With limited time in their work schedules, it is difficult for healthcare workers to make time for training and learn safe procedures. Additionally, many health care workers think it will never happen to them; the consequence being that many of them may not change their routine use of those sharp objects. Due to the above attitude among health care workers, the OSHA blood borne Pathogen Standard requires that all employers undergo training on an Exposure Control Plan; enforcing this policy among high risk health care professionals could be a key in preventing these injuries([1,17]).

Lack of awareness on policy and procedures

According to EU Directive 2010, Sharp injuries prevention measures can best be implemented using the Hierarchy of controls and principles of prevention frameworks. These are mentioned in EU health and safety directives, and used widely by occupation- al hygiene and safety specialists across the world (International Labour Organization (ILO)/World Health Organization (WHO).

Below is the description of the, policies and procedures as adopted by EU Directive 2010.([1])

Elimination of hazards:

Complete removal of a hazard from the workplace is the most effective way to control hazards. This includes removing sharps and needles when possible or replacing traditional sharps and needle system with needleless intravenous system or needle free connectors([5]).

Engineering controls:

It focuses on maintaining safe work environment, either by isolating or removing a hazard from a workplace.

Under this control environmental factor like enough measures there should be adequate number of easily accessible sharp disposable lightening and adequate space to carry out procedures and use of safety engineered devices like retractable intravenous cannulas or syringes or scalpel blades, etc. ((18).

Administrative controls:

According to administrative controls, everyone should know their health and safety responsibilities, from employers to employees and it should be well coordinated and adequately resourced. Presence of sharp injury prevention committee and health and safety committee might play very important role in the occupational health of the health care workers. Sharp policies, infection control measures and safer working system are also in the focus((19).

Work practice controls:

This controls focus on behavior change strategies in order to reduce the exposure to needle stick or sharp injuries. Practices like no needle recapping, safety engineered sharps containers, and accessibility of them, proper disposal of sharps after use, timely management of sharp containers when three quarter full are the main focus of work practice control.

Personal protective equipment (PPE):

Personal protective equipment's like eye goggles, gloves, gowns, face masks, etc., though found to be least effective measures in the prevention of NSIs, and help to limit the exposure to blood splashes (EU Directive, 2010).

Lack of utilization of safety box

Nurses are the major victims to suffer from needle stick injuries. Injuries with the used sharp or needles are terribly distressing. The effective and evidence based preventive measures of NSIs can assure the occupational safety of nurses as well as other health care workers.

In addition, prevention of needle stick injuries not only assures occupational safety of the healthcare workers but also improves patient safety.

Hospitals can monitor NSIs by using appropriate surveillance methods, like for example EPINet; which is a software tool that was developed in 1992 by the International Healthcare Worker Safety Center at the University of Virginia[4]. EPINet is widely used in the United States and some other countries like Japan to monitor NSSIs for the purpose of developing strategies to minimize it.

Strategies are available to prevent infections due to sharps injuries, including education of HCWs and reduction of invasive procedures(20). Also, the use of safer devices can prevent injuries from sharp objects and reduce patients' risk of exposure to the blood of injured personnel(20).An implementation of the Safety-Loksheath able winged steel needle in a hospital in New York demonstrated that needle stick injuries declined from 13.41 to 6.41 per 100,000 devices ordered. A safety program at Toronto East General Hospital achieved an 80% reduction in injuries within 1 year(20), and a study at the University hospital of Tokyo demonstrated that cases of injury decreased from 19.8 to 5.5%(20).

Safety devices have been available in the United States since the late 1990s. In order to reduce the risk of staff acquiring a blood borne infection, the US Government released the "Needle stick Safety and Prevention Act" in November 2000 to ensure availability of safety devices to all staff by the employers(18).

Other areas in which safety devices should be used are in the emergency medical services or in the treatment of aggressive patients. Safety devices should be used for all procedures when infection relevant body fluids could be transmitted, e.g., blood withdrawal.

Nevertheless, the implementation of safety devices in Germany has failed until now because of the estimated high costs[22,23].

With regard to prevention, when exposures occur, the risk of infection can be significantly reduced by following protocols for PEP. Guidelines have been issued for the management of HCWs who have had occupational exposure to blood borne pathogens. This includes urgent evaluation of the source and exposed person's status along with the timely administration of hepatitis B immune globulin (HBIG), hepatitis B vaccine and/or HIV PEP where applicable. For HCV, testing should be performed to determine if infection develops[24,25].

Empirical review

WHO reports of 2016indicate that of the 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. It further notes that 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in Health-Care Workers around the world are due to needle stick injuries[4,11].

Khraisat and Juni in their projects on needlestick and sharp injuries among healthcare workers in hospitals had the objective of reducing the exposure to HIV and other sharps-related infections (hepatitis B and C) in health care workers associated with injections. These projects which commenced in August 2003 are being implemented by WHO(1), WHO Collaborating Centers and the International Council of Nurses, and are based on the Toolkit entitled "Behavior

Change Strategy to Achieve a Safe and Appropriate Use of Injections". The Toolkit provides technical and political guidance to health-care workers, administrators and politicians in order to promote injection safety[4].

In Germany, about 500,000 needle stick injuries occur annually among health care workers (HCWs). These include injuries from syringes, sewing needles, and other sharp objects[8,19]. Globally, more than 35 million HCWs face the risk of sustaining a percutaneous injury with a contaminated sharp object every year(15). Overall, the number of HCWs annually exposed to sharps injuries contaminated with hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), is estimated at 2.1 million, 926,000 and 327,000, respectively[6]. Although the risk of HIV infection is generally lower than the risk of infection by HBV or HCV, the occupational acquisition of HIV represents a serious consequence of needle stick injuries(20).

The study carried out by Khraisat, FirasShehadehJuni, Muhamad Hanafiah[4]Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia showed that lack of experience was among four variables found to be statistically significant risk factors of needle stick injuries: having 10 or more years of experience compared with less than 10 years (OR 3.37, 95% CI 1.82, 6.24fi.

The most common reasons for needle stick injuries are recapping and the unsafe collection and disposal of sharp wastes. Thus, it is of high importance to explore what has been done to understand and prevent this problem.

In Egypt, like many developing countries, few efforts have been undertaken to raise awareness about needle stick injury (NSI) among HCWs and hospital managers. Concrete knowledge on the transmission of blood borne diseases in health care facilities is very limited and unsafe practices are common. Additionally, there is a lack of regulations and policies to protect HCWs from exposure[26,20].

HCWs rarely receive training in infection control and standard precautions, even though these are low-cost solutions to reducing the risk of sharp injuries and have a high likelihood of being adopted[23,27].

CHAPTER THREE: METHODOLOGY

3.1 Study Design

This study used a pre and post-interventional study design to identify the causes of needle stick injuries among nurses and midwives working in Inpatient Departmentat Kiziguro District Hospital and implemented a solution. The pre-intervention period from March to August 2016involved collecting data in Inpatient Department on needle stick injuries. Based on the root cause, an intervention was designed and implemented. The implementation of the intervention wasfrom September 2016 up to February 2017. Thus, it continues to be part of the hospital daily routine. The post-intervention evaluation was conducted during March 2017.

3.2 Baseline Data Collection Procedure

In order to understand the magnitude of needle stick injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital, data was collected fromMarch to August 2016.

Tool

The retrospective survey from the incident reporting form (Appendix 2) and ART (Anti Retro virus Treatment) post expose register and the report of Health and Safety Committee were used to collect data on incidents occurred atKi ziguro District Hospital (Appendix 1). These tools helped to get the insights of needle stick injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital. Also, the questionnaire and observation were used to collect data from nurses and midwives on root causes of needle stick injuries in Inpatient Department at Kiziguro District Hospital.

Sample

Thirty eight (38) nurses and midwives working in Inpatient Department at Kiziguro District Hospital were included in the pre-intervention sample. The nurses and midwives were asked to checkeach day on needle stick injuries and procedures of managing needles. The observation incident reporting forms were available in Inpatient Department. Completed forms were collected by the investigator at the end of the duty.

3.3 Root Cause Analysis

The root cause analysis was first done through the literature review on the reasons health care works (HCWs) face needle stick injuries. The major reasons mentioned arelack of training on needle stick injuries prevention, recapping, unsafe collection and disposal of sharp wastes, ignorance of the use of safety box to needles disposing, lack of experience, overload, lack of policy and procedures on prevention of needle stick injuries. However, recapping and unsafe collection and disposal of needles were highlighted as the most common causes of needles stick injuries(19).

The problem of “Needle stick injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital” was discovered through the registration book of the daily activities and incidents reporting in Inpatient Department at Kiziguro District Hospital. Thereafter, the following process was done to get more insights of the problem of needle stick injuries: meeting with administration team, meeting with the committees (Ethical committee, Quality Improvement committee and Health and safety committee), and meeting with the Heads of departments in Inpatients department at Kiziguro District Hospital. Data was collected using the questionnaire and reports from Health and Safety Committee.

Data collected was analyzed and verified in August 2016 in order to identify the root causes of needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital.

The findings on root causes of needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital showed a big number of root causes which were summarized into four possible root causes. This process of summarizing the identified root causes was first based on the criterion of similarity among root causes following the four pillars on fishbone (people, environment, equipment and policy and procedures). Secondly, other identified root causes were not significant and applied in our study. The four summarized root causes maintained were recapping, lack of training on needles stick keeping, lack of awareness on policies and procedures and non-utilization of safety boxes when health professionals were carrying out their duties. The summary of root causes identified is presented in a fishbone diagram below (figure 1).

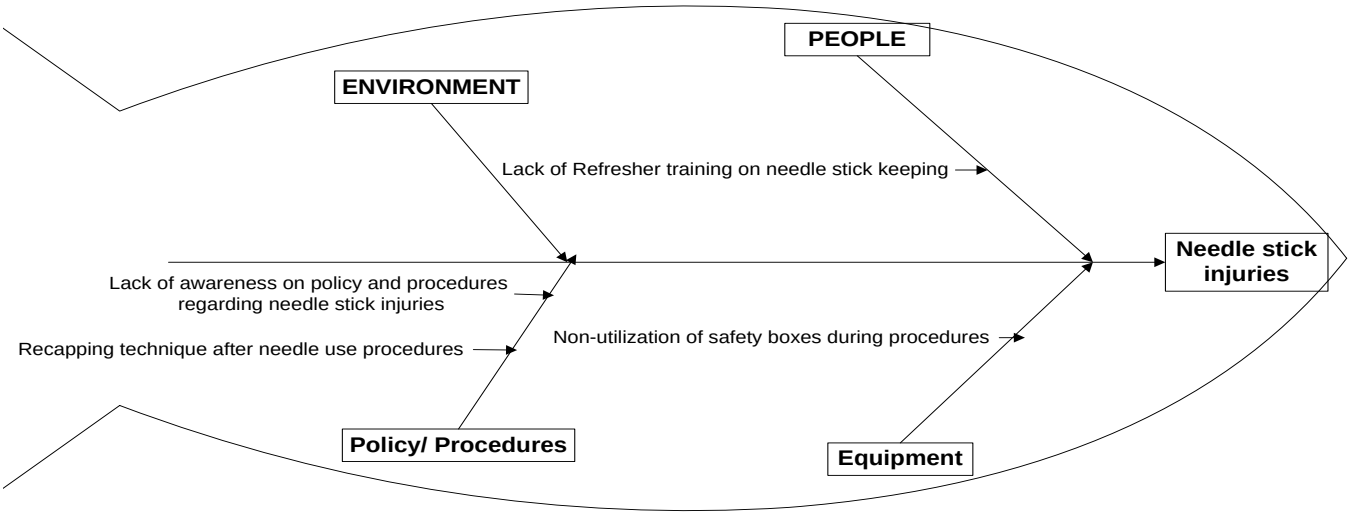

Figure1: Fishbone diagram summarizing the possible root causes

3.3.1Lack of refresher training on needle stick prevention

The researcher used the training records book to know if nurses and midwives in Inpatient Department at Kiziguro District Hospital have been trained on needle stick prevention. The researcher has discovered that, all 38 nurses and midwives in Inpatient Department at Kiziguro District Hospital did not receive any refresher training on needle stick keeping.

3.3.2Recapping needles after injection procedure

The investigator conducted a 1-month observation to see if nurses and midwives working in Inpatient Department in Kiziguro District Hospital recap the needles. The investigator found that among 38 nurses and midwives working in Inpatient Department at Kiziguro District Hospital, 34 equal 89.5% of nurses and midwives recapping the needles during injection procedures.

3.3.3Lack of awareness on policy and procedures on prevention of needle stick injuries

The investigator used two techniques which were questionnaire and observation on the availability of policy and procedures on prevention of needle stick injuries in inpatients department among nurses and midwives working in Inpatient Department at Kiziguro District Hospital. Data collected from all 38nurses and midwives indicated that practically there wasn't any policy and procedures of needle stick keeping in Kiziguro District Hospital while these policy and procedures are written in the books kept in this hospital.

3.3.4Non-utilization of safety boxes during procedures

The researcher used one technique which is the observation to test the use of safety boxes during injection procedures in Inpatient Department at Kiziguro District Hospital. The data collected indicated that 32 of 38nurses and midwives represented by 84.2%don't utilize the safety boxes during procedure.

Table 3.1: Summary of accepted root causes analysis

Root causes	Evidences from pre-intervention	Decision
Lack of refresher training	38(100%) declared not to benefitted from refresher training on needle stick prevention	Accepted
Recapping	34(89.5%)were observed recapping during procedures	Accepted
Lack of awareness on policy and procedures	38 (100%) nurses and midwives declared not to be aware policy and procedures of needle stick injuries prevention	Accepted
Non-utilization of safe boxes	32 (84.2%) of nurses and midwives declared not preparing safety boxes during injection procedures	Accepted

The root causes of this study was guided by four questions, which were lack of refresher training, recapping, lack of awareness and procedures as well as the non-utilization of safe boxes. At the end of study it has been revealed that among the root causes lack of refresher training has been identified as the most cause of needle stick injuries in inpatient department in Kiziguro District Hospital.

3.4 Intervention

Based on the root causes, researcher went in deep to shade more light on the incidents of needle stick injuries in Inpatients Department at Kiziguro District Hospital (Surgery, Internal Medicine, Pediatrics, Maternity, Emergency and Neonatology). The root causes were analyzed based on the report and the information from the staff of Kiziguro District Hospital to show exactly the real causes of needle stick injuries and how to overcome these causes through refresher training

on handling needles, utilization safety box, implementing policy and procedures and risk of recapping the needles. Seven people were used in scoring the alternative solutions.

These included six head of services in the following criteria were used: Impact, Time, Feasibility, and Cost. The comparative analysis is presented (appendix 6).

3.4.1Best solution

Table 3.2: Best solution

Alternative solutions	Impact	Time	Feasibility	Cost	Total ranking/20
Refresher training	4	4	4	4	16
Internal supervision	4	3	3	4	14

The best solution was "refresher training health professionals on needle stick injuries prevention". The above solution was chosen because it has a high ranking following the comparative criteria: Impact, Time, feasibility and Cost. The findings of comparative analysis showed that refresher training of health professionals on needle stick injuries prevention was ranked at 4 while internal supervision was ranked at 4. Therefore, refresher training on needle stick injuries prevention was selected as the best solution.

Refresher training has been selected as ideal response of the root causes of needle stick injuries because if the nurses and midwives were undergo training on recapping, policy and procedures and utilization of safe boxes there would not be cases of needle stick injuries on nurses and midwives working in Inpatient in Kiziguro District Hospital.

Refresher training on needle stick injuries prevention included four aspects: needle stick keeping, wastes and hazardous materials management and policy and procedures and the effect of needle stick injuries on the lives of health professionals. The implementation started officially in September 2016 as it is highlighted (Appendix4).

The refresher training of health professionals at Kiziguro District Hospital was organized in order to reduce the rate of needle stick injuries. The Training Manuel was developed in September, 2016.

It contains four main parts: needle stick keeping, wastes and hazardous materials management, and policy and procedures and the effect of needle stick injuries on the lives of health professionals. During intervention, the refresher training was organized three times consecutive in October 2016, December 2016 and February 2017.

3.5 Measurement

3.5.1 Process of intervention

During pre-intervention, the researcher explored the register and the report of Health and Safety Committee of 2015. It was found out that needle stick injuries were among the most registered in the incidents at Kiziguro District Hospital. Therefore, the refresher training of health professionals on needle stick injuries was organized. The trainings took place each Wednesday of the first week of the month. All health professionals (doctors, nurses, midwives and allied health professionals) of Kiziguro District Hospital participated in training sessions. Each training took an hour (60 minutes).

The trainer organized a PowerPoint presentation and explained to participants the relevant elements of the Manuel. After presentation, participants brainstormed on the topics and exchanged questions in relation the training topics. During the first refresher training of October 2016, 24 health professionals participated. The second refresher trained was attended by 21 health professionals and the third was attended by 22 health professionals. Thereafter in record of training book, 39 to 43 nurses and midwives are trained.

3.5.2 Outcome indicator

The percentage of needle stick injuries was measured by comparing the pre and post intervention. In the pre intervention, the needle stick injuries among nurses and midwives working in inpatients were 21% (Appendix 7)

3.5.3Process indicator

The refresher training aimed at increasing knowledge and skills on needle stick injuries prevention, and behaviors change in order to reduce risks associated to needle stick injuries. The refresher trainings would increase the knowledge of participants on the effect of recapping, the use of safety boxes during procedures and the effect of needle stick injuries. At the end of the refresher trainings, it was expected to reduce the rate of needle stick injuries and their effect among health professionals at Kiziguro District Hospital through the reduction of the rate of recapping, the increase of the rate utilization of safety boxes during procedures and in Inpatients Department at Kiziguro District Hospital.

Five measures (indicators) including one outcome and four process indicators were used in this study to evaluate the results of the intervention.

The first was the rate of needle stick injuries, the second was number of nurses and midwives trained on needle stick injuries , and the third was the rate of recapping during injection procedures, the fourth was the rate of awareness on use of policy and procedures and the fifth was the rate of non-utilization of safety boxes. (Appendix 7)

3.6 Data Analysis

Pre and post intervention data was entered in Excel for computing the rate needle stick injuries, the number of nurses 'training, the rate of recapping during injection procedures, the rate of non-awareness of policy and procedures and the rate of non-utilization of safety boxes. The change in each of the component was calculated for the pre and post intervention period using 2 independent sampleschi-square,P value set at 0.05. All statistics tests were conducted using SPSS (Version 20.0).

3.7 Ethical Considerations

The researcher got permission from the director of Kiziguro District Hospital to conduct the study. The data collection procedure did not interfere with the work process and the data collected did not include any patient information and would be kept confidential. The raw information collected during the study would not be revealed to anyone who was not involved in the study and would be only used for academic purpose.

CHAPTER FOUR: RESULTS

Among 38 nurses and midwives working in Inpatients Department at Kiziguro District Hospital, 8 (21.1%) were found injured by needle sticks in the pre-intervention while 2 (4.7%) among 43 nurses and midwives working in Inpatients Department at Kiziguro District Hospital got injured in post-intervention. The rate of needle stick injuries was significantly reduced from 21.1% up to 4.7%, with change of 16.4% and $P<0.02$.

All 38 (100%) nurses and midwives working in Inpatients Department at Kiziguro District Hospital declared not having refresher training on needle stick injuries prevention in pre-intervention. The rate of training has significantly increased in post-intervention to the level of 90.7%, with $P<0.031$.

Thirty four (34) represented 89.5% in pre-intervention recapped in pre-intervention. This was significantly reduced to 9 (20.9%) in post-intervention among 43 nurses and midwives, with change of 68.9% and $P<0.000$.

All 38 (100%) nurses and midwives working in Inpatients Department in Kiziguro District Hospital declared not to know policy and procedures of needle stick injuries prevention in pre-intervention while 3 (6.9%) among 43 declared the same in post-intervention. The rate of awareness of policy and procedures which was at the rate of 100% in pre-intervention was significantly reduced to the rate of 6.9% in post-intervention, with change of 93.1% and $P<0.008$.

Finally, 32 (84.2%) of nurses and midwives working in Inpatients Department in Kiziguro District Hospital were found not utilization of safety boxes during injection procedures in pre-intervention while 4 (9.3%) of 43 were found in post-intervention.

The rate of non-utilization on safety boxes during procedures which was 84.2% in pre-intervention was significantly reduced to 9.3% in post-intervention, with the change of 72.9% and P<0.025. The above findings are presented in table 4.1 below.

Table 4.1: Results

Variables		**Pre-intervention N (38)**	**Post-intervention N (43)**	**Change**	**P-Value**
Needle stick injuries occurrence	Yes	8 (21.1%)	2 (4.7%)	16.4%	<0.02
Participation in refresher trainings on needle stick injuries prevention	Yes	0 (0%)	39 (90.7%)	90.7%	
Recapping after injection	Yes	34 (89.5%)	9 (20.9%)	68.9%	
Lack awareness of policy and procedures	Yes	38 (100%)	3 (6.9%)	93.1%	
Utilization of safety boxes	Yes	6 (15.8%)	39 (90.7%)	74.9%	

* Significant at P<=0.05

CHAPTER FIVE: DISCUSSION

The study aimed at reducing needle stick injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital. Pre and post interventional design was used in the study. Thirty eight (38) nurses and midwives working in Inpatients Department at Kiziguro District Hospital were used in pre-intervention and 43 were used in post-intervention.

The pre-intervention results revealed the possible root causes of needle stick injuries among nurses and midwives working in Inpatients Department in Kiziguro District Hospital. They showed that a hundred per cent (100%) of nurses and midwives working in Inpatients Department in Kiziguro District Hospital declared not to have been trained on needle stick keeping. In the line of the study findings, a study carried out in Ethiopia showed that lack of training was among the possible reasons for the wide spread of presence of exposure to blood and body fluid[21,29].

The results showed that 34 (89.5%) of nurses and midwives working in Inpatients Department in Kiziguro District Hospital in pre-intervention recapped. Various studies noted that the commonest clinical activities that cause needle stick injuries were recapping used needles. Needle stick injuries were mainly associated with recapping of used needles. Recapping used needles was considered to be the single most common cause for needle stick injuries and can account for 25% to 30% of all needle stick injuries among nurses and laboratory staff[8,29].

The pre-intervention results showed that 38 (100%) of nurses and midwives who responded to the research questionnaire recognized the non-availability of policy and procedures during procedures at Kiziguro District Hospital. Thus, a study conducted in Unites states concluded that agencies with safe sharp using procedures did not have significantly rates of lower needle stick injuries compared to agencies without these procedures(17).

The pre-intervention results showed that among the 38 nurses and midwives working in Inpatients Department in Kiziguro District Hospital 32 (84.2%) declared that they do not prepare safety boxes during procedures. However, a study conducted by CDC in 1997 which revealed that 76% reduction in PI was associated with the use of safety device ($p < 0.003$)[(1)].

The intervention on needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital focused on training of health professionals working at Kiziguro District Hospital and was implemented from September 2016 to February 2017. It was significantly successful through the increase of knowledge on needle stick prevention and skills on preparation of safety boxes during procedures.

Also, the knowledge of policy and procedures on needle stick injuries prevention was increased. The study objective which was to reduce needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital from 21% to 7% was achieved as the intervention reduced needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital to 4.7%.

In order to meet the success of this intervention, many factors came in. These are among others the involvement of all stakeholders in injection procedures in Inpatient Department at Kiziguro District Hospital which are nurses and midwives and the managerial team of the Hospital. In addition, the Director of the Hospital, the Administrator and other member of the management helped the researcher to succeed the intervention and made a good routine of welcoming the intervention in every time requested in health professionals meeting which made the intervention possible and successful.

The process of root cause analysis also contributed a lot to the success of the intervention. Costly and complicated measures were systematically eliminated with the help of a systematic comparative analysis of root causes. The training which was less costly and easy to be implemented helped the project to meet its target.

Joint-decision making was also important in the process of intervention. During the intervention, participatory approach was privileged. After a short presentation of guidelines on needle stick injuries prevention, policies and procedures on wastes and sharps management, an open discussion help all staff to feel responsible to contribute to the elimination of needle stick injuries among nurses and midwives working in Inpatient Department at Kiziguro District Hospital.

The project was not ended without limitations. The study was conducted after a crisis of an employee who accused the hospital in court and the hospital paid a significant amount of money. Therefore, missing data was with high probability especially on the disclosure of needle stick injuries. Staffs feared to be the source of information. Also, the post-intervention period was not enough to exhaust all data on needle stick injuries prevention. In addition, the study was done only in one department of Kiziguro District Hospital, Inpatient Department. Hence, many errors would be made and many injured people would not be known.

Finally, due to the study design, other factors that could have influenced the study results. A quasi experimental study design would be more appropriate but it was not possible due to different constraints. Therefore, we cannot say that the results of this study are exclusively attributable /imputable to intervention. Therefore, further studies are needed to complete the study findings.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study findings showed that the refresher training strategy was able to reduce needle stick injuries among nurses and midwives' working in inpatient department at Kiziguro District Hospital at low cost and easy to be continued.

The project significantly reduced the rate of needle stick injuries among nurses and midwives working in Inpatients Department at Kiziguro District Hospital by providing knowledge and skills to prevent needle stick injuries through training sessions.

The implementation was easier and less cost as it was conducted in the hospital and was organized the time of health professionals' meeting. Therefore, health professionals of comparable hospitals in Rwanda may reduce risks of needle stick injuries by following the protocol of this project.

5.2 Recommendations

The Kiziguro District Hospital should put in place a protocol of incidents prevention at work for health professionals Kiziguro District Hospital should organize regularly refresher trainings of its staffs on needle stick prevention and put in place mechanisms of continuous monitoring on the needle stick injuries incidents.

Health professionals should quickly report the incident to the management of the hospital in order to facilitate their assistance and the follow-up.

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APPENDICES

Appendix 1: Magnitude of the Problem

At the beginning of Jan 2015, the Health and Safety Committee assessed 49 incidents reporting forms from 129 employees in various departments at Kiziguro Hospital. The data are displayed in the table below:

Service **Categories**	**Emergency**	**Maternity**	**Minor Surgery**	**Neo**	**Pediatric**	**Theatre/surgery word**	**ARV**	**Landry**	**Laboratory**	**Maintenance**	**Phar**	**Total**	**%**
Blood Borne pathogen	1	1	1	1	1	1	0	2	1	0	0	9	18.4
Slip slips/trips/falls	1	3	1	0	1	0	0	2	0	2	0	10	20.4
Hazard chemical	0	0	1	0	0	0	0	0	1	0	0	2	4.1
Medication error	0	0	0	0	1	0	0	0	0	0	3	4	8.2
Glutaraldehydes	0	0	0	0	0	1	0	0	0	0	1	2	4.1
Equipment hazards	1	1	2	0	0	1	0	0	0	1	0	6	12.2
Radiation hazarders	0	0	0	0	0	0	0	0	0	0	0	0	0.0
TB	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Work place violence	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Needle stick/sharps injuries	1	2	2	0	1	2	0	2	1	0	0	11	22.4
Electric	0	1	0	1	0	1	0	0	0	1	0	4	8.2
Fire hazards.	0	0	0	0	0	0	0	0	0	1	0	1	2.0
Total	**4**	**8**	**7**	**2**	**4**	**6**	**0**	**6**	**3**	**5**	**4**	**49**	**100.0**

Appendix 2:Incident report form

REPUBLIC OF RWANDA

KIZIGURO DISTRICT HOSPITAL

KIZIGURO DISTRICT HOSPITAL INCIDENT REPORT FORM N°……..

◇ • Inpatient ◇ Outpatient ◇ ;Client/ ◇ staff Equipment/Property

Name of Witness _____(Internalt/ExternalClient)

Position _____Department _____Ward_____

Patient's Admission Diagnosis:_____

Medication Incident _____Non medication incident_____

Department where incident occurred (If different from reporting department)_____

Description of what happened. Also document in medical file. *Objective information only*

_____

_____

_____

_____

_____

_____

Immediate actions and outcome:

_____

_____

Contributing Factors (Consider system, staff, patient and client issues – did any of these contribute to the incident. What occurred before the incident?)

Prevention Ideas of how this could have been prevented

Next of kin / guardian notified / patient?	Yes/No	N/A
Medical staff notified?	Yes/No	N/A
Has the incident been documented in the medical record?	Yes/No	N/A

I hereby certify that the above information is true and accurate.

Signature, Name and Position of person completing the form

Received by (Name and Position)

_____Date_____

Appendix 3:Tools for data collection

a) Questions

1. Have you ever been trained on prevention of needle stick injuries?
   a) Yes ☐
   b) No ☐
2. Have you ever seen policy and procedures on needle stick injuries prevention at Kiziguro District Hospital?
   a) Yes ☐
   b) No ☐
3. Do you always prepare safety boxes during injection procedures?
   a) Yes ☐
   b) No ☐

4) **OBSERVATION CHECKLIST**

Tick YES or NO

Item	**Yes**	**No**
Recapping during injection procedures		
Preparation of safety box in injection procedures		
Availability of policy and procedures in wards		

Appendix 4: Implementation plan

Action/Task	**Responsible**	**Time frame**						
		Sept. 2016	Oct. 2016	Nov. 2016	Dec. 2016	Jan. 2017	Feb. 2017	March 2017
Identify staff to be trained	Edison, Q.I focal Person	XXX						
Preparation of Training Manuel	Edison, Health and safety	XXX						
Scheduling of Training	Investigator	XXX						
1st Training on needle stick injuries prevention	Investigator		XXX					
Follow-up	Investigator			XXX				
2nd Training on needle stick injuries prevention	Investigator				X XX			
Follow-up	Investigator					XXX		
3rd Training on needle stick injuries prevention	Investigator						X XX	
Evaluating of the intervention	Investigator							XXX

Appendix 5: Disposal of sharps and needles policy and procedures

<table>
<tr><td rowspan="4">REPUBLIC OF RWANDA

 

EASTERN PROVINCE

GATSIBO DISTRICT

KIZIGURO DISTRICT HOSPITAL

Email:hopitalkiziguro@yahoo.fr</td><td colspan="3">Title: Disposal of sharps and needles policy and procedures</td></tr>
<tr><td>Policy code/ Number:

KZ/IPC/026</td><td>Effective Date:

December 2016</td><td>Revision Date:

December 2018</td></tr>
<tr><td>Department: all clinical department</td><td colspan="2">Applies To: All clinical departments</td></tr>
<tr><td>Responsible Person: EHO</td><td>Prepared by IPC Committee

Approval

Hospital Director</td><td>Signatures/dates:</td></tr>
</table>

A. Purpose

To avoid any occurrence of injuries and infection transmission by sharps.

B. Policy statement

Kiziguro district hospital shall ensure that staff consider precautions when handling sharps to prevent injuries and infection transmission during procedures of use, cleaning and dispose off

C. Definitions

Sharps

Sharps are items that could cause cuts or puncture wounds, including needles, hypodermic needles, scalpels and other blades, knives, infusion sets, saws, broken glass and pipettes.

Whether or not they are infected, such items are usually considered highly hazardous health-care waste.

Needle: As lender, pointed,steelinstrumentused in sewing or piercing tissues,asin suturing.

D. Equipment

1. Handling sharps guidelines

E. Procedures

1. Kiziguro District hospital administration provides training and guidelines and facilities for handling sharps
2. All Kiziguro district hospital staff complieswith guidelines of sharps handling.
3. All sharp objects are to be kept separated from general waste and general waste receptacles.

APPENDIX KZ/IPC/026/01: HANDLING SHARPS GUIDELINES

1. Take a sharps bin with you when completing a procedure requiring the use of disposable sharps.
2. Carry a used sharps container by the handle.
3. Do not bend, break, recap or otherwise manipulate used needles by hand.
4. Do not separate used syringes and needles before discarding.
5. Discard sharps into the container at the point of use.
6. Ensure that all sharps are completely in the container.
7. Lock down the lid when a sharps container is ¾ full,
8. Date the container and place it in a pre-designated area for removal.
9. Ensure the sharps containers are removed within the prescribed time frame.
10. Handling non-disposable sharps
11. Pick up only one sharp instrument at a time.
12. Position the sharp end of instruments away from oneself and others.
13. Never pass sharps from person to person by hand.
14. Place the sharp in a receptacle or ‘clear field’.
15. Seek help when using sharps with a confused or agitated patient/child.
16. Use the single hand “scoop” method, if re-capping cannot be avoided.
17. Be responsible for the correct disposal of any sharps they personally generate.

18. Disposal of all needles, lancets, glass pipettes, disposable scalpels, scalpel blades, and other

19. Sharp objects in the correct manner.

20. Not recap needles.

21. Not place their hands in any sharps containers

Appendix 6: Comparative analysis

The comparative analysis was carried out to select the best solution of needle stick injuries in Inpatients Department at Kiziguro District Hospital.The comparative analysis was done using scores of the alternative solutions from six head of services in Inpatients Department (Surgery, Internal Medicine, Pediatrics, Maternity, Emergency and Neonatology) and the Environmental Health Officer who totaled 7 people. The following were the alternative solutions:

1. Refresher Training staff on needle stick injuries prevention
2. Internal supervision

The following criteria were used: Impact, Time, Feasibility and Cost. The ranking was done using 5 to 1; 5= more significant while 1 = to less significant.

COMPARATIVE ANALYSIS

Alternative solutions	**Impact**	**Time**	**Feasibility**	**Cost**	**Total ranking/20**
Training	4.3	4.5	4.6	2.7	16.1
Internal supervision	3.1	3.7	3.1	4.1	14

JUSTIFICATION OF THE SCORE

The best solution was “refresher training health professionals on needle stick injuries prevention”. The above solution was chosen because it has a high ranking following the comparative criteria: Impact, Time, feasibility and Cost.

The findings of comparative analysis showed that refresher training of health professionals on needle stick injuries prevention was ranked at 4.025 while internal supervision was ranked at 3.5. Therefore, refresher training on needle stick injuries prevention was selected as the best solution.

The intervention focused on refresher training health professionals on needle stick injuries prevention and included four aspects: needle stick keeping, wastes and hazardous materials management and policy and procedures and the effect of needle stick injuries on the lives of health professionals. The implementation started officially in September 2016 as it is highlighted in appendix 4

Appendix 7: Monitoring and Evaluation

OUT COME INDICATOR:

INDICATOR	**DEFINITION**	**PERSON RESP/WHO**	**WHERE TO GET INFO**	**WHEN**	**Achievement status**
% of Needle stick injuries	# of staff who had needle stick injuries compared to # of staff in Inpatients Department	EDISON	Checking in register recording the incidents	Monthly starting from 1month after the training.	4.6%

PROCESS INDICATORS

INDICATOR	DEFINITION	PERSON RESP/WHO	WHERE TO GET INFO	WHEN	Achievement
# of staff trained	# of staff trained compared to # of staff in Inpatients department	Researcher	Checking the 45attendance lists	At the end of the training sessions	39/43=90.7%
Awareness on use of policy and procedures to prevent needle stick injuries	Investigation departments/ wards with no policy and procedures	Researcher	Departments / Wards	At the end of the training sessions	3 (6.9%)
# of nurses or midwives with non-utilization of safety boxes	# non-preparation of safety boxes during procedures	Researcher	Departments / Wards	During implementation	4 (9.3%)
% of recapping after injection	The percentage of nurse and midwives recapping after injection	Researcher	Observation study	WHEN Monthly starting from 1month after the training.	20.9%

Appendix 8: Authorization for Conducting an Operation Research

REPUBLIC OF RWANDA Date17/2/2016

EASTEN PROVENCE

GATSIBO DISTRICT

KIZIGURO DISTRICT HOSPITAL

Hopitalkiziguro@yahoo.fr

To: Mr. MFITUMUKIZA Edison

Dear Sir,

Re: Authorization for conducting an Operation Research

Following your application letter, for carrying out a quality improvement project on NEEDLE STICK INJURIES IN HOSPITALIZATION DEPARTEMENT AT KIZIGURO DISTRICT HOSPITAL

I am pleased to inform that you are authorized to undertake the operation research in Kiziguro District hospital for a period from march 2016 to march 2017

At the completion of your project, we are expected that your intervention will improve the quality care in reducing needle stick injuries in Kiziguro district Hospital

Dr TWAGIRAMUNGU MUKAMA Diocles

Medical Director of kiziguro Hospital

Cc:

-Administrator of Kiziguro Hospital

-Clinical Director

-Research Committee

-Ethical committee