



**College of Medicine and Health Sciences**

**School of Health Sciences**

**LOW RATE OF HAND HYGIENE COMPLIANCE OF CLINICAL STAFF IN  
MURUNDA 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, KANEZA Narcisse, hereby declare that this capstone project entitled “**Low rate of hand hygiene compliance of clinical staff in Murunda District Hospital**” has been written by me without any external unauthorized help, that it has been neither presented to any institution for evaluation nor previously published in its entirety or in parts. Any parts, words or ideas, of the dissertation, however limited, which are quoted from or based on other sources, have been acknowledged as such without exception.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **DEDICATION**

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

I also dedicate this dissertation to my child KANEZA DUSHIME Dorinne for her perseverance in time period of MHA program.

I also dedicate this dissertation to Murunda Hopital staff who have supported me throughout the process. I will always appreciate all they did, especially for helping me in my writing skills, and for the many hours of proofreading.

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I am grateful to the efforts of all the staff who were involved in this project at the hospital.

Last but not the least; I would like to thank my family especially my parents for supporting me throughout my life and my study.

I would like to thank also the Ministry of health for giving me a sponsorship and facilitate me to study this program.

I am grateful to the efforts of all the staff who were involved in this project at the Murunda Hospital.

## **ABSTRACT**

**Background:** Hand hygiene is the single most important measure to prevent healthcare associated Infections (HAIs). However, it was observed a low compliance among clinical staff of Murunda Hospital. In working period, Medical doctors, Nurses and Midwives perform various tasks and procedures to a large number of patients, requiring extensive patient contact.

**Root cause:** The main root cause identified include:Lack of knowledge regarding hand hygiene compliance and unavailability of hand hygiene equipment.

**Objective:** To increase the hand hygiene compliance among clinical staff of Murunda Hospital from 40.08 % to 60% from October 2016 to April 2017.

**Design:** A pre and post interventional study design was used during this project.

**Intervention:** Educating Clinical staff on Hand hygiene compliance using the organized training and availability of foot activated taps or pots (KANDAGIRUKARABE).

**Results:** The hand hygiene compliance rate significantly increased from 40.08 % pre-intervention to 77 % post intervention, where there is an increase of 27% ( $p < 0.001$ ).

### **Conclusion and recommendation**

The implementation was simple and cost-effective. Expanding its application to other hospitals in Rwanda should be considered in the following days. Our results showed that by using strategic problem solving approach and using data to identify and verify the root cause, we can set intervention and improve the hand washing compliance by using resources efficiently in order to decrease the infection rate in our hospital and can be applied to the other hospitals in quality improvement decisions.

## TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION .....	ii
ACKNOWLEDGEMENTS .....	iii
ABSTRACT .....	iv
TABLE OF CONTENTS .....	v
KEY WORDS DEFINITION .....	vii
LIST OF FIGURE .....	viii
LIST OF TABLES.....	ix
LIST OF ACRONYMS AND ABBREVIATIONS.....	xiii
CHAPTER ONE: INTRODUCTION.....	1
1.1. BACKGROUND.....	1
1.2. PROBLEM DEFINITION .....	3
1.3. OBJECTIVE .....	3
1.4. HYPOTHESIS .....	3
1.5. JUSTIFICATION OF THE PROJECT.....	3
1.6. ORGANIZATION OF THE DISSERTATION .....	4
CHAPTER TWO: LITERATURE REVIEW .....	5
2.1 The causes of low rate of Hand Hygiene Practice.....	5
2.2. Importance of hand hygiene compliance.....	7
2.3 Comparison of hand hygiene compliance at different hospitals .....	8
2.4. Interventions and efforts to improve hand hygiene compliance.....	9
2.5. Hand hygiene compliance in Murunda hospital.....	10
CHAPTER THREE: METHODOLOGY.....	12
3.1. DESIGN OF THE STUDY .....	12
3.2. MAGNITUDE OF THE PROBLEM .....	12
3.3. ROOT CAUSE ANALYSIS.....	13

3.3.1. Verification of root causes .....	15
3.3.1.1 Insufficiency of equipment.....	15
3.3.1.2 Knowledge on hand hygiene compliance .....	16
3.3.1.3 The availability of guideline and management intervention .....	17
3.3.2. Results of Root Cause Analysis .....	17
3.4. INTERVENTION.....	18
3.5. MEASURES .....	20
3.6. DATA ANALYSIS .....	21
3.7. ETHICAL CONSIDERATION .....	21
CHAPTER FOUR: RESULTS .....	22
CHAPTER FIVE: DISCUSSION.....	26
5.1. Keys success .....	27
5.2 Challenges .....	28
5.3 Lessons learnt.....	28
CHAPTER SIX. CONCLUSION AND RECOMMENDATION .....	30
6.1. CONCLUSION .....	30
6.2. RECOMMENDATION .....	30
REFERENCES.....	32
APPENDICES .....	37

## KEY WORDS DEFINITION

**Hand-washing** Refers to washing the hands with water and soap or with an antiseptic, and/or alcohol hand rub. In the context of this study, hand-washing is used interchangeably with hand-hygiene.

**Hand-hygiene** Is a general term that applies to hand-washing using water and soap, antiseptic hand rub using hand anti-bacterial.

**Clinical staff** This case considers only medical doctors, Nurses and midwives among other medical professionals.

**Compliance** Act of conforming to the hand hygiene protocols (grouped in five moments of hand hygiene in clinical setting)

## LIST OF FIGURE

Figure 1: Fishbone on hand washing compliance .....	14
Figure 2: Availability of equipment and supplies .....	16
Figure 3: The knowledge results on HHC in Murunda district hospital.....	16

## **LIST OF TABLES**

Table 1: Hand hygiene compliance in Murunda Hospital during five session .....	13
Table 2: Summary of RC.....	18
Table 3: Decision Matrix on hand hygiene knowledge of clinical staff .....	19
Table 4:Decision Matrix on sufficiency of material and equipment.....	20
Table 5: Hand Hygiene Compliance in Murunda Hospital.....	22
Table 6: Availability of materials and equipment of HH in Murunda Hospital.....	23
Table 7: Assessment of knowledge of clinical staff on HHC in Murunda Hospital .....	24

## **LIST OF ACRONYMS AND ABBREVIATIONS**

%	Percentage
Dr	Doctor
HAIs	Hospital Acquired Infection
HCAIs	Health Care Associated Infections
HCWS	Hospital Community Workers
HHC	Hand Hygiene Compliance
HIV	Human Immunodeficiency Virus
IEC	Information Education Communication
OPD	Outpatient Department
SPSS	Statistical Package for Social Sciences
UK	United of Kingdom
USA	United State of America
WHO	World Health Organization
ART	Anti-Retro viral Therapy
QI	Quality Improvement

## **CHAPTER ONE: INTRODUCTION**

### **1.1. BACKGROUND**

The hand hygiene practice is the main factor in preventing the spread of microorganisms within the health facilities, most of healthcare professionals recognise that the hand hygiene compliance is the common problem among healthcare givers and is usually less than 50%<sup>(1)</sup>.

Hand hygiene is considered one of the best methods to prevent healthcare-associated infections<sup>(2,3)</sup> and ensuring that today's medical professionals make hand hygiene a priority is essential. Simple activity of frequent hand washing has the potential to save more lives than any particular vaccine or medical intervention<sup>(2,4)</sup>, to increase awareness of hand washing ,the World Health Organization (WHO) issued the evidence-based and efforts to recommendations for improving health care providers hand hygiene practices<sup>(5)</sup>.

Despite the evidence proves that that the benefits of hand washing and efforts to raise the awareness of the importance of hand washing ,low rates of compliance continue to be reported worldwide<sup>(6)</sup>. Different possible causes such as workload and insufficient resources for hand hygiene expose the clinical staffs in developing countries not to comply with hand washing guidelines<sup>(7)</sup>. After seeing those challenges that is why the researcher with the members of Infection Prevention and Control committee proposed to conduct such research in order to handle this problem.

This study was conducted in Murunda District Hospital, a semi-public hospital that was built by Missionaries in 1962 and inaugurated in 1988. It is located in Western province, Rutsiro District with a Catchment area covering 17 health centers: Murunda, Kinyira, Cyimbiri, Biruyi, Karumbi, Rutsiro, Kabona, Mushubati, Mukura,

Kivumu, Nyabirasi, Congo-Nil, Kayove, Musasa, Kinunu, Bitenga and Kibingo. The Murunda Hospital covers 344,279 populations in its catchment area and it is the only one Hospital in Rutsiro District <sup>(8)</sup>.

Murunda hospital has a total of 125 staff in different categories as following: 1 Medical Director, 9 Medical doctors, 42 Nurses, 10 midwife, 20 Paramedical staff, 16 Administrative staff and 27 supporting staff.

The hospital has the following departments:

**The clinical department:** Outpatient (OPD), internal medicine, Gynaecology and obstetrics, pediatric, surgery, neonatology), Emergency, Ambulance, Pharmacy, Operating theater room, ARV, Dental, ophthalmology, Mental health, Physiotherapy, Laboratory and Medical imaging.

**The Support department:** Administration, Procurement, Accounting, Cashier, Monitoring and Evaluation, Logistics, Store, Recovery, Public relation and customer care, Secretariat and Maintenance <sup>(8)</sup>.

This capstone report describes the process of identifying the root cause of the problem, the creating of the intervention and its implementation in order to increase the rate of hand washing by clinical staff of Murunda Hospital.

## **1.2. PROBLEM DEFINITION**

There is a low rate of hand washing compliance among clinical staff of Murunda Hospital. The term hand hygiene refers to any action of hand washing which is physical removal of microorganisms from the hands by using soap, water or alcohol-based hand rub<sup>(6,9)</sup>. Most of Murunda employees in the meeting along with the members of Infection Prevention and Control committee agree that the poor hand hygiene problem is significant and serious and reported to be one of the leading causes of infection where the rate of hand washing compliance among clinical staff was low at 40.08%.The hospital has no water from WASAC but committed to avail water from spring source or rain water and the hand washing supply is available but no enough sink installation in the hospital.

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

## **1.3. OBJECTIVE**

To increase the hand hygiene compliance among clinical staff of Murunda Hospital from 40.08 % to 60% from October 2016 to April 2017.

## **1.4. HYPOTHESIS**

The regular staff training and availability of materials and equipment will increase the compliance in hand hygiene.

## **1.5. JUSTIFICATION OF THE PROJECT**

Hospital Acquired Infections (HAIS) have major consequences on patient where there is an increase of length of stay, morbidity, mortality and the financial burden in

the society<sup>(1,10)</sup> and this capstone dissertation will be important to the Rwandan society considering the increasing negative consequences of noncompliance of hand hygiene practice especially in health care setting and their negative effects. The hands of clinical staff in the health care setting are the most common source of transmission of pathogenic microorganism from hospital surroundings to patients<sup>(11-13)</sup>. This project is conducted in order to know the causes and consequences of noncompliance with hand washing, and performing the intervention for increasing the hand washing among clinical staff of Murunda Hospital and the success of this project will serve as a contribution and experience for others health care settings with similar problems.

## **1.6. ORGANIZATION OF THE DISSERTATION**

This Capstone is divided into six main chapters. Chapter one introduces the setting and background of the hospital.

Chapter two contains the literature review on detail, of definition and importance of hand washing compliance, as well as some findings about the hand washing compliance in different countries. Chapter three describes the design of the project. A detailed root cause analysis and the selection of intervention is described. The method of evaluating the effectiveness of the intervention is also included in this chapter.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 The causes of low rate of Hand Hygiene Practice

This chapter provides a review of relevant literature on the practice of hand hygiene as an important means to prevent the infections in healthcare settings. Resources and data sources that provide adequate information were accessed. Some of these include: Published literature: Books & Journals, Internet, Government agency publications, International Organizations where we use HINARI to gain access to one of the world's largest collections of biomedical and health literature, Pub Med and Un-published literature: Internet, PhD Dissertations, and Master Thesis. Science direct and other websites of health systems, World Health Organization, books, journals and previous dissertations related to the topic were also consulted. The researcher started by defining the term hand hygiene as any action of hand washing which is physical removal of microorganisms from the hands by using soap, water or alcohol-based hand rub<sup>(5,6)</sup>.

In the hospital, the transmission of nosocomial pathogens can be increased or decreased by the hand hygiene if the staff respect or not the opportunities of patient care following the five moments of WHO in hand hygiene such as:

**Moment 1:** Before patient contact to protect the patient against exogenous infection, by harmful germs carried on the hands of health professionals,

**Moment 2:** Before an aseptic task to protect the patient against infection with harmful germs including his/her own germs entering his/her body,

**Moment 3:** After body fluid exposure risk to protect the health care giver with the patient's harmful germs and germ spread,

**Moment 4:** After patient contact to protect the health care from colonization with patient germs and protect the health care environment from germ spread,

**Moment 5:** After contact with patient surroundings to protect from colonization with patient germs that may be present on surfaces/objects in patient surroundings(5,9,14).

Most of Murunda employees in the meeting with the member of Infection Prevention and Control committee agree that one of the causes of infection at health facility is poor hand hygiene and the poor hand hygiene in Murunda hospital is significant and serious problem. The report of World Health Organization states that more than 1.4 millions of people acquire the infection from the hospital. For insuring the safety of patients and the staff, it requires the proper hand hygiene compliance <sup>(15,16)</sup> and the use of gloves on hand hygiene compliance such as hand washing with soap and water; the use of alcohol based rub are the key way of reducing hospital acquired infections<sup>(17)</sup>.

There are four aspects of hand hygiene interventions such as demonstrative knowledge, demonstrative competence, enable staff and verify competency <sup>(18)</sup>.

A study that was conducted in USA on health-care-associated infections showed that poor hand hygiene is an important cause of morbidity and mortality among hospitalized patients worldwide. Such infections affect nearly two million individuals annually in the United States and are responsible for approximately 80,000 deaths each year <sup>(19)</sup>. Another study conducted in USA on hand hygiene compliance of health care workers showed that compliance rate ranged from 42% to 58% <sup>(15)</sup> and one of the causes of lack of hand hygiene compliance in health care institution is the perception and knowledge of the transmission risk where the impact of Hospital Compliance Acquired Infection (HCAI); social pressure; Hospital Community Workers (HCWs) conviction of their self-efficiency is stated<sup>(20)</sup> and the important

elements to be considered before selecting a hand hygiene agent are to form a multidisciplinary team; to establish criteria for product selection<sup>(21)</sup>.

## **2.2. Importance of hand hygiene compliance**

Hand hygiene is considered one of the best methods to prevent healthcare-associated infections<sup>(2,3)</sup>. In 1981, the first hand hygiene guidelines for the acute care setting were published by the Centers for Disease Control and Prevention<sup>(22)</sup>. These guidelines have since been updated and additional hand hygiene guidelines have been published by the Association for Professionals in Infection Control and Hospital Epidemiology, and the World Health Organization<sup>(18,23)</sup>. As part of the joint commission's hospital accreditation program, institutions are required to use hand hygiene guidelines, monitor hand hygiene compliance, and provide compliance feedback<sup>(24)</sup>. Further, national safety goals to reduce healthcare-associated infections stress the importance of proper hand hygiene<sup>(2,5)</sup>.

No one should get sick seeking care. Up till now globally, hundreds of millions of people are affected every year by health care-associated infections (HAIs), many of which are completely avoidable. No country or health system, even the most developed or sophisticated, can claim to be free of HAIs<sup>(9)</sup>.

Hand hygiene importance was first realized in a Vienna hospital in the 19th century. Maternity patients were dying at a high rate. Dr. Ignaz Semmelweis started ordering his staff members to wash their hands before treating the patients, extremely lowering the death rate as a result<sup>(2)</sup> and the transfer of bacteria from cadavers to the patients from the staff's hands was the criminal in the deaths that is why to be ensure that today's medical professionals make hand washing a priority is essential. Simple activity of frequent hand washing has the potential to save more lives than any particular vaccine or medical intervention<sup>(2,4)</sup>.

Dr Margaret Chan, Director General of WHO said “Strong measures for infection prevention and control support some of our most important global health goals. Infection prevention and control is the backbone of good hygiene and all its preventive power. Patients and staff deserve safe health care settings. Preventing infections in the first place reduces the need for antibiotics and cuts the risk that we will lose these fragile medicines” <sup>(25)</sup>.

### **2.3 Comparison of hand hygiene compliance at different hospitals**

Maximum hand hygiene opportunities take place when there are the nurse-patient interactions <sup>(26)</sup>. Even though hand hygiene is the single most important measure to prevent HAIs and the spread of antibiotic resistant microorganisms <sup>(22)</sup>; international research indicates that hand hygiene rarely is correctly accomplished<sup>(26)</sup>. Observational studies conducted in the UK <sup>(27)</sup> and USA <sup>(24)</sup> sub-Saharan Africa <sup>(28)</sup> have examined hand hygiene rates of healthcare workers in hospitals, and found that compliance scores vary between 40 and 78 % and most of healthcare professionals recognize that the hand washing compliance among healthcare givers is usually less than 50% <sup>(1)</sup> that is why Murunda Hospital has a serious problem where the hand hygiene compliance doesn't arrive to international target.

Differences in compliance vary between professional groups and level of staff experience <sup>(12)</sup>. A heavy workload and time pressure also affect hand hygiene compliance, as well as the kind of clinical task performed, and whether it is perceived as dirty or clean<sup>(21)</sup>. Compliance has also been reported to vary with time of day and time of year<sup>(29)</sup>.

## **2.4. Interventions and efforts to improve hand hygiene compliance**

Individual motivation, knowledge and engagement in infection control influence the hand hygiene performance of healthcare providers<sup>(30)</sup>, as well as social factors such as organizational culture, and the practices of peers and senior staff<sup>(31)</sup>. In addition, hand hygiene compliance is affected by the way work situations are organized for example whether alcohol based dispensers are available<sup>(32)</sup>, or pasted hand hygiene posters by washbasins are visible<sup>(33)</sup>.

A recent review determined that a successful hand hygiene educational program has several key features, these features include reinforcement of hand hygiene messages, knowledge of health care workers' perceived importance of hand hygiene and its role in prevention of healthcare-associated infections; monitoring and feedback of hand hygiene practices; practical education tools; role-modeling by senior staff; and supportive infrastructure and management. Interventions should be multimodal, and teaching methodology should be progressive and include different types of methods. The educational program itself should be designed to include local structure, priorities, and resources<sup>(34,35)</sup>. Additionally, as stated above, across several studies, the 2009 WHO report found hand hygiene practices should be multimodal, and structurally and culturally personalized to improve compliance with hand hygiene<sup>(13)</sup>.

A framework for change should include parameters to be considered for hand hygiene promotion, together with the level at which each change must be applied: education, motivation, or system. Some parameters are based on epidemiologic evidence and others on the authors' and other investigators' experience and review of current knowledge. Some parameters may be unnecessary in certain circumstances and helpful in others. In particular, changing the hand hygiene agent

could be beneficial in institutions or hospital wards with a high workload and a high demand for hand hygiene when waterless hand rub is not available<sup>(13,17)</sup>.

Several parameters that could potentially be associated with successful promotion of hand hygiene would require a system change and more research is needed to determine whether education, individual reinforcement technique, appropriate rewarding, administrative sanction, enhanced self-participation, active involvement of a larger number of organizational leaders<sup>(11)</sup>.

## **2.5. Hand hygiene compliance in Murunda hospital**

The hand washing rate in Murunda hospital rises at 40.08% because only 192 opportunities among 479 in clinical processes are realized as recommended means that the Medical Doctors are represented by 39.72% and the nurses/Midwives by 40.24%. For this case the research were conducted to know the cause of noncompliance of hand hygiene and search the remedies for handling this problem. The hospital has implemented the water tanks system (for the rain water) for water cleaning, and washing during water break and the hand washing supply is available in the hospital ,on the other hand no enough sink installation in the hospital.

Reasons given by professionals for the lack of compliance to hand-cleaning practices in Murunda hospital like the worldwide are highlighted in several explanatory factors, including: work conditions (lack of time), infrastructures (lack of equipment), training (inadequate), human environment (superiors, colleagues, unscrupulous patients) and the health of medical and nursing staff (skin irritations caused by frequent hand-cleaning).Infection prevention and control have always been serious topics<sup>(2)</sup>but if the researcher asks the clinical staff on hand hygiene procedure , a lot of them are in the position that nurses washing their hands not

only prevent them from getting sick, but it also reduces the risk of infecting others. If they don't wash their hands properly before coming into contact with others, they can infect their patients but also their family members.

## **CHAPTER THREE: METHODOLOGY**

### **3.1. DESIGN OF THE STUDY**

We conducted a pre and post interventional study design to assess the effect of our intervention on the hand hygiene compliance among clinical staff of Murunda Hospital. During the pre-intervention period from November to December 2016 a project team was formed to conduct this quality improvement project. An assessment to measure the magnitude of the problem, which served as our baseline data, and root cause analysis were conducted by the project team. The intervention was selected after the analysis of root cause and then was identified and implemented in January 2017. A post intervention evaluation was conducted in March 2017 (Appendix 8). The planned activities were conducted according to schedule and it was planned in Gantt chart (Appendix 4).

### **3.2. MAGNITUDE OF THE PROBLEM**

For data collection, the researcher started by informing the hospital managers about the project to be conducted, the data were collected by observation of all clinical departments requesting the hand washing using the tool for collecting data (appendix 1). The researcher in collaboration with the clinical director, the hospital quality improvement focal person and the environment health officer observed the hand washing compliance to clinical staff available in different services in five days by using ten minutes to each individual in different occurring opportunities. A tool was developed by the researcher adapted from a WHO tool to assess the average of compliance of hand washing. After data collection, the researcher compiled data and Excel was used for data entry and statistical analysis.

**Table 1: Hand hygiene compliance in Murunda Hospital during five session**

Session N°	Professional categories				Total per session	
	Medical doctors		Nurses/ Midwives		Opportunities(n)	Hand hygiene realized (h)
	Opportunities(n)	Hand hygiene realized (h)	Opportunities(n)	Hand hygiene realized (h)		
1	27	12	68	30	95	42
2	32	15	74	24	106	39
3	22	9	56	30	78	39
4	32	11	68	27	100	38
5	28	9	72	25	100	34
<b>Total</b>	141	56	338	136	479	192
<b>PERCENTAGE</b>	<b>39.72%</b>		<b>40.24%</b>		<b>40.08%</b>	

The table above brings the result that only 192 opportunities among 479 in MURUNDA hospital respected the hand hygiene compliance, which represents the 40.08% where the Medical Doctors are represented by 39.72% and the nurses/Midwives by 40.24%.

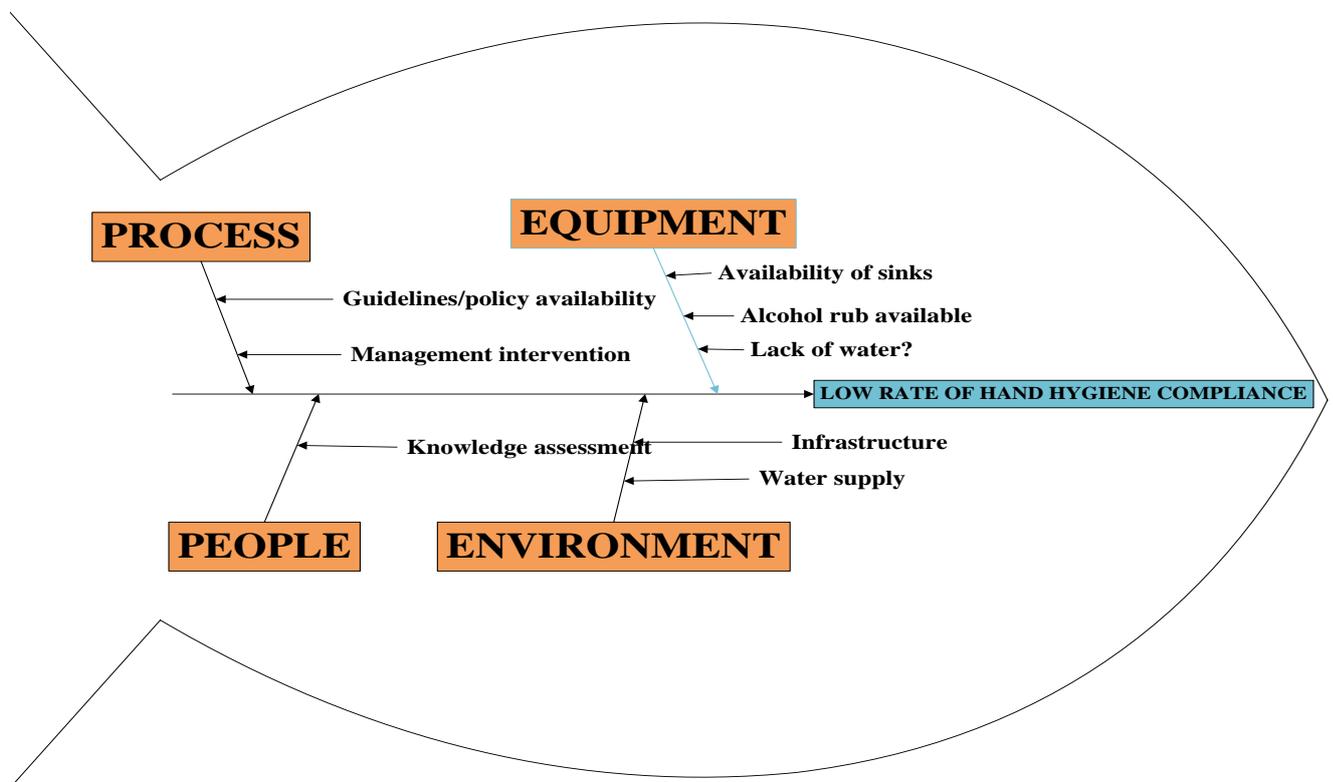
### 3.3. ROOT CAUSE ANALYSIS

In March 2016, a literature review was conducted to identify published documents on possible causes and impact of hand washing compliance in worldwide. With the intention of resolving this problem, the researcher has highlighted many causes

which contribute to the low rate of clinical staff hand hygiene compliance problem in MURUNDA hospital.

This section will go also in deep with data from environmental health and logistic services and other related sources of information, in order to find scientifically the real cause of the problem.

To verify these alternative causes, the researcher tried to make analysis of data from the clinical staff of Murunda hospital with consideration of the availability of equipment (Appendix 3) in order to satisfy the hand hygiene compliance requirements and also the hospital needs the personnel who understand the utility of hand hygiene compliance (Appendix 5).



**Figure 1: Fishbone on hand washing compliance**

In order to understand the raw rate of hand hygiene compliance, the researcher tried to make analysis of data from the clinical staff of Murunda hospital with consideration of the availability of equipment for a 5-day observation and a Questionnaire for clinical staff was distributed in different departments (Appendix 2).

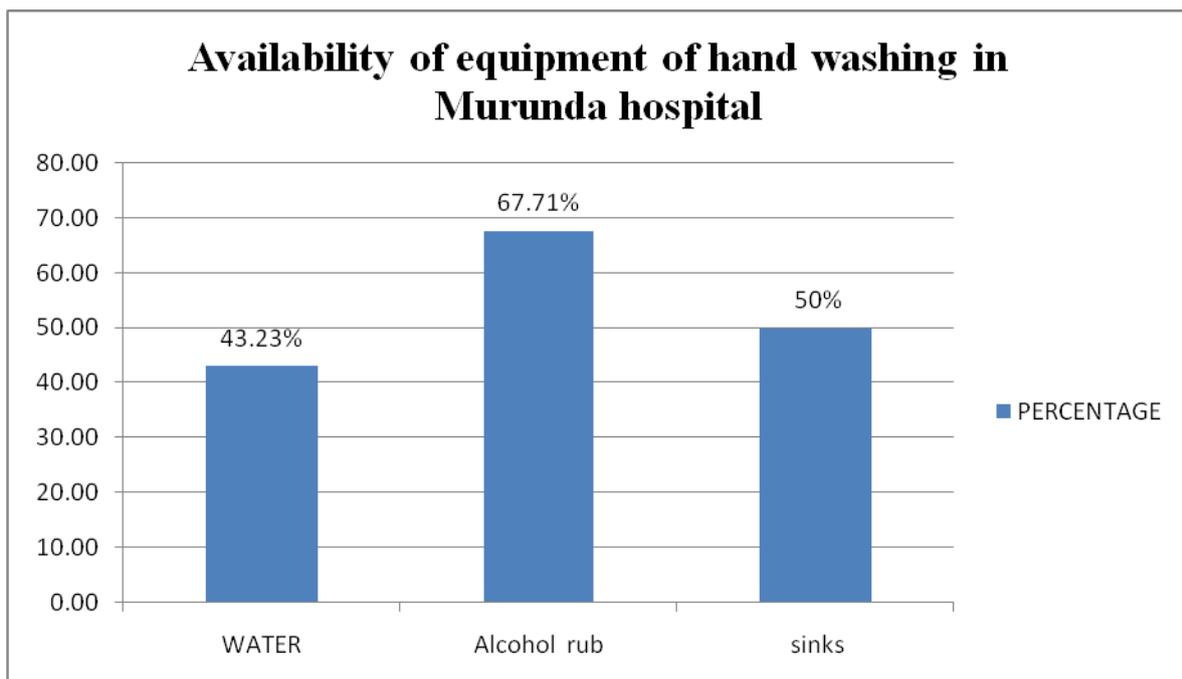
By using the designed checklist in different clinical departments, the researcher assessed the availability of all required equipment such as water, alcohol based hand sanitizer and sinks and he got the following results.

### 3.3.1. Verification of root causes

More data were collected in order to verify the 4 suggested root causes and identify the final root cause.

#### 3.3.1.1 Insufficiency of equipment

By using the designed checklist in different clinical departments, the researcher assessed the availability of all required equipment such as water, alcohol based hand sanitizer and sinks and he got the following results.



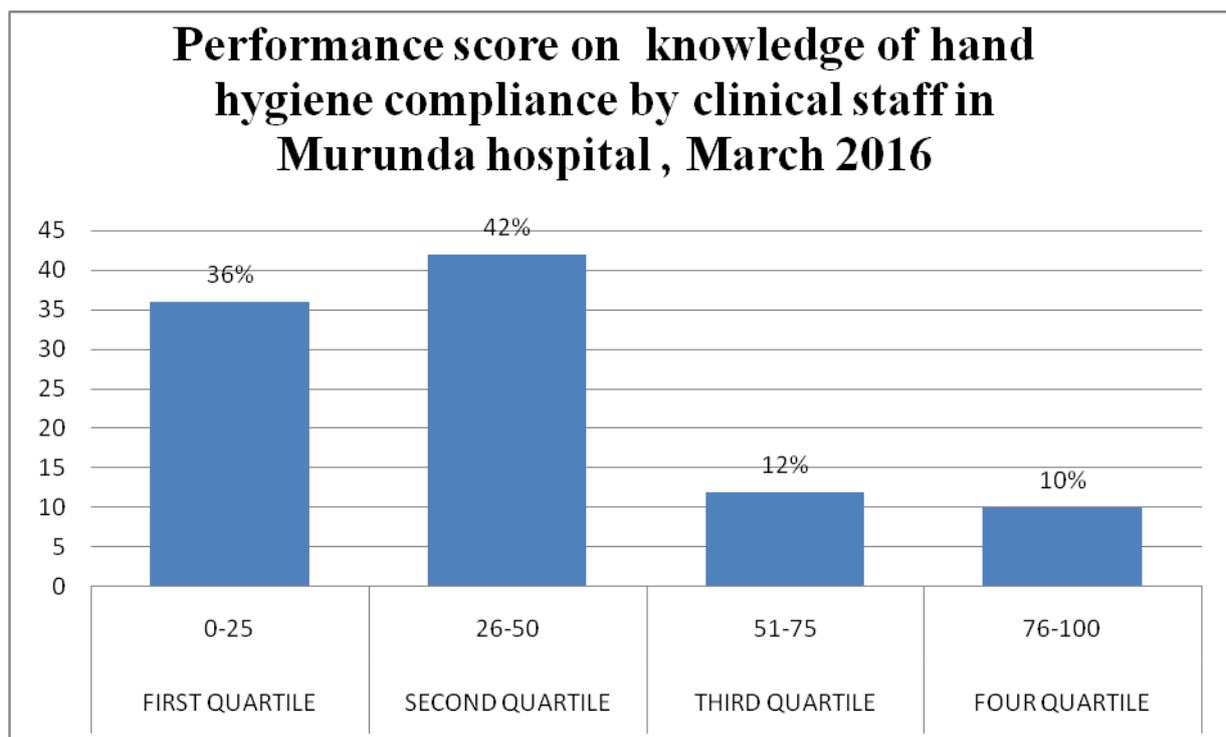
## Figure 2: Availability of equipment and supplies

The researcher saw that the availability of water is 43.23%, the alcohol rub at the 67.71% and the sinks at the 50%. This implies that it is a challenge for performing the hand hygiene without the sufficiency equipment.

### 3.3.1.2 Knowledge on hand hygiene compliance

The questionnaires of ten questions was distributed to 50 staff from all departments for ensuring how they are about hand washing compliance; the “Yes” answer was considered as the true response and the “No” answer as false response.

The following results are obtained:



## Figure 3: The knowledge results on HHC in Murunda district hospital

The categorization in marking schemes was made, and the four classes among the respondents after setting the criteria are adapted and the first quartile comprises between 0 and 25 marks, the second for 26 to 50, the third class for 51 to 75 and the

final one for 76 to 100 percent. The information collected through a survey gave us the results observed in the above chart of 78% of staff who don't have the sufficiency knowledge on five moments of hand hygiene compliance.

The researcher checked in training records register located in the office of chief of nurses to see the number of staff who got the training on HHC; the result showed that nobody had participated in training of hand hygiene compliance.

### **3.3.1.3 The availability of guideline and management intervention**

The documentation process was observed in order to understand the information on the availability of guidelines and protocols about HHC in administrative manual of the Hospital. The policy and procedure on hand washing is already established and the infection prevention and control committee has the mandate of identifying and prioritize infection risks throughout the organization also developing and evaluating the Infection prevention and control plan and assess if the staff knows about those guidelines but this committee seemed not to working properly. There was no clear intervention of administration for ensuring the execution of related policies.

### **3.3.2. Results of Root Cause Analysis**

After the root cause analysis, the results show that the clinical staff are not aware about hand hygiene compliance and a framework for change should include parameters to be considered for hand hygiene promotion shown in the table below:

**Table 2: Summary of RC**

<b>Suggested root causes analysis from fishbone</b>	<b>Information needed to prove or disprove it</b>	<b>Accept/Reject</b>
Insufficient equipment and infrastructures	Sinks are not enough for proper hand hygiene compliance	Accept
Availability of P&P on HHP	Existence of the Policy and Procedures <ul style="list-style-type: none"> <li>• Availability of P&amp;P</li> <li>• Availability of the infection prevention and control committee</li> </ul>	Reject
Training and knowledge on hand hygiene compliance	<ul style="list-style-type: none"> <li>• No record of hand hygiene practice in the book of training</li> <li>• 78% of respondents are not able to get 50% of marks through the distributed questionnaire.</li> </ul>	Accept

### **3.4. INTERVENTION**

Based on the root cause analysis, the project team generated a few strategies to address the root cause. Based on the comparative analysis, the project team decided to increase the clinical staff knowledge on Hand Hygiene compliance and avail the sufficiency equipment in Murunda Hospital.

For lack of knowledge, the possible solutions are:

Training of clinical staff,

Avail the hand hygiene vision reminder in work place,

IEC (Information Education Communication),

Supervision and reporting system.

**Table 3: Decision Matrix on hand hygiene knowledge of clinical staff**

Strategic alternatives	Evaluation criteria				
	Impact	Expens e	Feasibilit y	Time	Tota l
Training of clinical staff	5	4	5	4	18
Developing different materials	4	1	4	3	12
IEC	1	5	1	1	8
Supervision and reporting system	2	2	2	1	7

In other side, the unavailability of sufficient material can be solved by the following items: Increase the number of foot activated taps or pots (KANDAGIRUKARABE) of water in different units,

Avail alcohol based hand sanitizers,

Consistent availability of water supply in the hospital,

Requisition and reporting system.

**Table 4:Decision Matrix on sufficiency of material and equipment**

Strategic alternatives	Evaluation criteria				
	Impact	Expens e	Feasibilit y	Time	Tota l
Increase foot activated taps or pots (KANDAGIRUKARABE) of water in different units	4	3	5	4	16
Increase consistent water supply	2	1	2	3	8
Avail alcohol based hand sanitizers	2	3	3	2	10
Requisition and reporting system	1	5	1	1	8

Using the matrix table, the comparative analysis of alternative solutions based on impact, expense, feasibility, time and their respective scores, the final interventions are:

Education and training of clinical staff because it scores 18 over 20 marks and increasing foot activated pots (KANDAGIRUKARABE ) where it scores also 16 over 20 marks from the 4 solutions proposed and scored by the team.

### **3.5. MEASURES**

Both outcome indicator and process indicator are measured. To measure the impact of interventions, process indicators have been evaluated and monitored as planned. Those indicators include number of clinical staff trained, analyzing the results of pre and post test, HH equipment and supplies availability in services. Then finally we measured hand hygiene compliance as outcome indicator.

### **3.6. DATA ANALYSIS**

After collection of data, the double entry was carried out using Microsoft excel vision 2010 and thereafter the data editing and entry cleaning was conducted in order to correct the errors and avail a clean database fit for analysis. Descriptive statistics was used for data screening and inferences were drawn for results interpretation. Chi Square and fisher tests were used with p.value set 0.05 of significance level.

### **3.7. ETHICAL CONSIDERATION**

In order to conduct this project,the researcher needed ethical clearance from University of Rwanda, as well as permission from the management of Murunda Hospital as the direct supervisor (Appendix 5). The study did not involve patient contact, treatment of patient was not affected, we did chart audit where we got approval from hospital Director for conducting the research and being able to access the data (appendix 6).

## CHAPTER FOUR: RESULTS

The study aimed to implement the increasing of hand hygiene compliance among clinical staff of Murunda District hospital from 40.08% to 60%.

The intervention were implemented with Gant chart. The multidisciplinary team including the researcher, the medical doctors, the nurses and midwives, quality improvement team of the hospital and steering committee participated for implementation of this interested project.

### 4.1 Hand hygiene compliance

For pre- intervention, the total number of observed moments for hand hygiene was 479, and clinical staff's overall compliance was measured to 40 % where the Medical Doctors are represented by 39.72% and the nurses and midwives by 40.24%. Non-compliance was observed in 60 % of these moments.

The overall hand hygiene compliance statistically increased from 40 % pre-intervention to 77 % post intervention, with  $P < 0.05$  (table 3).

**Table 5: Hand Hygiene Compliance in Murunda Hospital**

Indicator	Pre intervention		Post intervention		p-value
	No frequency(N=479)	or Percentage	No(N=212)	Percentage	
Hand hygiene compliance	192	40.08%	164	77.36%	0.001*

## 4.2 Availing the materials and equipment of hand hygiene

Comparing the availability of equipment (Kandagirukarabe), the hospital doesn't have any kind of that equipment like Kandagirukarabe before the intervention but the 18 items had been bought during the intervention means that there is a statistical increase from 0% to 75% as shown in table below:

**Table 6: Availability of materials and equipment of HH in Murunda Hospital**

Indicator	Pre intervention		post intervention		p. value
<b>Process indicator</b>					
Availability of equipment (KANDAGIRUKARABE)	No frequency(N=24)	or Percentage	No(N=24)	Percentage	
	0	0	18	75	0.001*

## 4.3 Knowledge of clinical staff on hand hygiene

The results for knowledge assessment show that minimum time 46% in pre intervention to 89% (P=0.001) with 43% of improvement, effectiveness from 28% to 85% (P=0.001), impact from 46% to 81% (P=0.001), rapidity from 6% to 71% (P=0.004), contribution decreased from 100% to 98% (P=0,36), content from 30% to 85% (P=0.002), importance increased from 76% to 89% (P=0,074), conditions 22% to 79% (P=0.001), procedures or techniques increased from 56% to 97% (P=0.001), recommendation increased from 60% up to 87% (P=0.009).

**Table 7: Assessment of knowledge of clinical staff on HHC in Murunda Hospital**

<b>Knowledge</b>	<b>Pre-intervention</b>	<b>Post intervention</b>	<b>Difference (%)</b>	<b>p-value</b>
The minimal time needed for alcohol-based hand rub is to kill most germs on your hands is between 20-30sec?	23(46%)	55(89%)	43%	0.001*
Hand rubbing is more effective against germs than hand washing	14(28%)	53(85%)	57%	0.001*
Hand rubbing causes skin dryness more than hand washing	23(46%)	50(81%)	35%	0.001*
Hand rubbing is more rapid for hand cleaning than hand washing	3(6%)	44(71%)	65%	0.004*
Hand hygiene can contribute to infection control	50(100%)	61(98%)	-2%	0,36
Hand Hygiene covers both: Hand washing using soap and water, Cleaning hands with waterless or alcohol-based hand sanitizers	5(30%)	53(85%)	55%	0.002*
Hand hygiene is the most important measure to avoid the transmission of harmful germs and to prevent health care-associated infections	38(76%)	55(89%)	13%	0,074
After hand rubbing or hand washing,	11(22%)	49(79%)	55%	0.001*

let your hands dry completely before  
putting on gloves

Hands should always be washed after  
removing gloves following a clinical  
procedure

28(56%)      60(97%)      41%      0.001\*

Hand washing and hand rubbing are  
recommended to be performed in  
sequence

30(60%)      54(87%)      27%      0,009\*

---

## CHAPTER FIVE: DISCUSSION

The main objective of this study was to improve hand hygiene compliance and the researcher observed the increasing of hand hygiene significantly. The method used was a pre and post intervention study that explored Murunda Hospital clinical staff hand washing compliance within international standards. It was important that clinical staff hand washing compliance rate was 40.08% for pre intervention and become 77.36 %, which is higher than that reported among Jordanian HCWs (63.8%)(36)and among Turkish clinical staff (52.63 %)(37) means that Murunda hospital clinical staff are aware on hand hygiene practice which will reduce the infections in that hospital. On the other hand, it is still less than the compliance rate of 80.2% among nurses in China (Hong Kong),(38) 88% among HCWs in The Netherlands after applying an educational program (39)and 84% among American nurses (40). Despite some organisational dissimilarities that make those findings not comparable, Murunda Hospital clinical staff hand washing compliance rate described in this study is quiet considered low when compared with hand washing protocols.

The current quality improvement project showed that the hand hygiene compliance was 44% and post intervention 77% ,the findings are close to those found in experimental study in Gitwe District hospital where it improved from 34 up to 68% by educating health workers on proper HHpractice ,providing materials and equipment and infrastructures(28). However, the individual motivation as well as social factors such as organizational culture can also improve the compliance on hand hygiene practice (41).

These results may be attributable to differences in training between physicians and nurses, perceived model roles, motivation and this should be explored fully in

subsequent studies. The benefits of hand hygiene compliance are to reduce the rate of deaths , to save more lives than any single vaccine or medical intervention, to prevent diarrheal disease and pneumonia which cause more than 3.5 million deaths worldwide in children under age of every year <sup>(2,22)</sup> .

### **5.1. Keys success**

These findings provided some interesting keys to success including commitment from hospital senior management team and to Junior Staff showed the flexibility during the implementation process, sharing the results from the baseline assessment till the evaluation process. As we are in accreditation process, the staffs were fully committed in order to improve their hand washing compliance. The researcher with environmental health officer provided training to the staff and put posters on the walls in various locations. Training was attended mostly by physicians and nurses. Both of them showed significant improvement in hand hygiene practice after the intervention. The success of this intervention was also due to many factors such as identifying a controllable and a focused problem. The selection of a realizable project determines the chance of success. The project intervention was within the control of the hospital and thus making the intervention possible.

The top factors identified by participants for improving hand hygiene compliance related to avail the resources especially the foot activated taps or pots “Kandagirukarabe” and training; themes that run throughout the literature on this topic. From our findings, we suggest that that promotion of a positive culture, led by management, should ensure effective and continual hand hygiene compliance improvement. The project creates opportunity for our staff to gain knowledge and

develop skills (the staff knew when to wash the hand and how to perform it, they knew the importance of hand hygiene as one way to fight against the HAIs).

## **5.2 Challenges**

Despite the interruption by different factors, all planned activities were implemented at really in one hand but in other hand some challenges persisted. Thus this project had the following limitations: The post-intervention period of this project was limited knowing that the quality improvement project require much time , the resistance to change and lack of commitment to some staff were observed means that some staff were not actively engaged and the ownership were slowly grading. Another challenge was the unavailability of all staff during the training as they have different work shifts and their participation in “Itorero ry’igihugu”. The problem of water interruption during the period of intervention was also observe. The availability of some hand hygiene equipment such as foot activated taps or pots were not consistent due to hospital budget limitation. The study participants were only clinical staff instead of including all hospital staffs.

## **5.3 Lessons learnt**

Different lessons have been acquired during this quality improvement project, the steps involved in conducting the quality improvement were noted. In addition, we realized that an effective quality improvement project requires changes in an organization's culture. This occurs when all staff embraces the thinking of the project and recognizes their roles in supporting an institution focus on quality improvement. Through this period it was found that for quality to be effectively managed, individuals and groups in an organization should have a clear understanding of their roles and responsibilities relative to the project. Each staff member has a role in ensuring that the objective of QI project is met and the

organization needs to build also ongoing opportunities for staff into the QI framework to sustain the QI determination. The implementation help us to know better how if we use proper leadership and governance principles to manage internal workforce we can change things in our working place.

## **CHAPTER SIX. CONCLUSION AND RECOMMENDATION**

### **6.1. CONCLUSION**

As caring professionals, health care workers seek to protect others and ensure the wellbeing of patients and co-workers. Although a simple measure in preventing the spread of disease, the literature suggests that hand hygiene practices are not always undertaken in accordance with universally accepted standards. The implementation of this project was simple and cost-effective. Expanding its application to other hospitals in Rwanda should be considered in the following days. Our results showed that by using strategic problem solving approach can improve and achieve results with a minimum available resources the improve hand hygiene compliance in health care settings.

### **6.2. RECOMMENDATION**

Longer term follow up is needed to see the sustainability of the project. We also recommend the senior management committee of the hospital to integrate strategic problem solving in staff training plan in the future to build staff capacity in implementing other quality improvement projects within the hospital.

Based on the key results of this study, the following recommendations are formulated:

Although, the results show high rates of hand washing compliance among Doctors, nurses and midwives who participated in the study, consistent efforts must be applied in order to achieve a 100% of HH compliance, even if it is rarely achieved.

Murunda District hospital should ensure the consistency availability of hand hygiene supplies and updating knowledge systematically of staff .It is recommended that further research should be done in order to identify other factors associated with perceived behavioral control in the local context. The greatest contribution of this

study is in raising the awareness regarding the importance of complying with hand washing protocols.

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## APPENDICES

**Appendix 1: Hand hygiene compliance tool/collection of data**

Session N°	Professional categories				Total	
	Medical doctors		Nurses, Midwives			
	Opportunities(n)	Hand hygiene realised (h)	Opportunities(n)	Hand hygiene realised (h)	Opportunities (n)	Hand hygiene realised (h)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
<b>Total</b>						

## Appendix 2

### QUESTIONNAIRE TO ASSESS THE KNOWLEDGE ON HHC

NO	QUESTION	ANSWERS	
		Yes	No
1	The minimal time needed for alcohol-based hand rub to kill most germs on your hands is between 20-30sec?		
2	Hand rubbing is more effective against germs than hand washing		
3	Hand rubbing causes skin dryness more than hand washing		
4	Hand rubbing is more rapid for hand cleansing than hand washing		
5	Hand hygiene can contribute to infection control		
6	Hand Hygiene covers both: Hand washing using soap and water, Cleaning hands with waterless or alcohol-based hand sanitizers		
7	Hand hygiene is the most important measure to avoid the transmission of harmful germs and to prevent health care-associated infections.		
8	After hand rubbing or hand washing, let your hands dry completely before putting on gloves		
9	Hands should always be washed after removing gloves		

	following a clinical procedure		
10	Hand rubbing is more rapid for hand cleansing than hand washing		
11	and washing and hand rubbing are recommended to be performed in sequence		

**Appendix 3: Check list on the availability of materials and equipment on the.../...../2016**

Department	TIME	WATER		TOWEL		Alcohol rub		sink	
		yes	No	Ye s	No	Yes	No	Yes	No
Pediatrics	Day1								
IM	Day1								
MATERNITY	Day1								
SURGERY	Day1								
NEONATOLOGY	Day1								
EMERGENCY	Day1								
OPD	Day1								
LABORATORY	Day1								
KINE	Day1								
Pediatrics	Day2								
IM	Day2								

MATERNITY	Day2								
SURGERY	Day2								
NEONATOLOGY	Day2								
EMERGENCY	Day2								
OPD	Day2								
LABORATORY	Day2								
KINE	Day2								

## Appendix 4 implementation Gantt chart

Tasks/actions	Responsible	Time Line											
		Nov-16				Dec-16				Jan-17			
		1 wee	2 week	3 week	4 week	1 week	2 week	3 week	4 week	1 week	2 week	3 week	4 week
<b>Availability of equipment</b>													
Preparation of bidding document	Procurement officer												
Publication and distribution of invitations to bid	Procurement officer												
Submission and receipt of tenders	Procurement committee												
obtaining approvals for the award recommendations from competent authorities	Director & Researcher												
Preparation of notification of tender award	Procurement officer												
Requisition of materials	procurement & Researcher												
Reception of Kandagirukarabe	Logistics & Researcher												
<b>Training</b>													
Prepare training manual(power point)	Researcher &EHO												
Prepare training materials(flipchart, video,projector)	Researcher&EHO												
Identify the participants	Researcher &EHO												
Look for training location	Researcher												
Prepare the invitation	Researcher												
Sign the invitation	Hospital Director												
Requisition of signed invitation	Secretary												
Submission or distribution of invitation	Researcher												
Register of participants	Researcher												
Pre-test	Researcher and EHO												
Training	Researcher and EHO												
Post test	Researcher and EHO												

## Appendix 5. Comparative Analysis of Alternative Solutions

Based on the root cause, the following alternative solutions were proposed:

**Solution one:** A trained staff will be assigned to clinical department in order to improve the hand hygiene compliance

**Solution two:** Increase the number of foot activated taps or pots in different departments.

### COMPARATIVE ANALYSIS FOR AVAILABILITY OF EQUIPMENT

**Table 1: Comparative analysis based on impact**

Alternative Solutions	Impact	Score
Increase the number of foot activated taps or pots (KANDAGIRUKARABE) of water in different units	Needs removing soiled water	4
Consistent availability of water supply in the hospital	Suitable for continuous water	2
Avail alcohol based hand sanitizers	A lot of work is needed	2
Requisition and reporting system	The consumption is shown	1

**Table 2: Comparative analysis based on expense**

Alternative Solutions	Expense	Score
Increase the number of foot activated taps or pots (KANDAGIRUKARABE) of water in different units	Ten foot activated taps = 700,000 Rwf 10 hand basin = 5,000 Rwf Total budget: 705,000 Rwf	4

Consistent availability of water supply in the hospital	Cost of all materials necessary in water supply 2,400,000 Rwf	1
Avail alcohol based hand sanitizers	Average of 1,000,000 Rwf	3
Requisition and reporting system	Average of 200,000 Rwf	5

**Table 3: Comparative analysis based on feasibility**

Alternative Solutions	Feasibility	Score
Increase the number of foot activated taps or pots (KANDAGIRUKARABE) of water in different units	Good recommendation when installing sinks is not possible	5
Consistent availability of water supply in the hospital	Rarely to be possible because of the environment	2
Avail alcohol based hand sanitizers	Applicability is possible and can be made by the staff themselves	3
Requisition and reporting system	Can't be feasible because of the mind of staff	1

**Table 4: Comparative analysis based time**

Alternative Solutions	Time	Score
Increase the number of foot activated taps or pots (KANDAGIRUKARABE) of water in different units	Request of proformat invoice: 5 days Answer of proformat invoice: 5 days Analyzing of proformat invoice and giving feedback to the suppliers and ordering: 3 days Delivering time: 7 days Placement of the foot activated taps:1 day	4

	Total duration :21 days	
Consistent availability of water supply in the hospital	Request of proformat invoice: 5 days Answer of proformat invoice: 5 days Analyzing proformat invoice and giving feedback to the suppliers and ordering: 3 days Delivering time: 5 days Total duration: 24 days	3
Avail alcohol based hand sanitizers	Open market which can exceed one year/365 days	2
Requisition and reporting system	It is a systematic way and can depends on the time of intervention	1

## COMPARATIVE ANALYSIS FOR LACK OF KNOWLEDGE

**Table 1: Comparative analysis based on impact**

Alternative Solutions	Impact	Score
Training of clinical staff	This can influence completely hand washing compliance	5
Developing different materials	Suitable for increasing knowledge	4
IEC	A lot of work is needed	1
Supervision and reporting system	The monitoring can be observed	2

**Table 2: Comparative analysis based on expense**

<b>Alternative Solutions</b>	<b>Expense</b>	<b>Score</b>
Training of clinical staff	Average of 250,000 Rwf	4
Developing different materials	Cost of all materials necessary in developing those materials 1,500,00 Rwf	1
IEC	No cost	5
Supervision and reporting system	Average of 1,200,000 Rwf	2

**Table 3: Comparative analysis based on feasibility**

<b>Alternative Solutions</b>	<b>Feasibility</b>	<b>Score</b>
Training of clinical staff	It is good to be feasible	5
Developing different materials	Can be the one of the ways	4
IEC	Not applicable	1
Supervision and reporting system	The managers can't make the follow-up of this activity	2

**Table 4: Comparative analysis based time**

<b>Alternative Solutions</b>	<b>Time</b>	<b>Score</b>
Training of clinical staff	3 days of training are sufficient	4
Developing different materials	Request of proformat invoice: 5 days Answer of proformat invoice: 5 days Analyzing proformat invoice and giving feedback to the suppliers and ordering: 3 days Delivering time: 5 days Total duration: 24 days	3
IEC	It is a systematic way and can depends on the time of intervention	1
Supervision and reporting system	It is a systematic way and can depends on the time of intervention	1

## **THE FINAL SOLUTIONS**

Using the matrix table, the comparative analysis of alternative solutions based on impact, expense, feasibility, time and their respective scores, the final interventions are:

Education and training of clinical staff because it scores 18 over 20 marks and increasing foot activated pots (KANDAGIRUKARABE ) where it scores also 16 over 20 marks from the 4 solutions proposed and scored by the team.

## Appendix 6. Request for data collection

RECEPTION  
HOPITAL MURUNDA  
Date: 03.08.2016  
NAME: Narcisse  
SIGNATURE: 

Cl N° 338/016

**KANEZA Narcisse**

RUTSIRO DISTRICT

Murunda District Hospital

Tel: 078874423

Email: narcicuska@yahoo.fr

1<sup>st</sup> August 2016

The Director of Murunda District Hospital

**R.E: REQUEST FOR PERMISSION TO CONDUCT A QUALITY IMPROVEMENT PROJECT**

Sir,

I humbly request permission to conduct a quality improvement project at Murunda hospital.

I am presently registered at the University of Rwanda, Masters Degree in Hospital administration and health care management (MHA), under the supervision of **Professor NTAGANIRA Joseph and HABAGUSENGA Jean d'Amour**. The title of the Project is **“Improving Hand Hygiene Compliance among Murunda Hospital staff”** structured questionnaire, tally sheet, observation and brainstorming with staff . The information will be treated as strictly confidential.

The results of the project may help hospital to deliver a good quality service to the client and community in whole.

Yours Faithfully

**KANEZA Narcisse**



REPUBLIC OF RWANDA

Murunda, 05 SEPT 2016  
No...*FF1*.../HM/016



WESTERN PROVINCE  
RUTSIRO DISTRICT  
**MURUNDA HOSPITAL**

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E-mail: [nilingiyimana@hotmail.com](mailto:nilingiyimana@hotmail.com), [murundahospital@gmail.com](mailto:murundahospital@gmail.com)

Mr KANEZA Narcisse

University of Rwanda

Kigali

Dear,

**RE:** Your request for the permission to conduct a quality improvement project  
at Murunda hospital

Reference is made to letter of 1<sup>st</sup> August 2016 requesting the permission to conduct a quality improvement project on “**Improving Hand Hygiene Compliance among Murunda Hospital staff**”.

I am pleased to inform you that you allowed conducting your research at Murunda Hospital. We kindly request you to share with us your findings.

We wish you all the best in this endeavor.

**Dr NIRINGIYIMANA Eugene**  
Director of Murunda Hospital



CC:

-Accreditation focal point

## Appendix7. Approval for data collection

## Appendix 8. Evaluation Plan

<b><u>Process indicator</u></b>				
<b>Indicator</b>	<b>Definition</b>	<b>Person</b>	<b>How</b>	<b>When</b>
Staff trained	Number of staff trained compared to the staff which supposed to be trained	Researcher, EHO	Attendance list	In February 2017
Availability of equipment	Number of equipment distributed in different locations	Researcher, Logistic	Store cards	Dec-16
<b><u>Outcome indicator</u></b>				
<b>Indicator</b>	<b>Definition</b>	<b>Person</b>	<b>How</b>	<b>When</b>
Hand hygiene compliance	Number of action / opportunitiesX100	Researcher, EHO,QI	Observation use checklist	In March 2017
Knowledge on hand hygiene	Performance scores which is greater than 75%	Researcher	Questionnaire	In March 2017

