



College of Medicine and Health Sciences

School of Health Science

**IMPLEMENTATION OF WHO SURGICAL SAFETY CHECKLIST IN OPERATING
THEATRE OF MASAKA DISTRICT HOSPITAL**

A dissertation submitted in partial fulfillment of the requirements for Master of Hospital and
Healthcare Administration (MHA)

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DECLARATION

I hereby declare that this capstone project entitled “**Implementation of WHO Surgical Safety Checklist in operating theatre of Masaka District hospital**” is my own work .It has not been submitted for any degree or examination at any other learning institution. All sections of the paper that uses quotes or describes an argument or concept developed by another author have been referenced, including all secondary literature used, to show that this material has been adopted to support my thesis. I further certify that the research paper has not published or submitted for publication anywhere else.

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BISANUKURI Evergiste

Date

DEDICATION

I dedicate my dissertation work to my family and friends. A special feeling of gratitude to my loving wife UWIMBABAZI Claudine whose words of encouragement and push for tenacity ring in my ears.

I also dedicate this dissertation to my children Gereon and Elfride for their perseverance in time period of the MHA program.

I dedicate this work and give special thanks to the staff of operating theatre (OT) and quality improvement team in Masaka District hospital for their strong contribution in dissertation process.

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ABSTRACT

Background

Surgical care is an essential component in health care worldwide, 75% of all surgeries are the major surgeries, and it is estimates 234 million major surgeries each year corresponding to 1 operation for every 25 alive people. WHO estimates that 500.000 deaths per year could be prevented through worldwide implementation of the surgical safety checklist (SSC).

Methods

A pre and post intervention design was used in the current dissertation, the data on magnitude of the problem served as the baseline data, the root cause analysis were conducted in conjunction with the concerned staff, after getting the main causes; the alternative solutions were identified and interventions were selected after comparative analysis of identified alternative solutions.

Results

During the 4 months of selected intervention, December/2016 up to March /2017, the utilization of SSC was significantly increased from 0% in pre-intervention to 74% after intervention with a p.value <0.000., the Sign in and Time out were completed at 100% with a value <0.001 but the Sign out part was completed at a rate of 92% with a p-value of <0.001, the staff training on WHO SSC use increased the knowledge from an average score of 51% pre intervention up to 83% post intervention..

Conclusion

Increase of knowledge through education and training and put in place the policy and procedures were the key strategies to implement the WHO SSC in Masaka District hospital, The implementation of WHO SSC improved team communication ,reduced the health care cost ,reduced peri operative mortality rate.

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LIST OF ACRONYMS AND ABBREVIATIONS

CHUK	Centre Universitaire de Kigali
CV	Curriculum vitae
HMIS	Health management information System
HIV	Human Immune Virus
HRM	Human resource Manager
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
MHA	Master in Hospital and health care administration
MS EXCEL	Microsoft Excel
OR	Operating room
OT	Operating theatre
P&p	Policy and procedure
QI	Quality improvement
RCA	Root Cause Analysis
SBAR	Situation Background Assessment Recommendation
SPSS	Statistical Package for the Social Sciences
SSC	Surgical safety checklist Surgical Site Infections
SSI	
TB	Tuberculosis
WHO	World health organization

DEFINITION OF KEY TERM

Who surgical safety checklist(SSC) is a tool developed by the world health organization (who) which helps to reduce surgical related morbidity and sentinel events by performing a simple exercise as confirming the patient's identity, surgical site, procedure, consent ,allergies ,airway/aspiration risk ,risk of blood loss ,sponge counts ,etc

Operating theatre A room, or suite of rooms, designed for the safe performance of surgical operations

Major surgery Any surgery within or upon the contents of the abdominal, pelvic, cranial or thoracic cavities; or which, given the locality, condition of patient, level of difficulty or length of time to perform, constitutes a hazard to life or function of an organ or tissue.

Major surgery usually requires general anesthesia, a period of hospitalization of varying length (often a week) and may be performed by a general board-certified-surgeon in a secondary care hospital, or by a surgical subspecialist in a tertiary care hospital.

Implementation The process of putting a decision or plan into effect; execution.

CHAPTER ONE: INTRODUCTION

1.1 Background

Surgical care is an essential component in health care worldwide ,as the traumatic injuries ,cancer and cardiovascular disease increases ,there is also increase of the impact in surgical interventions on public health ,75% of all surgeries are the major surgeries, it is estimates 234 million major surgeries each year corresponding to 1 operation for every 25 alive people⁽¹⁾ WHO estimates that 500.000 deaths per year could be prevented through worldwide implementation of the Surgical safety checklist(SSC) ⁽²⁾.

The project on the implementation of the WHO SSC was conducted in Masaka District hospital which is a newly founded public district hospital based in Kicukiro, Kigali City, it was established in 2011 by the government of Rwanda in partnership with the Chinese government. It is located in Masaka sector, Kicukiro District. The hospital has a capacity of 140 beds with a catchment area of 318,564 population ⁽³⁾. Receiving referrals from 10 health centers of its catchment area and other nearby health centers from Gasabo and Rwamagana District.

The current study focused on Masaka District hospital operating theatre(OT) department as study setting , located in the center of the hospital, made by a preparation room used for patient pre-operative preparation and materials, two staff changing rooms reserved for changing the ordinary clothes to the surgical don, a store room for storing the medical materials and consumables to be used during the surgical procedures, a washing room for staff used for the hand washing before and after surgical procedure and two operating rooms where surgical procedure are performed.

The operating theatre was selected as study setting as it is the critical area where patients can experience the serious complications or lose their life in short period if the patients' safety measures are not met.

As requested by Rwanda hospital essential accreditation standard, at each major surgery the Surgical Safety Checklist (SSC) should be used before, during and after surgical procedure for preventing all complications or errors related to surgery, the surgical team include nurses/midwives, anesthetists and the surgeon are responsible to use and complete the SSC by checking if each element of the checklist meets the requirement.

Table 1. Masaka District hospital Staff, year 2016

Staff categories	Number
Top managers	5
Administrative staff	11
Doctors	14
Nurses	75
Midwives	25
Allied health professionals	24
Support staff	42
Total	196

Masaka District hospital provides outpatient, surgical, Pediatric, Maternity, neonatal, and adult services. The support services include Laboratory, radiology, HIV/Aids services, pharmacy, dentistry, ophthalmology, physiotherapy, family planning and traditional Chinese medicine.

In 2016, the hospital had a total annual 10336 inpatient admission with an average 82 bed occupancy rate, an average 6-day length of stay and a totality of 42323 outpatients, at daily average of 117 outpatients.

Top five causes of mortality in Masaka hospital, year 2016 Asphyxia deaths (26.7%), HIV opportunist infections (9.5%), pneumonia (8.9%), and tuberculosis (6.8%), Chronic Diarrhea as chronic infections (6.1%).

Table 2. Top ten causes of mortality in Masaka hospital,2016

s/o	Conditions	percentage
1	Neonatal Asphyxia deaths	26.7
2	HIV Opportunistic Infections	9.5
3	Pneumonia	8.9
4	TB (All forms)	6.8
5	Diarrhea Chronic opportunistic infection_Death	6.1

The top ten causes of morbidity (table 2) in Masaka District hospital,the skin infections are predominant (20.5%),physical trauma (14.6%),Gastritis and duodenitis (14.3%), acute respiratory infections(11.1%),bone and joint disorder other than fractures (10.4%),fractures (9.8%),urinary tract infections(7.6%),simple confirmed malaria(not pregnant) patients (3.9%), Fungal mycoses and superficial skin infections(3.9%),ear infections(3.8%).

Table 3 . Top ten causes of morbidity in Masaka District hospital, 2016

s/o	Condition	percentage
1	Skin Infections (others)	20.5
2	Physical traumas other than fractures	14.6
3	Gastritis and duodenitis	14.3
4	Acute Respiratory infections	11.1
5	Bone and Joint disorder other than fractures	10.4
6	Fractures	9.8
7	Urinary Tract Infections	7.6
8	Simple confirmed malaria(not pregnant) patients	3.9
9	Fungal, mycoses ,superficial skin infections	3.9
10	Ear infections	3.8

Table 4.Masaka District hospital operating theatre information, year 2016

Number of operative rooms	02
Total number of major surgeries	1642
Number of staff	17
Range of major surgeries per month	120-160

Source: Health Management Information System (HMIS), Rwanda

1.2 PROBLEM STATEMENT

There is no implementation of WHO SSC in Masaka District hospital.

Despite the known clinical importance of WHO Surgical Safety Checklist in clinical settings for surgical procedures, in Masaka District Hospital there has been lack of WHO Surgical Safety Checklist usage in surgical procedures given medical errors and legal implications caused by this practice gap.

A retrospective patient file audit was conducted in April 2016, in all 233 patient files audited there was no WH SSC forms used during the major operation, the use of the SSC should be a must for all the major surgeries⁽⁴⁾. The magnitude of nonuse of SSC was presented to the staff of operating theatre and all staffs agreed to address the problem.

1.3 Objectives

1.3.1 General objective

- To implement the SSC from 0% up to 40% from November /2016 to end of March 2017.

1.3.2 Specific objective

- To assess the completion of WHO Surgical safety checklist in surgical procedures in Operating Theatre of Masaka District Hospital.
- To increase knowledge of OT staff about the WHO SSC

1.4 The hypothesis

Ho: The compliance to the hospital policy and procedure on use of WHO SSC and regular staff training will not increase the implementation rate of SSC.

H1: The compliance to the Hospital policy and procedure on use of WHO SSC and regular staff training will increase the implementation rate of SSC

1.5 Justification of the project

The proper use of Surgical Safety Checklist (SSC) is a key strategy to prevent surgical complications, it provides the coordination and cohesion of the surgical operating team, it increases significantly the surgical safety⁽⁵⁾

This project aims at implementing the Surgical Safety Checklist in Masaka District hospital operating theatre by establishing high quality care to patients who are operated in terms of safety and reduce the eventual financial burden on the patients and the hospital in one side or ethical and legal issues in other hand.

1.6 Organization of dissertation

This dissertation is divided into six main chapters. Chapter one introduces the setting and background of the hospital. Chapter two describes the literature review, detail on definition and benefits of implementing the WHO SSC, the details on findings about the implementation of SSC in different countries. Chapter three describes the design of the project. A detailed root cause analysis and the selection of intervention are described, the method of evaluating the effectiveness of the intervention is also included in this chapter.

The results of the study are presented in chapter four. A detailed discussion based on the results of the project is in chapter five. Finally conclusion and recommendations based on this study are also mentioned in chapter six.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Serious medical errors occur in surgical procedures and result on poor clinical outcomes and affect negatively the patients and their families. However, the underlying root causes for such medical errors emanates from communication inconsistencies among the surgical team ⁽⁶⁾. Studies have shown that poor communication in the OT is often associated with much tension among the team members and the nature of their work ⁽⁶⁾. The author thought it would be necessary to understand how communication has changed healthcare, and how it has led to the development of the WHO Surgical Safety Checklist. During an international study conducted by the World Health Organization in 2009,reported that the utilization of checklists in the surgical procedures reduce morbidity and mortality by half ⁽⁷⁾ . According to a systematic review, 1 in every 150 patients admitted into a hospital die, and almost two thirds of in-hospital incidents occur during surgical care⁽⁸⁾ . Sentinel events are caused by an average of 70% of communication failure⁽⁹⁾ .This shows how important it was to develop a standardized communication system into a surgical unit, and thus it was the World Health Organization which developed the surgical safety checklist. There are an estimated 234 million surgical procedures performed each year ⁽²⁾. With numbers like that, it was imperative for the World Health Organization to take action with reducing errors in the surgical unit.

The safe surgery saves life program was established by WHO in intension to reduce the number of surgical deaths across the world ,ten essential objectives were identified and grouped in WHO Surgical Safety Checklist ,the aim of the checklist is to reinforce accepted safety practices and foster better communication among the clinical professionals ⁽⁴⁾

2.2 Description of surgical safety checklist

To improve quality of care by reducing errors and increasing patient safety in the surgical procedures, checklists have been implemented to strengthen the lines of communication. As previously mentioned, two important communication tools were the S.B.A.R. and pre-operative checklists. Recently the World Health Organization, has developed the surgical safety checklist.⁽⁴⁾

The WHO Surgical Safety Checklist was developed under the Safe Surgery Saves Lives initiative, the World Safety Alliance working with WHO, assisted surgical staff, in developing a set of safety checks. These checks were placed in an appropriate manner to reflect the needs of a surgical unit. The WHO SSC was can be modified before its usage or adapted.⁽⁴⁾ . In addition, the checklist was developed so that modifications may be made to it, by the facility deciding to utilize the tool.⁽⁴⁾

The tool is comprised of three parts. The first part of the checklist is to be completed before the induction of anesthesia. This part was called the sign in. It includes: patient confirmation (identity, surgical site, procedure, consent), surgical site marked, anesthesia safety check completed, pulse oximeter on patient and functioning, any known allergies, difficult airway/aspiration risk, risk of >500mL blood loss (WHO, 2009). If there will be a blood loss of > 500mL, then a second IV may be needed and blood products should be available. Many critics had noted what was the importance of only referring to one medical device in the surgical safety checklist, the pulse oximeter. A pulse oximeter measures the saturation of oxygen in the patient's blood.⁽⁴⁾

Next is part two, before skin incision. This was called the time-out. It included: confirmation of all team members having introduced themselves by name and role, surgeon/anesthesia professional/nurse verbally confirm (patient, site, procedure), anticipated critical events, have antibiotics been given within last 60 minutes, is essential imaging been displayed⁽⁴⁾.

Last part is the sign out, which is completed before the patient leaves the operating room. It included the nurse verbally confirming: the name of the procedure recorded, that instruments/sponge/needle counts are correct, how the specimen was labeled, whether there are any equipment problems to be assessed. Finally the nurse, surgeon and anesthesiologist review any concerns for the recovery of the patient⁽⁴⁾.

2.3 The effects of use of WHO Surgical Safety Checklist

Worldwide 1 in 25 of population are treated through the surgical procedure and their lives are saved through the surgical procedures, However ,despite the positive impact of surgery on health of the population; the surgery can itself result on the risks⁽¹⁾ ,the estimated morbidity and mortality following the surgery indicate that 1 million among 234 millions of surgeries suffer complications related to the surgery and one million of them will end up with the death⁽⁴⁾

Around the half of those complications are prevented through the use the WHO surgical safety checklist, the proper use of Surgical Safety Checklist is a key strategy to prevent surgical complications, it provides the coordination and cohesion of the surgical operating team ,it increases significantly the post-surgery morbidity and mortality⁽¹⁰⁾

Since the launching of the surgical checklist in 2007 worldwide ,different studies were conducted evaluating its benefits ,the cross continent study was prior conducted in eight cities (Toronto, Canada, New Delhi ,India ,Amman,jordan ,Aucland ,New;Ifakara,Tanzania ,London, Uk ,seattle and USA), the use of who surgical safety checklist reduced the death rate and surgical complications by more than one -third across all the eight pilot hospitals, the rate of inpatients complications dropped from 11%to 7 % , and in patient death rate related to major surgeries fell from 1.5 to 0.8% ⁽¹¹⁾ .Many studies have been reported and support the findings of a reduction in complications and death while using the WHO Surgical Safety Checklist. A cluster randomized

control trial from Norway that compared 2212 control procedures with 2263 procedures using the checklist, the complication rates decreased from 19.9% to 11.5%⁽⁸⁾.

The use of the WHO SSC is associated with a significant reduction in post-operative complication rates and mortality as shown in the a comprehensive search of all published studies assessing the use of SSC in any surgical setting, the implementation of the WHO SSC significantly reduced the risk of total complications by 37.9%, surgical site infections by 45.5%, unplanned return to OR by 32.1%, and mortality by 15.3%. Increased adherence to safety measures including airway evaluation, use of pulse oximetry, prophylactic antibiotics when necessary, confirmation of patient name and surgical site, and sponge count was also observed⁽¹²⁾

In addition ,the study found that introduction of the WHO SSC Checklist was associated with significant ($p < 0.05$) improvements in terms of overall surgical processes and surgical outcomes⁽¹³⁾ Also other study conducted in one of the Iran hospital found that that surgical complications decreased from 22.9% to 10% when the checklist was used⁽¹²⁾ as well as in Netherlands' Surgical Patient Safety System found a significant reduction in in-hospital mortality (1.5% to 0.8%) and in overall complications (27.3 to 16.7%) after implementation of a comprehensive surgical checklist⁽¹⁴⁾ reduced the complication (16.9% to 11%)⁽¹⁵⁾.

Although many studies showed that the use of SSC reduces morbidity and mortality, the study published in the New England Journal of Medicine found no reduction in following use of the Checklist being mandatory in the Canadian state of Ontario; this does not necessarily show that the Checklist does not work. The paper has many shortcomings, mainly that the authors did not know how often the Checklist was actually used and the period of the study was only three months, a very short time to expect to see a benefit.⁽¹⁶⁾

Apart from the reducing mortality and mortality also the use of SSC has benefits on cost saving and estimated that the Checklist need only prevent five complications before having a positive financial impact, even when the costs of implementation were taken into account. The authors predict a cost saving within one year of using the Checklist.⁽¹⁷⁾

Authors have reported better communication between members of the operating team following introduction of the Checklist, including better recognition of other team members and improved likelihood of staff speaking up when a problem is noticed.^(18–20)

Using the Checklist is associated with improved scores on a standardized questionnaire that evaluates culture and attitudes towards safety issues. Questions are included on the reporting of errors, ability to resolve disputes and supportive team work.^(21,22)

2.4 Success factors of WHO SSC implementation in health facilities

The implementation of the WHO SSC is challenging as other new practices, The hospitals from the low and high income countries may experience the same challenges in implementing the WHO SSC ,the key difference is that in low income countries there was a shortage of pulse oximetry which was a barrier to implement the WHO SSC⁽²³⁾.

The understanding on what makes implementation of it successful is growing as worldwide experience increases. A few key factors have been identified, which include local clinical champions of the Checklist who are influential in their hospital are very important in explaining and demonstrating the benefits of correct use of the WHO SSC, staff need to be fully engaged in bringing about local modifications to the Checklist and the implementation process, Workshops and wider safety education alongside use of the Checklist are helpful, Senior hospital leaders need

to be seen to be committed to implementing the Checklist.⁽²⁴⁾ ,also the successful implementation of the SSC requires for administration to embrace the patient safety as a priority and to use the surgical safety checklist for their own cases, the staff training using the demonstration, videos and coaching are the key strategies to implement the WHO SSC ⁽²⁵⁾.Although each member of the operating team; surgeons, anesthetists, nurses, technicians and other operating room personnel is involved in its execution, a single person should be responsible for leading the discussion of all components of the Checklist. This is essential for its success. This will often be a circulating nurse, but it can be any clinician or health-care professional participating in the operation. This individual should prevent the team from progressing to the next phase of the operation until each step has been satisfactorily addressed⁽⁵⁾. Also putting in place the implementation strategy such as protocols to sustain the practice, integrate the SSC into daily professional practice, regulation regarding the use of SSC are the key success of its implementation in the health facility.⁽¹⁰⁾

The unavailability of the SSC leads to its nonuse as demonstrated in study conducted in CHUK ,Muhimbili,Mulago and Kenyatta referral hospital ,25% of anesthetists interviewed regularly use the SSC .to make the SSC available in the hospital and train the surgical team and identify the local anesthetics champions should increase the use of SSC in East Africa.⁽²⁶⁾

It is also shown, in the quality improvement study on the use of SSC conducted in Butaro District hospital, 2011 to 2012, focusing on the use of prophylactic antibiotic as one of 19 elements of the WHO SSC, in terms of writing time and appropriate antibiotic choice found only 5.2% at the baseline of its use and at the end was 65%. ⁽²⁷⁾

After noticing the low utilization rate of surgical safety checklist, the Surgical quality improvement was performed measuring the effect of SSC implementation on culture of safety in Rwanda in four

hospitals of Kigali city such as Kibagabaga, Rwanda military, CHUK and Muhima hospital, compared to the baseline data and the final data from the study, the use of SSC has a significant positive impact on the patient safety with use of low resources. ⁽²⁸⁾

Even though past studies have proven that the WHO surgical safety checklist was a success in improving patient safety in a surgical setting, but the real question was how it was implemented? There were still some obstacles in the way of successfully implementing the checklist as reported in article published in Hospitals & Healthcare Networks In Box, it stated that there was some resistance from physicians. ⁽²⁹⁾

The big concern was implementation of the checklist and still meeting The Joint Commission regulations and protocols of correct patient and surgical site. ⁽²⁹⁾ In addition to correct patient and surgical site, protocols also required hospitals to verify that they had correct test results, blood products, implants and other surgical equipment in the room. ⁽²⁹⁾ This presented a serious obstacle to the implementation of the checklist, because institutions had to follow Joint Commission on Accreditation of Healthcare Organizations (JCAHO) rules and also wanted to utilize the surgical safety checklist at the same time.

The issue, which was raised during the implementation of the surgical safety checklist, was the reaction of the physicians. It was a major hurdle to jump because the surgeons really do have a lot to say when it comes to what happens in their operating rooms. According to Fran Griffin, who was the Director of the Institute of Healthcare Improvement, the older surgeons were the ones who were the most resistant to the change ⁽³⁰⁾

2.5 Completeness of WHO SSC

Even if the WHO SSC use results on reducing different surgery related complications but in some hospitals is still low, the completeness of the SSC is a common problem in developed countries

as well as in developing countries, all three components of the checklist are not well completed ,usually sign out is omitted on the rate of 64% in developing countries⁽¹⁵⁾ ,the entire SSC completion rate was 62.1% in a period of 8 months in Canada ⁽¹⁵⁾, although the SSC was implemented by different hospitals but the compliance with the completion in the operating room has wide variation in suboptimal⁽³¹⁾

In developing countries, the study reported 39.7% utilization rate of SSC in Ethiopia ⁽³²⁾ Large variation in checklist used exist in different hospitals ,but not between surgical specialties or between elective and emergency procedures Sign out was not completed in 39% of cases ,largely due to uncertainty about when to conduct it⁽³³⁾

CHAPTER THREE: METHODOLOGY

3.1 Design of the study

A pre and post intervention study design was used in this project to examine the implementation rate of WHO SSC.

The pre-intervention assessment was conducted between March and April starting by identifying the team to work with in quality improvement project , 2016 ,the source of data were inpatient medical files for the patients who underwent the major surgical procedures in first quarter of 2016 The team includes doctors, nurses ,midwives and anesthetists . An assessment to measure the magnitude of the problem, which served as the baseline data, and root cause analysis were conducted by all team. The interventions were selected after comparative analysis of identified solutions. Post intervention evaluation was conducted in a period of three months from January to March/2017.The planned activities were conducted according to the schedule and planned in Gantt chart.

3.2 Baseline data collection procedure

The baseline data describing the magnitude of the problem were collected in April/2016 from the patient files whose patients underwent the major surgeries in a first quarter of 2016(January-March);the head of archive department, the head of maternity department and the quality improvement focal person participated in data collection process.

3.2.1 Tool

A developed tool (appendix 2) was used showing the completeness of the three main parts of the SSC such as Sign in, Time out and Sign out; the three parts include 19 elements of safe surgery.

3.2.2 Sample

All patient files for major surgeries for a period of three months (January to March/2016) were used for ascertaining the magnitude of the problem, the patient files were chosen as the study target because each patient operated should have a form of WHO SSC attached in patient file.

3.3 Root cause analysis

The researcher, quality improvement focal person and medical doctor in charge of Hospital accreditation organized the meeting with all operating theatre staffs (nurses, anesthetists and medical doctors) to present the baseline findings on use of SSC in Masaka District hospital, discuss and brainstorm on possible causes of its nonuse.

The literature review was used to compare what the staff mentioned and those from different publications, the possible causes were displayed on the fishbone from four main groups such as people, environment, policy and procedure and equipment.

The team comprised by quality improvement focal person and medical doctor in charge of Hospital accreditation, head nurse of OT, head anesthetist of OT was formed to conduct the root cause analysis; the data on root cause analysis were collected and analyzed in a period of 2 $\frac{1}{2}$ months between June and August/2016.

The first step for root cause analysis was to conduct an extended literature review on the common causes of nonuse of WHO SSC within the health facilities but different literatures talked about the barriers to its implementation. The common causes found are lack of guidelines, lack of Knowledge On SSC, not trained staff on SSC, poor communication among the staff and poor coordination by the leaders⁽³⁴⁾

Different meetings were organized including the quality improvement focal person and medical doctor in charge of Hospital accreditation, head nurse of OT, head anesthetist of OT and other OT staffs to brainstorm on possible causes of nonuse of WHO surgical safety checklist .

The possible root causes identified are 1. staff don't know the WHO surgical safety checklist ,2.they don't have training on the WHO SSC,3.there didn't have been oriented on the WHO SSC(induction);4.No policy and procedure /guideline regarding the use of SSC 5.unavailability of the WHO SSC in Masaka District hospital setting . All possible root causes were displayed in the fishbone diagram.

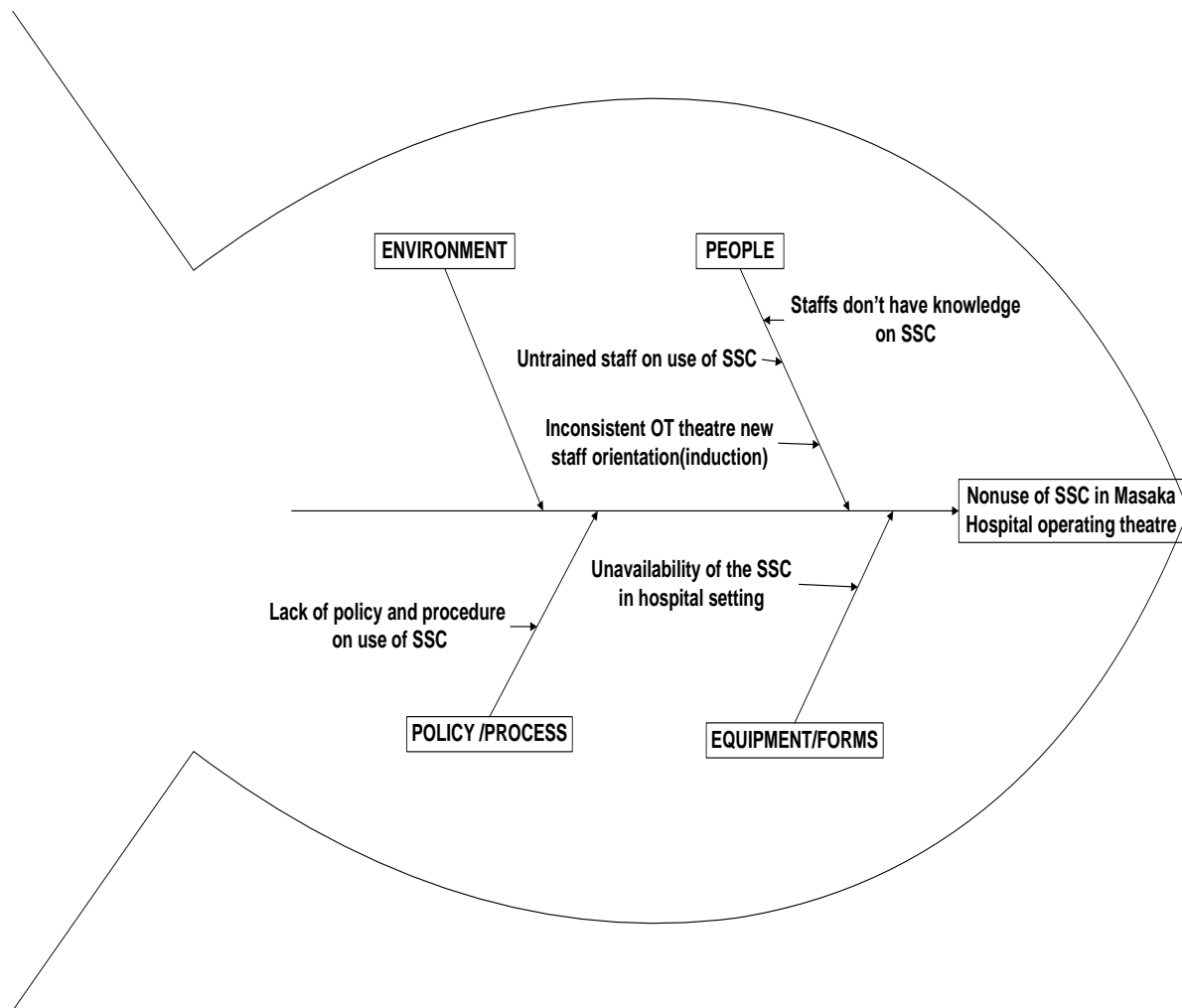


Figure 1.Fish bone illustrating the possible causes of nonuse of SSC in Masaka District hospital

3.4 Verification process

The data related to each suggested possible causes were collected and analyzed prior to the final root cause identification.

3.5 Lack of knowledge of surgical safety checklist

3.5.1 Tool

To assess the level of knowledge on the SSC, the researcher adopted WHO questionnaire (appendix 4) to check whether the Operating theatre staff have a general knowledge on the SSC. It is in this regard that ten questions with Yes and No answers administered to each one of the staff at their convenience and the questionnaire was self-administered.

3.5.2 Sample

All seventeen staff were eligible to be part of the sample but twelve staffs were available in time of completing the questionnaire.

The score performance on SSC knowledge are summarized on Pareto chart, 17% of the respondents are less than 25%, 67% were between 26 to 50%, between 51 up to 75 only 8% and 75 to 100% represent only 8%.

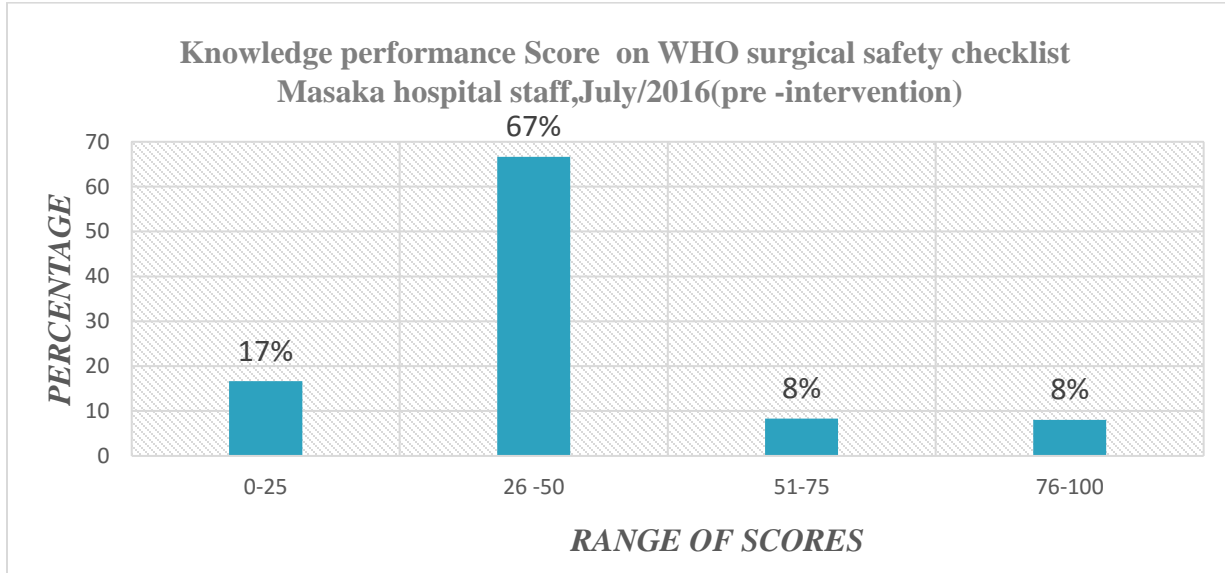


Figure 2. OT staff Knowledge performance on WHO SSC

The results on assessment of knowledge are summarized in table 5 , only 42% of the respondents succeeded the question WHO SSC Checklist is a synonym for Team Time Out, for the WHO SSC checklist does not have to be signed by every member of the team(50%), the WHO SSC checklist asks for the exact documentation of the number of used swabs (33%), the WHO SSC checklist exclusively addresses surgeons (58%), the WHO SSC recommends an antibiotic prophylaxis within 60 minutes before surgery(83%), the WHO SSC shall support inexperienced members of the team(16%), the WHO SSC is a tool used to attribute mistakes and misses to specific persons(0%), the WHO SSC checklist aims at preventing accidental omissions within routine procedure (16%), the WHO SSC aims at improving team communication (67%) and finally the WHO SSC may be used to document complications (8%).

Table 5.Pre-intervention on OT staff knowledge performance results

Questions	correct answers	incorrect answers
WHO SSC Checklist is a synonym for Team Time Out.	5 (42%)	7 (58%)
The WHO SSC checklist does not have to be signed by every member of the team.	6 (50%)	6 (50%)
The WHO SSC checklist asks for the exact documentation of the number of used swabs.	4 (33%)	8 (67%)
The WHO SSC checklist exclusively addresses surgeons.	7(58%)	5 (42%)
The WHO SSC checklist recommends an antibiotic prophylaxis within 60 minutes before surgery	10(83%)	2(17%)
The WHO SSC checklist shall support inexperienced members of the team	2(16%)	10(83%)
The WHO SSC checklist is a tool used to attribute mistakes and misses to specific persons	0(0%)	12(100%)
The WHO SSC checklist aims at preventing accidental omissions within routine procedure	2(16%)	10(83%)
The WHO SSC aims at improving team communication	8(67%)	4(33%)
The WHO SSC may be used to document complications	1(8%)	11(92%)

3.6 Untrained staff

3.6.1 Tool

To know the staff who have been trained on the use of Surgical Safety Checklist a tally sheet was used, it was completed by asking each OT staff whether he/she had been trained or not, if yes by who, where and the duration of the training .the information received from the staff were cross checked in their CV through personal files in HR office.

3.6.2 Sample

All staff working in OT were asked if they are trained on the use of surgical safety checklist The results (table) showed that only 3(17%) were trained, all of them are anesthetists, one was trained at Rwamagana for a 3 day period in 2014 and other two were trained at CHUK for a three day period. After crosschecking in personal files, found that the CVs are not up to date and no staff had a record about the training on SSC in his/her CV.

Table 6.Masaka District hospital OT staff trained on SSC (N=17)

Staff	Number of staff	Percentage
Trained	3	17%
Not trained	14	82%
Total	17	100%

3.7 Inconsistent new staff orientation (induction)

3.7.1 Tool

The specific staff orientation is an approach of helping the new staff to his /her responsibilities, it last 3 months from the beginning of new post.

To evaluate the specific orientation, the review in personal files in human resources manager office was performed and confirmed by asking the new appointed staff in operating theatre after 2015 using a tally sheet to determine the total staff by category and the percentage of operating theatre who have received specific orientation or not.

3.7.2 Sample

The sample included all staffs who started their new job after 2015 and were identified using a tally sheet.

The results showed that all 14 staffs did not receive an official staff orientation as confirmed by the verification in their personal files in HR office.

All fourteen new staff in operating theatre after 2015 were not oriented on their specific responsibilities in operating theatre as confirmed by the OT staffs, those are 4 nurses, 6 medical doctors and 4 anesthetists' technicians.

3.8 Lack of policy and procedures for WHO SSC use

Lack of policy and procedure (p&p) on the use of surgical safety checklist was carried out using the tally sheet guided in asking the staff, the view of master list of the policies and procedures of the hospital was conducted to ascertain that there is or not a policy and procedure on use of WHO SSC or availability of any posters or printed guidelines related to the WHO SSC.

The results showed that the policy and procedure on surgical safety checklist use was not on the master list of the hospital p&p.

All OT staff confirmed that the policy and procedures regarding the use of Surgical Safety checklist was not available since the time they have started their jobs. In conclusion, the lack of policies and procedure is retained as one of the causes of nonuse of WHO SSC.

3.9 Unavailability of surgical safety checklist Masaka District hospital setting

To check if the WHO SSC are available in hospital setting a view of the list of the forms and books that are used in the hospital was conducted in the logistic office, crosschecked in the hospital printing office.

The results showed that there is no WHO SSC among other forms a books used in Masaka District hospital.

Table 7. Decision Summary on RCA

The possible causes of nonuse of SSC	Results	Rejected /accepted
Untrained operating theatre staff	Trained :17% Not trained:83%	Accepted
Staffs don't have knowledge on SSC use	Score (Max=100) 0-25:17%, 26-49:67% 51-75:8%,76-100:8%	Accepted
Inconsistent staff induction	No staff received orientation on SSC use, was not included in specific oriented	Rejected
Unavailability of SSC in hospital setting	All forms used in Masaka District were viewed from the logistic officer and crosschecked b asking the OT staff	Rejected
Lack of policy and procedure on use of SSC	The policy and procedure on use of SSC was not available on Masaka District policies and procedures master list.	Accepted

3.10 Intervention

After identification of root causes, the team proposed a set of alternative solutions. The team conducted a comparative analysis on the alternative solutions based on the different criteria such as impact, cost, feasibility and time of each alternative solution (Appendix 5).

The final intervention selected was to develop a policy and procedure on use of SSC and institutionalize regular staff training. The implementation plan is attached in appendix 3.

3.10.1 Development of policy and procedure on use of SSC

The policy and procedure describe who will use the SSC, when to use it, on which it is used for, how to use it, etc. (Appendix 6).

After getting a document to refer to, the team consulted all staff working in theatre including anesthetists, doctors, nurses and midwives and developed a draft of a policy and procedures on use of surgical safety checklist. The draft was sent to the accreditation committee for review. After modifications were made according to the committee's feedback, it was submitted to the director for signature for final official approval.

3.10.2 Staff Training

Once the policy and procedures was put in place, the team organized three series of staff trainings to allow staff to understand and familiarize with the new procedure and guideline attached to the policy and. The team prepared the training materials and identified the participants. An invitation was sent to all participants and posted in OT before one week. The training was repeated four times to ensure staff working at different shifts could all participate. In the training, the audio and visual aids and role play were used to ensure optimal understanding of the content.

3.11 MEASURES

Three main measures were used in the study to evaluate the results of the intervention of the project. First, the SSC utilization rate, second, the completion rate of SSC and thirdly the staff knowledge level on SSC.

Table 8. Measure of outcome indicators

Indicator	Definition
SSC Utilization rate	Number of SSC used / number of all major surgeries in X time
SSC completeness rate	Number of elements of SSC completed/number all elements that should be completed in X time

Table 9. Measure of process indicators

Indicator	Definition
Existence of policy and procedure for SSC use	Policy exists or not
Staffs trained on the policy on use of SSC policy and procedure	Number medical doctors, nurses or midwives and anesthetists trained on the policy of SSC use
Staff trained on comprehensive (theory and practice) of WHO SSC use.	Number of medical doctors, nurses or midwives and anesthetists of OT trained on use of SSC
performance score (on SSC)	Percentage of improvement from pre intervention to post intervention

3.12 DATA ANALYSIS

3.12.1 The WHO SSC utilization rate

The compliance rate was collected using the developed data collection tool (appendix 2) from the patient files. The information was recorded into MS Excel for compilation and analysis.

3.12.2 WHO SSC Completion rate

The completion rate were collected from patient file auditing by assessing the used SSC whether are well completed or not, and which parts of the checklist are not completed. The data were compiled using MS Excel and analysed using SPSS 20.0.

3.12.3 Knowledge of staff on WHO SSC

The same questionnaire was used for all staff working in OT to test their knowledge on SSC, the results were entered to MS Excel for compilation and imported In SPSS 20 for analysis.

To compare pre and post intervention; the Chi Square tests were used with a p. value set at 0.05. The unpaired t-test was used to compare two means of knowledge performance level on SSC.

3.13 ETHICAL CONSIDERATIONS

The study did not involve patient contact, procedure or treatment were not affected, we did the patient file audit after an approval from hospital administration after ethic committee study analysis for access the patient files (appendix 7).

CHAPTER FOUR: RESULTS

The study aimed to implement the WHO SSC in Masaka District from 0% to 40%.

The interventions were implemented in accordance with the Gantt chart; the multidisciplinary team participated in introduction of WHO SSC, the implementation of the who checklist was led by a multidisciplinary team including the researcher ,the medical doctor head of operating theatre, the head of anesthetist and head of nurses in theatre and the quality improvement team from the hospital .

All staffs were mobilized and took their time to concentrate on quality improvement project in context of improving surgical safety issues for the patients who undergo the major surgeries, after analyzing the reason why the SSC was not used during the surgical procedure; the prioritized interventions were performed focusing on training sessions guided by the policy and procedure on its use

4.1 The utilization of the WHO SSC

After implementing the identified interventions in a period of three months, the utilization rate of the SSC reached at 74%, 292 among 393 major surgeries performed in Masaka District Hospital from January up to March/2017 the SSC was used, the utilization of SSC was significantly increased from 0% in pre intervention to 74% after intervention with a p-value 0.000.

4.2 The completeness of SSC

To evaluate the completeness of the SSC used in major surgeries ,the patient files for all patients underwent major surgeries was carried out ,all nineteen (19) elements of the WHO SSC checklist grouped in the Sign in; time out and Sign out were checked for their completeness ,the Sing in and Time out were completed at 100% with a P.value 0.000, but the Sign out portion was completed

at a rate of 92%, compared to the baseline data (0%) the completeness of the WHO SSC is statistically significant with a P.value 0.000.

4.3 Knowledge on SSC

The average score was 83% after intervention, from the average score of 51% before intervention, the improvement in general knowledge toward the WHO SSC was statistically significant p.value 0.001, in pre intervention 17% of staff assessed for knowledge were under 25% score; 67% of staff were between 16% up to 50%; 8% of staff between 50 up to 75% and 8% above 75%; After intervention the assessment scores showed that there is no score under 50% , 14% of staff scored 50 to 75% and finally 84% scored 75 % up to 100% .

The knowledge assessment of each question was conducted, the results (table 12) showed that for question 1, WHO SSC Checklist is a synonym for Team Time Out; in pre intervention was 42% and post intervention was 100%, the knowledge has significantly improved with a p.value of 0.000, question 2; WHO SSC checklist does not have to be signed by every member of the team has been improved from 50% up to 91%, with a value 0.000. The pre-intervention 33% and post 95% with a value 0.000 for question 3 ;The WHO SSC checklist asks for the exact documentation of the number of used swabs, question 4 ;WHO SSC checklist exclusively addresses surgeons 58% to 100%, p =0.000 , question 5;the WHO SSC checklist recommends an antibiotic prophylaxis within 60 minutes before surgery 83% to 100% ,with P.value 0.01, question 6;the WHO SSC checklist shall support inexperienced members of the team 16% to 86% ,with the p 0.000, question 7 ;the WHO SSC checklist is a tool used to attribute mistakes and misses to specific persons 0% to 92% ,p value 0.000, question 8 ;the WHO SSC checklist aims at preventing accidental omissions within routine procedure 16% to 86%,pv 0.001, question 9 ,the WHO SSC aims at improving team

communication from 67% to 95% ,p v 0.001,question 10; the WHO SSC may be used to document complications 8% to 41%,pv 0.001.

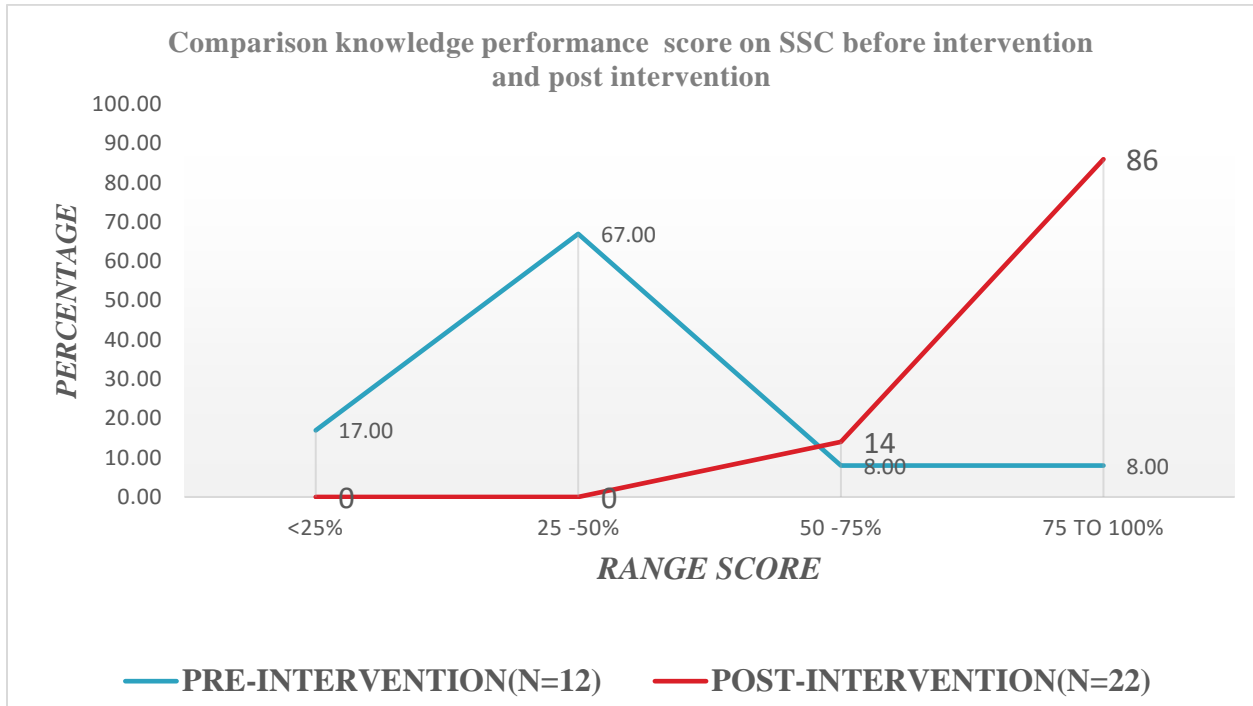


Figure 3. Graph comparing the knowledge performance on SSC pre and post intervention

Table 10. Summary of findings on Staff Knowledge of SSC in Masaka District Hospital

Questions	correct answers (Pre intervention (n=12))	correct answers (post intervention n=22)	% of Change	P Value
WHO SSC Checklist is a synonym for Team Time Out.	5 (42%)	22 (100%)	58%	0.001
The WHO SSC checklist does not have to be signed by every member of the team.	6 (50%)	8 (91%)	41%	0.021
The WHO SSC checklist asks for the exact documentation of the Number of used swabs.	4 (33%)	21 (95%)	62%	0.000
The WHO SSC checklist exclusively addresses surgeons.	7 (58%)	22 (100%)	42%	0.001
The WHO SSC checklist recommends an antibiotic prophylaxis within 60 minutes before surgery	10 (83%)	22(100%)	17%	0.048
The WHO SSC checklist shall support inexperienced members of the team	2 (16%)	19(86%)	70%	0.000
The WHO SSC checklist is a tool used to attribute mistakes and misses to specific persons	0 (0%)	20	91%	0.000
The WHO SSC checklist aims at preventing accidental omissions within routine procedure	2 (16%)	19 (86%)	70%	0.000
The WHO SSC aims at improving team communication	8 (67%)	21 (95%)	28%	0.023
The WHO SSC may be used to document complications	1 (8%)	9 (41%)	33%	0.076

4.4 Training on WHO SSC

The different in job training sessions were conducted on the use of WHO SSC, the previously trained staff with the researcher led the training, and 82% of operating theatre staff was trained from 17% who were trained before starting the project

4.5 Policy and procedure on use of WHO SSC

The policy was developed by the QI team in conjunction with the representatives of operating theatre staff, and approved, then after shared to all staff members.

CHAPTER FIVE: DISCUSSION

The results from the study on implementation of WHO SSC in Masaka District hospital showed that at initial phase of implementation there were low compliance rate (61%) in January 2017 ,but the completeness rate of WHO SSC was 98%,it is different from the finding from the quality improvement conducted in Ethiopia where 83% of compliance rate were observed within one month of intervention but the completion rate were low 84%⁽³⁵⁾,in the same context the training and education using different methodologies like simulation and role play are the key training methods to deliver knowledge on WHO SSC and result to the substantial outcomes on the increasing the performance level on the use of WHO checklist⁽³⁵⁾ , the same interventions based on training and education used in current study were also reported to be much beneficial among interventions for implementing the WHO SSC⁽³⁶⁾ ,also the success of implementation of WHO SSC requires for administration to embrace the patient safety as a priority and to use the surgical safety checklist for their own cases as demonstrated in the current study , the same as the staff training using the demonstration, videos are the key strategies to disseminate the knowledge on use of WHO SSC⁽²⁵⁾.

The leadership influence should be involved in implementation of the checklist, the staff feel engaged when the leadership intervenes in the implementation process, if the leaders do not empower the staff, the outcome of the study can fail⁽³⁷⁾

The sign out was sometimes omitted as shown in the current study at 92% ,the study showed also that the completeness of the sign out is at the level of 60%,also the results from the current study showed that the compliance rate of sign in and time out is 100% which is close to the findings for the study conducted by Hannan JA et AL ,95 to 99% ,also indicated that the compliance to the sign out was at 22%⁽¹⁵⁾compared to 92% for the current results . Lack of knowledge, regular training

and supervision was identified to be the main causes of nonuse of the checklist ,the same findings were found to be the cause of non-adherence to the SSC ⁽³⁸⁾.

Even if the implementation of the surgical checklist succeeded in the current study, there are some hospitals who failed to implement the WHO SSC , the case of Colorado hospitals Biffi there were non adherence to the Checklist because they judged it as unimportant in reducing the post operative infection rate ⁽³¹⁾.

The use of WHO SSC increased communication among the team performing the surgical procedure as evidenced by the exchange and discussion on critical cases before surgical interventions , the poor communication among the surgical team has been mentioned as the source of surgical errors ⁽³⁹⁾, moreover the studies showed that when the WHO SSC is well implemented improves team communication among the surgical team.

Also 20% of health care related cost for the operated patients reduced due to utilization of prophylactic antibiotic before the surgical procedures, the study shows that the use of WHO SSC reduced significantly the cost assigned to the surgical complications(20),In addition, the peri-operative mortality reduced from 2 cases (0.4%) among 453 surgical procedures performed in a quarter of October to December /2016 to 0 case among 388 surgical procedures performed from January up to March/2017, the findings were stated in a study where the use of WHO SSC in major surgeries reduced from 1.5% up to 0.8%.⁽²⁰⁾

For the Surgical site infection(SSI), the use of Surgical site infection did not show the improvement because the SSI rate remained stagnant (6-7%) a quarter of October to December /2016 and in quarter of January to March/2017,the study confirmed that the use of SSC is part of the interventions to be used in SSI rate reduction but other many factors are required to support it

;showed that when the WHO SSC is well implemented less than one SSI is prevented among the patients underwent the major surgical procedures.⁽⁴⁰⁾

5.1 Challenges

Despite the interruption by different factors, all planned activities were implemented at really in one hand and other hand a little bit delayed, those factors are especially related to hospital working environment like presence of emergencies, occurrence of meetings and external trainings, the duty shifting system. In addition due to limited knowledge of English language, the video presented to staff describing the use of SSC was difficultly confined as reported by the staff after training. Moreover staff turnover and interdepartmental staff rotation was also a breakdown of maintaining common knowledge and practice provided during training about SSC use.

Some staff were not actively engaged and the ownership were slowly grading ,the staff who participated in their free time need the incentives if they prioritize the quality improvement activities for maximizing the QI activities need to draw the intrinsic motivation .

The time allocated to the QI project was limited, the time of QI project requires much time, and activities such as team and relationship building are time consuming, especially when they start from a low base.

5.2 How to overcome challenges

To overcome the challenges requires the multidisciplinary approach, emphasizing on the context of QI project perspectives, day to day supervision and close monitoring of the activities. It is better to focus on single problem, better recognition of resources and at each level the support is required, ensures that the basic details are agreed, embeds in institutional structure rather than relying on

individuals and involves representatives from all professions involved in quality improvement project in designing the interventions.

the staff turnover should be addressed by putting in place the staffing plan and implement it as it is planned ,the planned, the time for research intervention should be increased ,the staff should be facilitated for transport when they are in their day off so that they attend the training .

5.3 Lesson learnt

Different lessons have been acquired during the QI project, the steps involved in conducting the QI projects were noted as well as the use of different study designs during the quality improvement process were noted. In addition, realized that quality improvement to be effectively managed, individuals and groups in an organization or department should have a clear understanding of their roles or contributions in QI process. Ideally, each staff has equal and valuable contribution on QI team .However the total quality commitment involves all levels of organization's structure, the organization needs to build ongoing training opportunities for staff into the QI framework to sustain and advance the QI efforts.

A diverse team is more effective, because its members bring their varying backgrounds, viewpoints and experiences to the QI process.

5.4 Limitation of the study

The study was only limited to the implementation of surgical safety checklist and did not look to the patient outcomes to see of the use and completion of surgical safety checklist had a positive impact but different studies did about it in low income settings as demonstrated in different studies⁽⁴⁰⁾

The training sessions were conducted on working site and sometimes there were interruption when the emergence cases happens, the staffs who were in off time also it was difficult for them to attend the training .Also the time for intervention was short, the data collection from the patient files were time consuming due to the archiving problems where it was very difficult to locate all patients file for the patients who underwent the major surgery.

Other limitation was to link the quality improvement approach with the scientific research.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The surgical safety checklists are very important in improving surgical safety when are effectively used ,in low resource setting ,the initiation of the checklist requires the different support from a multidisciplinary team and the power of leadership as well as the experienced staff or another organization who support the hospital in quality improvement process. The staff must have the be aware on the rationale behind the use of SSC at their own side, to the patients and to the institution in general .To have the policy and procedure guiding the use of surgical checklist is the first intervention to reveal the staff that the leadership is implicated in the implementation of SSC, the main tools to be used for disseminating knowledge on surgical safety checklist are the simulation and role play .The supervision is also important in implementing the WHO SSC. Although the quick compliance and completeness of WHO SSC by the staff was found, but the drawbacks can be found and the interventions should also address on the maintenance strategies .The implementation of WHO SSC improved team communication, reduced the health care cost, reduced peri- operative mortality rate but did not reduce the SSI rate.

6.2 Recommendations

6.2.1 Recommendations for implementation

While implementing a new tool into existing practices there will usually be some sense of difficulty. The Surgical Safety checklist in the setting used for this study was new tool to be established. The quality improvement to be effectively managed, individuals and groups in an organization or department should have a clear understanding of their roles or contributions in QI process.

Ideally, each staff has equal and valuable contribution on QI team .However all levels of organization's structure need to build ongoing training opportunities for staff into the QI framework to sustain and advance the QI efforts. During the intervention the staffs require the facilitation for attending the training sessions in their day off.

6.2.2 Recommendations for Improving Current Research

The present study could have benefitted from a long time period which allows extending the time of project evaluation.

6.2.3 Recommendations for Future Research

Future research should be performed on benefits or impact of the surgical safety checklist in Masaka District hospital .The researcher recommends that if future research is done that would replicate this study, it could only be in a setting, where the Surgical Safety Checklist has been freshly implemented. In addition the report system on the use of SSC and regular training approach should be put in place and evaluated.

List of References

1. Global S, Safety, Patient www.who.int/patientsafety/safesurgery/en. Safe surgery saves lives. 2008.
2. World Health Organization (<http://www.who.int/patientsafety/safesurgery/en>). Safe Surgery Saves lives .Geneva. 2009.
3. National Institute of statistics of Rwanda(NISR) Ministry of Finance and Economic Planning (MINECOFIN) Rwanda Fourth Population and Housing Census. Thematic Report: Population size, structure and distribution. The National Institute of Statistics of Rwanda (NISR) and the Ministry of Finance and Economic Planning (MINECOFIN). 2014.
4. World Health Organization. WHO Guidelines for Safe Surgery 2009 Who. 2009. 125 p.
5. W. A. van Klei, MD, PhD et al. Effects of the Introduction of the WHO “ Surgical Safety Checklist ” on In-Hospital Mortality. Vol. 255. 2012.
6. Aveling E-L, McCulloch P, Dixon-Woods M. A qualitative study comparing experiences of the surgical safety checklist in hospitals in high-income and low-income countries. *BMJ Open* . 2013.
7. Walker IA, Reshamwalla S, Wilson IH. Surgical safety checklists: Do they improve outcomes? Vol. 109, *British Journal of Anaesthesia*. 2012.
8. Haugen AS, Sjøfteland E, Eide GE, Sevdalis N, Vincent CA, Nortvedt MW, et al. Impact of the World Health Organization ’ s Surgical Safety Checklist on safety culture in the operating theatre : a controlled intervention study. 2013;110(February):807–15.
9. Cullati S, Le Du S, Raë A-C, Micallef M, Khabiri E, Ourahmoune A, et al. Is the Surgical Safety Checklist successfully conducted? An observational study of social interactions in

- the operating rooms of a tertiary hospital. Vol. 22, *BMJ quality & safety*. 2013.
10. Gillespie BM, Marshall A. Implementation of safety checklists in surgery: a realist synthesis of evidence. 2015.
 11. Hannam J a, Glass L, Kwon J, Windsor J, Stapelberg F, Callaghan K, et al. A prospective, observational study of the effects of implementation strategy on compliance with a surgical safety checklist. Vol. 22, *BMJ quality & safety*. 2013.
 12. Bergs J, Hellings J, Cleemput I, Zurel Ö, De Troyer V, Van Hiel M, et al. Systematic review and meta-analysis of the effect of the World Health Organization surgical safety checklist on postoperative complications. *Br J Surg [Internet]*. 2014;101(FEBRUARY 2014):150–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24469615>
 13. Yuan CT, Walsh D, Tomarken JL, Alpern R, Shakpeh J, Bradley EH. Incorporating the World Health Organization Surgical Safety Checklist into Practice at Two Hospitals in Liberia. 2012;38(6).
 14. Mayer EK and A. Surgical Checklist Implementation Project : The Impact of Variable WHO Checklist Compliance on Risk-adjusted Clinical Outcomes After National Implementation. *Ann Surg*. 2015;0(0):1–6.
 15. Mayer EK, Sevdalis N, Rout S, Caris J, Russ S, Mansell J, et al. Surgical Checklist Implementation Project [Internet]. Vol. 263, *Annals of Surgery*. 2016.
 16. Urbach DR, Govindarajan A, Saskin R, Wilton AS, Baxter NN. Introduction of surgical safety checklists in Ontario, Canada . Vol. 370, *The New England journal of medicine*. 2014.

17. Aveling E, Mcculloch P, Dixon-woods M. A qualitative study comparing experiences of the surgical safety checklist in hospitals in high-income and low-income countries. 2013.
18. Wappler F, Tinschmann T, Kindermann P, Rixen D, Bellendir M, Schwanke U, et al. The implementation of a perioperative checklist increases patients ' perioperative safety and. Vol. 10, An international Journal of anaesthesiology and intensive care ,pain and Emergency care. 2011.
19. Treadwell JR, Lucas S, Tsou AY. Surgical checklists: a systematic review of impacts and implementation. *BMJ Qual Saf* [Internet]. 2014;23(4):299–318.
20. Fudickar A, Hörle K, Wiltfang J, Bein B. The Effect of the WHO Surgical Safety Checklist on Complication Rate and Communication. Vol. 109. 2012.
21. de Jager E, McKenna C, Bartlett L, Gunnarsson R, Ho YH. Postoperative Adverse Events Inconsistently Improved by the World Health Organization Surgical Safety Checklist: A Systematic Literature Review of 25 Studies. *World Journal of Surgery*. Springer International Publishing; 2016.
22. Motta R, Fátima L De, Marcos A, Lyra G. The WHO Surgical Safety Checklist : knowledge and use by Brazilian orthopedists &. *Rev Bras Orth*. 2013;48(6):554–62.
23. Aveling E, Mcculloch P, Dixon-woods M. A qualitative study comparing experiences of the surgical safety checklist in hospitals in high-income and low-income countries. *BMJ Open*. 2013;1–10.
24. Conley DM, Singer SJ, Edmondson L, Berry WR, Gawande AA. Effective surgical safety checklist implementation. *J Am Coll Surg*. 2011;212(5):873–9.

25. Woodman N, Walker I. Tutorial 325 World Health Organization Surgical Safety Checklist. *Anesth Tutor week*. 2016;325(february ,by WHO):1–9.
26. Epiu I, Verel J, Tindimwebwa B, Mijumbi C, Ndarugirire F, Twagirumugabe T, et al. Working towards safer surgery in Africa ; a survey of utilization of the WHO safe surgical checklist at the main referral hospitals in East Africa.. *BMC Anesthesiology*; 2016.
27. Mody GN, Taha BW, Mubiligi J, Mpunga T, Musavuli J, Rutaganda E, et al. Original Article Systems-based Quality Improvement as a tool to implement the Surgical Safety. 2014;71(March):9–14.
28. Maine R. IMPLEMENTATION ON CULTURE OF PATIENT. 2014;
29. Kim FJ, Donalisio Da Silva R, Gustafson D, Nogueira L, Harlin T, Paul DL. Current issues in patient safety in surgery.2015.
30. Tang R, Cunningham FC, Tang R, Ranmuthugala G, Cunningham F. Surgical safety checklists : A review *Surgical safety checklists : a review*. 2013.
31. Biffi WL, Gallagher AW, Pieracci FM, Berumen C. Suboptimal compliance with surgical safety checklists in Colorado: A prospective observational study reveals differences between surgical specialties. *Patient Saf Surg* . 2015;9(1):1–8.
32. Melekie TB, Getahun GM. Compliance with Surgical Safety Checklist completion in the operating room of University of Gondar Hospital, Northwest Ethiopia. *BMC Res Notes* . 2015;8:361.
33. Russ S, Rout S, Caris J, Mansell J, Davies R, Mayer E, et al. Measuring variation in use of the WHO surgical safety checklist in the operating room: A multicenter prospective cross-

- sectional study. *J Am Coll Surg* . 2015;220(1):1–11.e4.
34. Fourcade a., Blache J-L, Grenier C, Bourgain J-L, Minvielle E. Barriers to staff adoption of a surgical safety checklist. *BMJ Qual Saf*. 2012;21(3):191–7.
 35. Bashford T, Reshamwalla S, McAuley J, Allen NH, McNatt Z, Gebremedhen YD. Implementation of the WHO Surgical Safety Checklist in an Ethiopian Referral Hospital. Vol. 8, Patient safety in surgery. 2014.
 36. Bergs J, Lambrechts F, Simons P, Vlayen A, Marneffe W, Hellings J, et al. Barriers and facilitators related to the implementation of surgical safety checklists: a systematic review of the qualitative evidence. *BMJ Qual Saf* . 2015;(July):776–86.
 37. Foundation TH. Overcoming challenges to improving quality. 2012.
 38. Mcginlay D, Moore D, Mironescu A. A prospective observational assessment of Surgical Safety Checklist use in Brasov Children ' s Hospital , barriers to implementation and methods to improve compliance. 2015;22(2):111–21.
 39. Conley DM, Singer SJ, Edmondson L, Berry WR, Gawande AA. Effective Surgical Safety Checklist Implementation. 2011;212(5):873–9.
 40. Gillespie BM, Chaboyer W, Thalib L, John M, Fairweather N, Slater K. Effect of using a safety checklist on patient complications after surgery: a systematic review and meta-analysis. 2014;120(6):1380–9.

Appendix2: tool on use and completeness of WHO SSC

MONTH AND YEAR									
PATIENT FILE NUMBER									
VARIABLES	y/n	y/n	y/n	y/n	y/n	y/n	y/n	y/n	y/n
SSC AVAILABLE									
IF SSC AVAILABLE IS IT COMPLETE?									
THE SIGN IN									
TIME OUT									
SIGN OUT									
TOTAL COMPLETED									

Appendix 3: Gantt chart

TASKS	PERSON RESP	Nov/2016		Dec/2016				Jan/2017				Feb/2017				Mar/2017			
		3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
DEVELOP POLICY AND PROCEDURE ON SSC																			
Meeting with the staff involved in the project to discuss on the implementation plan	Researcher																		
Develop a policy and procedures on use of SSC	Accreditation focal person																		
Policy and procedures validation	Chairperson of accreditation steering committee																		
Approval of policy and procedures	Hospital director																		
Teach the policy and procedures to the OT staff	Accreditation focal person																		
TRAINING ON USE FOR SSC																			
Develop a training plan on SSC use	Clinical director																		
Conduct training on use of SSC	Head of nursing																		
Training report	Clinical director																		
implementation	Clinical director																		
Supervision on use of SSC	Clinical director																		
Collect data to evaluate the rate of SSC use	Researcher																		
Provide feedback	Clinical director																		

Appendix 4: Questionnaire on knowledge on Surgical Safety Checklist

DOCTOR ANAESTHETIST Nurse/midwife

N=22

QUESTIONS	TRUE/FALSE
WHO SSC Checklist is a synonym for Team Time Out.	
The WHO SSC checklist does not have to be signed by every member of the team.	
The WHO SSC checklist asks for the exact documentation of the number of used swabs.	
The WHO SSC checklist exclusively addresses surgeons.	
The WHO SSC checklist recommends an antibiotic prophylaxis within 60 minutes before surgery	
The WHO SSC checklist shall support inexperienced members of the team	
The WHO SSC checklist is a tool used to attribute mistakes and misses to specific persons	
The WHO SSC checklist aims at preventing accidental omissions within routine procedure	
The WHO SSC aims at improving team communication	
The WHO SSC may be used to document complications	

Appendix 5: Comparative analysis


1. Training on SSC

Option	Impact/5	Time/5	Feasibility/5	Cost/5	Total/20
Institutionalize regular training of operation theatre staffs on the use and importance of SSC.	5	3	5	4	17
Develop and Provide to OT staff the user manual on SSC use and evaluate for their knowledge after a given time	2	4	5	5	16
Customize SSC best practice field visits for the operation theatre staffs in order to share good e experience with others in practice	5	4	3	3	15

Comparative analysis for P&P Development

Options	Impact	Time	Feasibility	Cost	Total/20
Develop and educate the policy and procedure on SSC use	5	5	5	5	20
Design posters describing the use of SSC to be posted in different areas of operating theatre	5	3	4	4	16

Appendix 6: Policy and procedure on use of WHO SSC

<p>REPUBLICQUE DU RWAND</p>  <p>KIGALI CITY KICUKIRO DISTRICT MASAKA DISTRICT HOSPITAL B.P: 3472 KIGALI Email:masaka.hospital@moh.gov.rw</p>	<p>USE OF SURGICAL SAFETY CHECKLIST IN OPERATING PROCEDURE POLICY AND PROCEDURE</p>		
	<p>Policy code/ Number: MDH-48-PCC</p>	<p>Effective Date: December /2016</p>	<p>Revision Date: December/ 2018</p>
	<p>Clinical department</p>	<p>Applies to: Operating theatre staff,all medical doctors</p>	
	<p>Responsible Person: Clinical director</p>	<p>Approvals: Ag.Masaka Hospital Director Dr. Marcel UWIZEYE</p>	<p>Signatures/dates:</p>

Policy statement

To ensure that the WHO Surgical safety Checklist is used at each major surgical procedure performed at Masaka District hospital operating theatre in intension of preventing the eventual complications.

Definitions of key terms

- **Surgical safety checklist (SSC):** is a checklist developed by the World Health Organization which reduces surgical morbidity and mortality and sentinel events by such simple exercises as confirming the patient's identity, site, procedure and consent, allergies, airway/aspiration risk, risk of blood loss, sponge counts, etc.(Segen's Medical Dictionary. 2012 Farlex)

- **Surgeon:** medical doctor performing the surgical/interventional procedure, regardless of designation.
- **Major surgery :** Any operation within or upon the contents of the abdominal, pelvic, cranial or thoracic cavities; or which, given the locality, condition of patient, level of difficulty or length of time to perform, constitutes a hazard to life or function of an organ or tissue(Segen's Medical Dictionary. © 2012 Farlex)

Materials /equipment

- Surgical safety Checklist forms
- Patient file
- Set of materials depending to the type of operation
- Pen
- Lab/Radiological investigations results forms

Procedure

- Prior to the commencement of the operating list ,participation by the full theatre team allocated to the operating list is required
- Staff must introduce themselves to each other by name and role.
- Any issues related to the organization of the list must be discussed e.g. staffing, wards, recovery, beds, radiology, manual handling, instrumentation or equipment.

I. Sign In – Before Induction of anesthesia

- The team will verbally confirm all points detailed on the sign in section of the WHO Surgical Safety Checklist. Discretion may be used for questions relating to airway/aspiration risk and blood loss.
- The registered practitioner/delegated staff record the checklist in the appropriate place; commonly it is a task of circulating nurse to fill the SSC.
- It is acknowledged that in certain circumstances i.e. obstetric emergencies it may not be possible to complete the WHO. Every effort must be made to confirm identity, consent and correct side of surgery as a minimum requirement. The WHO checklist must be completed at the earliest available moment.

II. Time Out – Before start of the procedure

- To be completed by the whole team including surgeons, anesthetists and nurses.

- A registered practitioner/delegated person will confirm all team members are present and initiate the checklist by reading out loud all points contained in the timeout section of the checklist. Discretion may be used for questions relating to blood loss if the patient has a local or regional anesthetic.
- If, at any point during completion of the checklist, a member of the team is required to leave the theatre the checklist must be suspended and recommenced when all are present.
- If, at any point during completion of the checklist, the team is interrupted by an individual external to the team, the checklist must be suspended and recommenced when all team members can pay full attention to the process.
- Any concerns or queries raised by any team member must be resolved before the procedure commences.
- The registered practitioner/delegated person will clearly mark the checklist in the appropriate place in patient file.
- Any concerns/problems/issues raised during the checking procedure must be documented in patient file.
- If, at any point during the procedure, a member of the team is replaced or a further member of staff joins the team, they will be introduced by name and designation and be briefed on the procedure, given any necessary information and have sight of the consent form.

III. Sign out : after completion of the final swab and instrument count and prior to any staff member leaving the operating theatre

- To be completed by the whole team including surgeon, nurses and anaesthetists.
- A registered practitioner/delegated person will confirm all team members are present and initiate the checklist by reading out loud all points contained in the sign out section of the checklist.
- Any concerns/problems/issues raised during the sign out procedure must be documented in patient file
- Any concerns or issues that have arisen during the procedure must be reported as an incident.
- The team must formally acknowledge any concerns for recovery and

postoperative management of the patient.

IV. List Debriefing

The whole team including surgeon(s), nurses and anesthetist(s) must debrief at a suitable interval to review the procedures undertaken on the operating schedule.

The whole team must acknowledge:

- What did we expect to happen?
- What actually happened?
- Why was there a difference?
- What have we learned?

V. Dissemination and Implementation New Staff.

The WHO Surgical Safety Checklist policy will be provided as induction ‘pre-reading’ material for all new members of staff who are involved in the surgical care pathway.

Existing Staff

The WHO Surgical Safety Checklist policy will be available at the concerned staff for its use.

Training

An introduction to the WHO Surgical Safety Checklist must be included in the local induction/orientation programme for all new staff. Documentary evidence of this must be available.

All staff must receive instruction in how to implement the WHO Surgical Safety Checklist. Documentary evidence of this must be available.

VI. Monitoring compliance and effectiveness

- Monitoring of the WHO Surgical Safety Checklist will be performed daily and monthly reports through reports on its use will be provided by the operating theatre department.
- Results of the audits provided by the Information Department will be reviewed and any shortfall acted upon by the Divisional Management Team. The results are included in a monthly report provided by the Information Department to the Trust Board.

Appendix 7: Authorization letter

MINISTRY OF HEALTH

MSK/...../20/March/2016



KICUKIRO District
MASAKA HOSPITAL
P.O BOX:3472
E-mail: masaka.hospital@moh.gov.rw

BISANUKURI Evergiste
MHA Candidate (University of Rwanda)

RE: Acceptance to conduct the research project.

Reference is made to the letter of 6 March 21, 2016 requesting to conduct a research project in Masaka hospital, We are pleased to inform you that your request to conduct a study on "Implementation of WHO safety checklist in Masaka hospital" has been accepted based on your presentation made on the problem and rationale of the study, it has been accepted by the ethical Committee of Masaka District hospital to conduct such research project through the quality improvement steps.

The ethical Committee recommends that at the end of the project you will present to the Masaka hospital staff for learning from the project.

If any support needed through the project processes do not hesitate to contact the hospital administration.

Yours faithful



Dr Marcel UWIZEYE
Ag Masaka hospital Director