



**UNIVERSITY of
RWANDA**



**Regional Centre of Excellence in
Biomedical Engineering and E-Health**

**PERCEPTION OF HEALTHCARE PROVIDERS AND CANCER
PATIENTS ON THE USE OF TELEMEDICINE AT BUTARO
CANCER CENTER OF EXCELLENCE, A CROSS SECTIONAL
STUDY 2023**

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College of Medicine and Health Sciences

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Master in Health Informatics

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MASTER IN HEALTH INFORMATICS

In the College of Medicine and Health Sciences

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August 2023

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I, Anitha BATETE, declare that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Rwanda or any other institution.

Anitha BATETE

Signature,



Date: 13th September 2023

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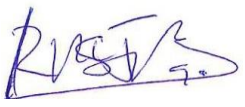
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DEDICATION

I dedicate my research project to almighty God, who is in control of all things, for his protection throughout my academic journey at the University of Rwanda. I dedicate my work to my husband for his support and encouragement. I also want to thank my supervisors, Dr Judith Mukamurigo and Dr Felix Manirakiza, for their support and guidance. God bless you.

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ABSTRACT

Background: Advancements in information technology have led to the development of telemedicine platforms for healthcare services, affecting hospitals, finances, and medical insurance. This study explores healthcare professionals' and cancer patients' perceptions of telemedicine.

Methods: A cross-sectional study involved 12 cancer patients and 20 healthcare providers at Butaro Cancer Center of Excellence. Demographic data was collected, and opinions were collected through separate questionnaires. Data was analyzed using SPSS, descriptive statistics, and frequency tables and graphs. Qualitative data was manually analyzed using content analysis methods, and results were presented using illustrative examples.

Findings: Patients (66.7%) have ordinary phones, while 8% have smart phones. 83.3% prefer in-person healthcare, while 45% agree telemedicine offers better services. However, challenges like internet connectivity and telemedicine skills may hinder access. Healthcare providers find in-person meetings more convenient for cancer patients.

Conclusion: Healthcare providers are aware of telemedicine and its impact on healthcare services, and they are willing to use it. Nevertheless, they are worried about their clients, whose knowledge of using information technology is low and whose means of affording its cost is also a challenge; therefore, it may still be better for patients to meet their healthcare providers in person.

KEY WORDS

Cancer, Telemedicine, Perception, Patients, Healthcare providers

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LIST OF ABBREVIATIONS

AIDS: Acquired Immunodeficiency Syndrome

BCCOE: Butaro Cancer Center of Excellence

CHUK: The University Teaching Hospital of Kigali/Centre Hospitalier Universtaire de Kigali.

EMR: Electronic Medical Record

GLOBOCAN: Global Cancer Observatory

HCP: Healthcare Providers

HIV: Human Immunodeficiency Virus

IARC: International Agency for Research on Cancer

ICT: Information Communications Technology

KFH: King Faisal Hospital

LMICs: Low and middle Income countries

NCCP: National Cancer Control Plan

RCC: Rwanda Cancer Center

SPSS: Statistical Package for Social Science

SSA: Sub-saharan Africa

WHO: World Health Organization

CHAPTER 1: INTRODUCTION

1.1. DEFINITION OF KEY TERMS

- **Cancer:** A condition in which some cell in the body develop uncontrollably and spread to other parts of the body
- **HIV:** An infection that assaults the body's immune system and weakens it, leaving it vulnerable to further infection.
- **AIDS:** A disease caused by Immunodeficiency virus.
- **Caregiver:** A person who looks after a vulnerable person regularly
- **Mortality:** The state of being subject to death
- **Morbidity:** A frequent state of being ill or sick
- **Healthcare Providers:** A professional who provides healthcare services
- **Nurse:** A person who has been trained to care for the sick or infirm
- **Communicable Diseases:** Type of diseases or illness caused by infectious agents that can be transmitted from one person to another.
- **Non-Communicable Diseases:** Group of diseases which are caused by an acute infection that can cause long term consequences to life.
- **Telemedicine:** The use of telecommunication technology to treat and assess patients' conditions from a distance.
- **Melanoma Skin Cancer:** Is the type of skin cancer that starts in body cells called melanocytes.
- **Non melanoma skin cancer:** Is the form of skin cancer that forms in the lower part of the epidermis but not in melanocytes.
- **Healthcare:** The coordinated provision of medical treatment to individuals or communities

1.2. BACKGROUND

The development of communication technology across the globe has resulted into the use of telemedicine as a modern platform for delivering healthcare services (1) This has caused healthcare institutions to adopt the use of information technology in their areas of interest such as hospitals, health centers, finance and medical insurances with an aim of improving the quality and effectiveness of work done by medical organizations (2).

Health sector is one of the main areas where information technology has changed the lives and wellbeing of a high number of people. During the covid-19 pandemic, telemedicine has played a big role in protecting the lives of people especially in the developed countries where the good infrastructures and skilled labor force has helped the use of telemedicine to be successful, and helped people to be resilient to the crisis they were in (3).

During the covid-19 pandemic, the care of people with severe illness and their families required social distancing for their protection as well as protection of healthcare providers who were highly needed by the time. This has resulted in the use of telemedicine as a solution to the problems caused by the pandemic for accessing healthcare services. As a result, telemedicine provided the high level of satisfaction and minimized the risk of infection during the pandemic (4)

Worldwide, telemedicine is being used in different fields of medical care including consultations, diagnosis, and follow-up of patients (5). Almost every specialty of medical care has started using telemedicine. Examples include tele-dermatology (6), tele-pathology(7), tele-dentistry (8) etc. Telemedicine for cancer patients' management has been effective in some countries of Middle East such as Saudi Arabia, Iran (9), but in Africa as telemedicine is lagging behind, the use of telemedicine for cancer management is almost non-existent despite that there is an increase in cancer incidence in this continent.

After communicable diseases and cardiovascular diseases, cancer is the third leading cause of deaths on African continent. In 2020, there was an estimated 1.1 million of new cases and 711,429 deaths related to cancer (10). In sub-Saharan Africa, 1 billion inhabitants are affected by cancer, it is also among the 3-leading cause of death among people who are in the range of 30-69 years of age. One in 7 premature deaths in sub-Saharan Africa are caused by cancer (11).

Particularly for Rwanda, according to Globocan/IARC, in 2018, there were 10704 new cancer cases and 7662 deaths caused by cancer, with a high mortality rate in females than males. The number of deaths caused by cancer among females was estimated to be 4,306 and 3356 among men respectively (12).

During Covid-19 pandemic, patients with advanced cancer have faced the difficulties in accessing care and treatment. However, in some countries, the arise of telemedicine services has helped patients to continue on their care and support as well as preventing people from contracting the virus among themselves (13). Rwanda—among low income country— has showed the significant improvement in the use of digital health mainly between the year of 2012 and 2016 with emphasis on the use of technology in regard to diseases management , and the recent use of tele-robotics in the management of corona virus pandemic as well as digital management of diabetes in rural settings (14). The use of telemedicine for cancer management is almost limited to tele pathology diagnosis. Therefore, there is a need to assess the perception of both healthcare providers and patients on the adoption of such technology especially for cancer management.

1.3.PROBLEM STATEMENT

Rwanda has got limited capacity regarding cancer diagnosis services; many patients fail to be diagnosed hence not counted. The increase in number of patients has also led to shortage of staff hence poor quality of services. Cancer patients or their family /care givers who come from rural areas going to the cancer center for treatment, follow-ups or diagnosis, spend a lot of money for traveling long distance. Those expenses can pull them into the crisis of poverty. With poverty, there is an increased probability of poor access to cancer care services which is the major cause of discrepancy in survival and disease related outcomes among low and high come countries (10)

Pain management and palliative care services are prioritized in the nation due to advanced cancer patients. Only Butaro Cancer Center of Excellence (BCCOE), King Faisal Hospital (KFH) Kigali and Rwanda Military Hospital offer cancer treatment services. With the help from Partners in Health, BCCOE provides treatment free of charge. As a result, many patients travel from all over the country to get the treatment at BCCOE, since the treatment of cancer is very expensive to be affordable by many patients. On the other hand, KFH offers services to the patients who can pay privately(15) Major hospitals providing cancer care services in Rwanda, are BCCOE and KFH. The first hospital is located in a remote rural area while the second hospital is located

in Kigali city. These locations do not allow easy geographic accessibility for all population (16). Hence, several patients with cancer are lost to follow-up within the referral process from health center to the referral hospital. Furthermore, some patients who will start their cancer treatment will fail to complete the course of prescribed treatment regimen due to long distances and or long waiting time (17). It is in this perspective we would like to investigate the perception of healthcare providers and cancer patients on the use of telemedicine in the management of cancer.

1.4.SIGNIFICANCE OF THE STUDY

This study will show to the public as well as concerned institutions, how both patients and healthcare providers in Rwanda perceive the use of telemedicine towards cancer management. This might result in a response to the problem faced by cancer patients of having limited access to the healthcare services due to the geographical location of cancer care centers in Rwanda by enhancing the use of telemedicine in that particular area of health care.

The result of the study will also allow future researchers to depend on while doing more research on telemedicine and health in Rwanda.

1.5.GENERAL OBJECTIVE

The study aimed at finding out how cancer patients and healthcare providers perceive the idea of using telemedicine technology with regard to cancer management.

SPECIFIC OBJECTIVES

- To assess the readiness of patients with cancer on the use of telemedicine
- To assess the attitude of patients with cancer on the use of telemedicine
- To assess the perception of healthcare providers on the use of telemedicine for management of patient with cancer.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

According to the WHO, Telemedicine is defined as the delivery of health care services by the healthcare professionals using information and communication technology for diagnosis, treatment and prevention of diseases (18). It is known to be a solution when distance has become a problem to the patients who want healthcare services or other problems that hinders the meeting of a patient and healthcare providers such as covid-19 pandemic (14).

Due to the impact that the telemedicine service has provided to the healthcare system in general, especially during the corona virus pandemic, research has showed that, this intervention has brought a lot of benefits to the patients using it. Among those benefits include patient's independency and their healthcare plan. The purpose of this technology is to improve access to healthcare services for everyone regardless of where he/she stays, and it has been proved that most patients who have been exposed to the use of telemedicine are satisfied by the services provided (19)

For many decades, healthcare providers, researchers and technology developers have been advocating for the use of telemedicine, therefore it's not a new concept. It's adoption to the community has showed a significant change like easy accessibility of healthcare services, flexibility and convenience, however the technology has shown some challenges like not including all healthcare services, it's implementation is expensive, it cannot be easily adopted by any country or institution etc (20).

Telemedicine began in Netherlands in 1900s with the assessment of transmission of heart rhythms via the Telephone. In Pennsylvania, images from radiology were transmitted via telephone in the years of 1940s (21).

The replacement of analogue means of communication become a motivation to the healthcare institutions to think more about the ways of providing health care services efficiently and effectively. The introduction on the use of internet which has been brought by the speed in the use of information, communication technology has brought telemedicine technology to start being approached on websites and multimedia methods (22). The introduction of telemedicine services was brought by the changes in the use of technology. It has provided massive ways to the accessibility of standardized healthcare services, as well as

closing the gap that was seen between the accessibility, affordability and the quality of healthcare services (23).

2.2. TECHNOLOGY USED IN TELEMEDICINE AND BARRIERS TO IT'S IMPLEMENTATION

Telemedicine is known to be a various collection of technology and clinical applications. It uses the electronic signals to transfer information from one person to another or from one place to another. The type of information sent and the means by which the information is transferred defines the kind of telemedicine system that have been used. There are many medical areas that have strong telemedicine applications compared to the others. For example, image sharing used in radiology and pathology departments. Skilled healthcare providers can share the finding virtually as well as sharing data from specific tests like electroencephalograms and electrocardiograms (24).

Telemedicine services are categorized into different ways, like the kind of information and the method of sharing it. Therefore, tools and technology applications for providing telemedicine services we find in healthcare institutions will depend on the type of information to be shared and the purpose of telemedicine or medical specialty (25).

Nevertheless, telemedicine have got many challenges. According to the research, it has been revealed that struggle for change, limited knowledge and skills among healthcare providers are the main barriers for the acceptance of telemedicine (3) (26). The other barriers include technological barriers, non-standardized or poor infrastructure which affects deeply the use of telemedicine. In addition, planning and funding are also major challenge to the implementation of telemedicine especially in LMIC (3)(27).

Telemedicine challenges are many but differ depending on type of population that uses it. When it comes to elderly and vulnerable people, it becomes a serious challenge as it requires a good knowledge of technology and good health state for active and effective communication. Virtual consultation and assessment are linked with patients' hesitation and doubt to the care they are receiving, as well as lack of confidentiality about the information he/she is sharing with the healthcare provider (18).

2.3. USE OF TELEMEDICINE AND ITS PERCEPTION AMONG HEALTHCARE PROVIDERS AND PATIENTS ACROSS THE GLOBE

The implementation of telemedicine technology in healthcare institution is very important to every country regardless of its level of development. Many people around the world stood up for the adoption of digitalized healthcare services, government leaders and researchers are doing their best so that the implementation of digital health will be effective to every human being who seeks medical help (28).

In the developed countries, the adoption of telemedicine has contributed to the good performance of healthcare institutions in regard to the provision of good quality healthcare services specifically to the European countries. For the developing countries particularly middle eastern countries are progressively adopting the telemedicine programs and putting more efforts on related technology, policies and guidelines, even though the progress is still slow (9).

In sub-Saharan Africa, telemedicine programs are not new in healthcare institutions. The policy makers, researchers and medical practitioners have provided the authorization to its implementation and it has supported the provision of healthcare services at an excellent level. Literatures show that they have helped in fighting against pandemic like Ebola virus in some African regions as well as the recent pandemic known as corona virus.

This happened due to the use of telecommunication technology in sub-Saharan Africa (29). Nevertheless, only 6.7% of households in Africa can access internet in their homes, hence telemedicine technology requires information and communication infrastructures including the use of internet which is at the lowest level in Africa. Moreover, in African low-income settings most of people are computer illiterate. Communication in Africa is expensive and most people cannot afford it and due to African history made up of civil wars that have lasted for long period, there is poor infrastructures and in rural areas where poorest people lives there is no high probability of having access to the use of telemedicine (30).

In Europe, 70-80% of patients concerns are addressed online via telemedicine platforms (31). Telemedicine services along with their right tools satisfy the needs of both patients and healthcare providers to the extent that the online accessibility of healthcare services is about to replace the traditional methods. This achievement (or milestone) comes from the benefits provided by the use of this technology including cost-effectiveness, right tools to increase the efficiency as well as reducing waiting times and high number of

clients at the hospital (32). Over 85% of households in Europe have access to internet and a half of Europeans people have searched health information online. Moreover, more than 15 states in Europe have used EMR and patients were able to have access to their medical records (10).

In the United States, about 76% of their hospital connects with the patients using any kind of telemedicine. The radiology services count to be the most services that is provided via telemedicine platforms, at the rate of 39.5%, followed by psychiatry at 27.8% and cardiology at 24.1% respectively. Telemedicine does not benefit only patient and doctor, it also helps healthcare professional to be more connected, as well as partners (33). After the rise of covid-19 pandemic, the use of telemedicine service and its demand have increased. For patients with non-communicable diseases, home-based telehealth monitoring has been proved to be effective not only to patients but to healthcare providers and hospitals as well (34).

CHAPTER 3: RESEARCH METHODOLOGY

3.1. STUDY DESIGN AND SETTINGS

The research design used for this study was a descriptive case study and a cross-sectional qualitative and quantitative research that included cancer patients, both men and women, who came to the hospital for treatment and other follow-ups, as well as their health care providers. The study's objective was to learn how telemedicine technology is seen by cancer patients and medical professionals(35)

We chose a case study research design using qualitative and quantitative research methods in order to gain more in-depth insight about the patients' and healthcare providers' perceptions on the use of telemedicine for cancer management than would be obtained using only one type of data (36)

It took place at the Butaro Cancer Center of Excellence (BCCOE) in the Northern Province of Rwanda, in Burera district. BCCOE is a cancer treatment, research, and teaching center administered by Butaro District Hospital and affiliated with the medical school of the University of Global Health Equity. Administratively, the cancer center is one of the specialized units of the hospital. It provides treatment to patients free of charge under the support of partners in health.

3.2. STUDY POPULATION

The population for the study included patients living with cancer who came from all parts of the nation, seeking chemotherapy services at BCCOE, and their healthcare providers, who were made up of nurses and doctors who work at BCCEO to provide healthcare services to the patients living with cancer on a daily basis. The study selected 20 healthcare providers and 12 Patients, both men and women, who were present at the hospital at the time of data collection.

3.3. SAMPLING TECHNIQUES

Butaro Cancer Center of Excellence was selected because it is the sole specialized cancer center of excellence in the country, receiving patients from the entire country with different economic capacity (15). Patients and healthcare professionals were selected using convenience sampling technique, where by the participant were selected due to their availability and accessibility. This strategy was chosen because most of cancer patients

were not in a good condition to be interviewed and their healthcare providers were overloaded with work. Therefore we interviewed the people that were available and easily accessible (37).

3.4. DATA COLLECTION AND MANAGEMENT

We used interview schedule containing questions and proposed answer options. The questionnaire was made of open ended and closed ended questions (see appendix No 1 and No 2 respectively). Research assistant asked questions using questionnaire and respondents give him answers and he took notes, but for healthcare providers, they completed the questionnaire on their own and research assistant helped them on the section of open-ended questions by noting everything they would answer concerning the question. For qualitative data, we considered open ended section of the questionnaire and after reaching at 12th participants among patients and 20th among healthcare providers we considered saturation means of data collection since the answers that the participants were providing were almost the same.

3.5. DATA ANALYSIS

The main objective of this study was to assess healthcare providers and cancer patients' opinions on the use of telemedicine for cancer management. For quantitative data, we export it from Excel to SPSS for analysis. We performed descriptive analysis to calculate frequencies and corresponding percentages. The results are presented using tables or graphs. Qualitative data were manually analyzed using content analysis methods (we started with quantitative content analysis approach then proceeded with manifest qualitative content approach) (38) Qualitative results were presented using illustrative examples.

3.6. INCLUSION CRITERIA

This study included only cancer patients and healthcare providers who are involved in the management of cancer patients at BCCOE.

3.7. EXCLUSION CRITERIA

Critically ill patients were excluded from this study.

3.8. ETHICAL CONSIDERATION

Ethical clearance to start the research was given by University of Rwanda, College of Medicine and Health Sciences, from institutional Review Board and by BCCOE Ethics committee. Explanation regarding the study aim and its importance were given to the participants and they were explained that there is no payment, gifts or risk from the study. Additionally, they were informed that the participation is voluntarily and we asked them to sign a consent form before participation. The data collected will be kept confidential and the names of the participants do not appear on the results.

CHAPTER 4: RESULTS

The main purpose of this research was to find out the perception of healthcare providers and cancer patients on the use of telemedicine for cancer management. The participants' social-demographics characteristics are present and the results of the study are presented as well.

4.1. PATIENTS DATA

In this section we will be displaying the patient results as collected using quantitative and qualitative research types.

4.1.1. Patients' demographics

The majority of participants (n=7; 58.3%) were female while male represented 41.7% (n=5). 58.3% of our respondents were farmers and other remaining categories like teacher, technician, constructor and butcher man were presented by one person from each and there was also 1 respondent who was a prisoner. About the educational level of the respondent 58.3% representing 7 out 12 respondents have less than primary education, only 2 completed S6. No one has attained the university to obtain bachelor's degree.

Table 1: Patients Demographic Information

Gender		
Sex	Frequency (N=20)	Percentage (%)
Female	7	58.3
Male	5	41.7
Job		
Constructor and farmer	1	8.3
Farmer	7	58.3

Farmer and Butcher	1	8.3
Prisoner	1	8.3
Teacher	1	8.3
Technician	1	8.3
Education Level		
Completed p6	2	16.7
Completed s3	1	8.3
Less than primary	7	58.3
S6	2	16.7

4.1.2. Quantitative analysis and findings For Patients

In this study we used closed ended question and Likert-scale question, we interviewed both patients and healthcare providers.

For the patients the questionnaire was made of 3 sections, the first section was demographics; the second one was to assess the availability of information technology tools with the aim of finding out whether they were physically ready to use telemedicine. The third one was to evaluate the expectations and attitudes of patients towards the use of telemedicine.

4.1.2.1. Opinion of patients about providing cancer care services via telemedicine

In this question we wanted to ask patients, whether it is possible for cancer care services to be provided using telemedicine. Their responses are summarized in table 2

Table 2: Frequency and percentages of patient's responses about the opinion of using telemedicine for cancer care

	Frequency (N=12)	Percentage (%)
Neutral	3	25.0
Agree	1	8.3
Disagree	4	33.3
Strongly agree	1	8.3
Strongly disagree	3	25.0
Total	12	100.2%

As the table shows, many patients disagreed with the fact that cancer care services can be provided using telemedicine. Only 2 people out of 12 showed that they agree that cancer care services can be provided online.

4.1.2.2. Patients' responses about the use of telemedicine for current diseases

In this question we wanted to know if the patients have ever used telemedicine for their current disease. Responses are summarized in table 3

Table 3: Frequency and percentages of patients who use or have used telemedicine for the current disease (cancer)

	Frequency (N=12)	Percentage (%)
Never	9	75.0
Rarely	2	16.7
Frequently	1	8.3
Total	12	100.0

75% of respondent have said that they have never used telemedicine for the current disease, and only 1 among 12 agreed that she have used it.

4.1.2.3. Kind of telephone used by patients

Here we wanted to see whether they are some number of patients who have smart phone, because it is one of the tools that can be used to get a good number of telemedicine service, and this would show the readiness of individual in using telemedicine. Results are summarized in table 4

Table 4: frequency and percentages of the kind of telephone used by patients

	Frequency (N=12)	Percentage (%)
None	3	25.0
Ordinary Phone	8	66.7
Smart phone	1	8.3
Total	12	100.0

Only 1 person among 12 have smart phone and other 8, counting 66.7% had the ordinary phones, and the 25% of participants had no phones at all.

4.1.2.4. None of the interviewed patients has a computer

We investigated if some of patients possess a computer. Finally, we found that 100% of patients do not possess computer.

4.1.2.5. Only one participant has internet access through cellular data.

We assessed if the participants had the ability to access the internet. We found that high number of the participants we interviewed have no access to the internet, and only 1 person among the participants has access to the internet through cellular data. Responses summarized in figure 1

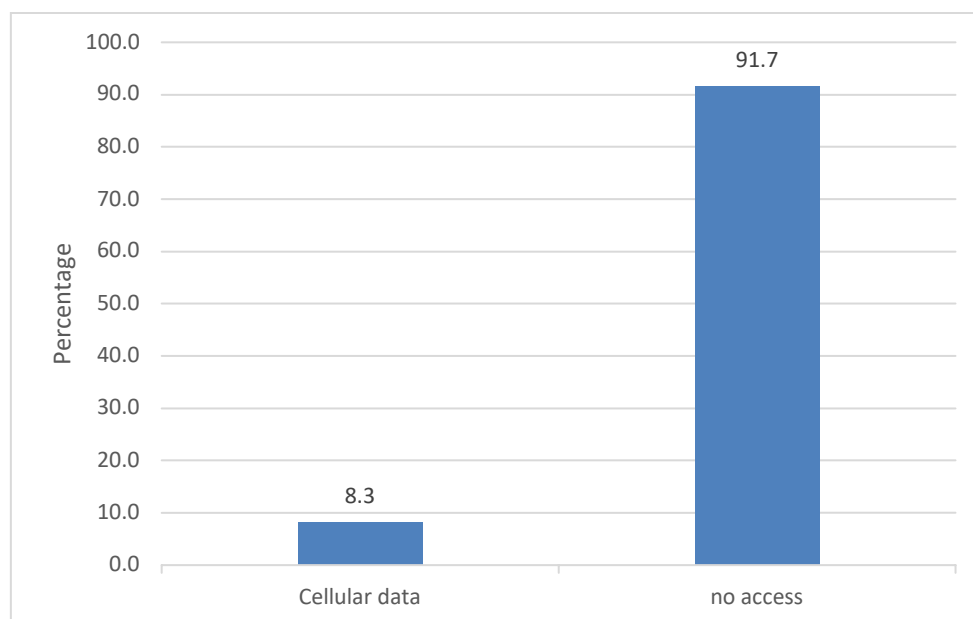


Figure 1: bar graph showing the level of patients with access to the internet

4.1.2.6. Opinions of patients living with cancer about the idea that telemedicine is beneficial

In this question we wanted to know if the patients think of telemedicine as a benefit to them in regards to the accessibility of care services. 66.7% of the respondent strongly agreed that telemedicine can be a great benefit to them in regard to the accessibility of care services.

4.1.2.7. Healthcare services that can be provided via telemedicine

In this question we wanted to ask participant the healthcare services that can be provided through telemedicine. About 91.7% of participant chose the service of appointment, they thought it was the one that can be provided via telemedicine.

4.1.2.8. Patients' perception about their confidentiality while using telemedicine

We found that about 50% of patients are worried (moderately or extremely worried) about their privacy. The details are provided in Table 5

Table 5: Frequency and percentage of patients worried about the confidentiality while using telemedicine

	Frequency (N=12)	Percentage (%)
Extremely worried	3	25.0
Moderately worried	3	25.0
Neutral	1	8.3
Not at all worried	4	33.3
Somewhat worried	1	8.3
Total	12	100.0

4.1.2.9 Point of view of patients in regards to receiving care through physical visit versus through telemedicine

We investigated if the patient would feel much more comfortable if he/she meets the healthcare providers in person than virtually. Most of patients said that, it is better for them to meet the providers in person. Results are summarized in table 6

Table 6: Frequency and percentage of patients who feel that they would get a better care if they see the healthcare provider in person compared to healthcare through telemedicine

	Frequency (N=12)	Percentage (%)
Agree	1	8.3
Neutral	1	8.3
Strongly agree	10	83.3
Total	12	100.0

4.1.2.10. Patients' level of comfort meeting their providers in person

Patients interviewed, majority (83.3%) they strongly agreed to feel comfortable in meeting healthcare providers in person during consultations. Summarized results in figure 2

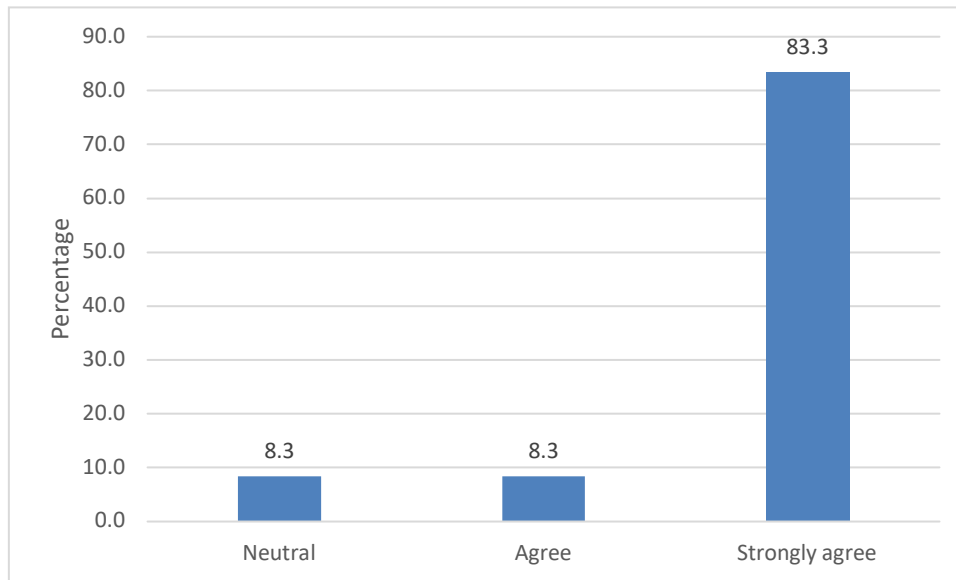


Figure 2: A bar graph showing the level of patients who feel comfortable meeting their providers in person

4.1.2.11. Worried that insurance cannot cover telemedicine services

Up to 50% of patients interviewed showed extreme concern that their health insurance cannot afford to cover telemedicine services.

Table 7: Frequency and percentage of patients concerned that their insurance may not cover telemedicine services

	Frequency (N=12)	Percent (%)
Extremely concerned	6	50.0
Moderately concerned	1	8.3
Slightly concerned	3	25.0
Somewhat concerned	2	16.7
Total	12	100.0

4.1.3. Qualitative thematic results for patients

The questionnaire for patients was made up of closed ended questions as well as open ended question, but in this section, we are going to talk about open ended questions only. Patients were able to answer questions in their own words, and express their views freely. The questions were four and a respondent was free to answer the question or not, as a result there were questions in this section that were not answered.

4.1.3.1. The attitude of using telemedicine while getting medical treatment

In the section of open-ended questions, we asked the patients the attitude of using telemedicine to get medical service. The intent was to find out how patients consider or view the use of telemedicine in regard to the cancer care services provided at Butaro Cancer Center of Excellence. 8 out of 12 respondents reported that they have never used telemedicine to access care services and other 3 said that the services provided through telemedicine are the use phone call, patients making follow-up with their respective doctors or receptionist. They said that telemedicine is available but its practice is low. Only one patient said that the service provided to her via phone call was good and satisfying.

“I have never used that technology service you are talking about, for us to be given healthcare services we travel a very long distance to reach here”.

“Telemedicine is good and the services provided through it are good and satisfying, I live at Huye and when I want to make follow-up concerning my appointment or talking to the doctor about my health status, I call over phone call and I get all information I want and get help concerning my health status”.

“Telemedicine used here is the use of phone call, but its practice is at lower level”

“I am prisoner, you know I can’t be able to have all information regarding healthcare services and I have no idea about the use of telemedicine”.

4.1.3.2. The experience of getting healthcare services at Butaro Cancer center of Excellence

About the experience of accessing healthcare services normally, most respondents said that they receive good services, they are given medicine to help them, However 4 out of 12 said that they are provided with poor

services, due to the fact that, the hospital receives high number of patients and it takes a very long time to be given help, on the other hand others were complaining about spending longtime at the hospital and never get medicine nor meeting their respective doctors..

“Services here at Butaro go very slow, it’s been a week now but they haven’t given me medicine”

“The services are not bad except that there is always large number of people waiting to be given services”.

4.1.3.3. Choosing between using telemedicine for healthcare services or Physical encounter with the provider

8 out of 12 patients said that they can choose telemedicine over physical encounter, provided that it can reduce the travel expenses and the time they spend at the hospital waiting to be given medicines. On the other hand, others were saying that they can choose physical encounter because it cannot be easy to explain the health problem they have virtually and their knowledge on the use of telemedicine tools is low.

“It is better to have physical encounter with the provider, because the way that cancer attacks cannot be explained virtually”

“Yes I can choose using it because I use a lot of money and I travel a very long distance to reach here”

“Of course I can choose telemedicine because it can help me to minimize transport fees and traveling long distance to reach here”.

“I cannot choose using telemedicine, because I don’t have smart phone that would help me with using that technology”.

4.1.3.4. Advantages and Disadvantages of using telemedicine

Almost half of respondents were saying that they don’t have knowledge about telemedicine use and it was difficult for them to know its advantages and disadvantages. Never the less, 5 out 12 said that telemedicine saves time and it facilitates care services to be provided fast hence good quality of healthcare services. However, it is associated with a lot of challenges like knowledge on the use of its tools such computers and smart phone and technical problems while using it like poor internet access.

“Technology helps people to not travel long distance however it requires knowledge of which many people do not have, including me”.

“Technology is a good thing to choose for quickening the services but again some they disappoint the users at the end you find that you haven't met your expectations”.

“I don't know much about telemedicine; I can't be able to answer that question”.

“It saves money and time, but I think it is very expensive”

4.2. HEALTHCARE PROVIDERS DATA

4.2.1. HCPs Demographics

Most of the healthcare providers we interviewed were between the age of 40 and 50 years and they were female. 45% were nurses by professional and only 35% percent have specialized in different medical field and 65% have no specialization. The sample size was 20.

Table 8: Healthcare Providers' Demographic Information

Age, years		
	Frequency (N=20)	Percentage (%)
20-30	6	30.0
31-40	6	30.0
41-50	7	35.0
51-60	1	5.0
Total	20	100.0
Gender		
	Frequency (N=20)	Percentage (%)
Female	13	65.0
Male	7	35.0
Total	20	100.0
Medical Professional		
	Frequency (N=20)	Percentage (%)

Doctor	8	40.0
Midwife	2	10.0
Nurse	9	45.0
Psychology	1	5.0
Total	20	100.0
Highest level of study		
	Frequency (N=20)	Percentage (%)
A1	6	30.0
Ao	6	30.0
Masters	7	35.0
Masters	1	5.0
Total	20	100.0
Specialization		
	Frequency (N=20)	Percentage (%)
anatomic pathology	3	15.0
internal medicine	2	10.0
None	13	65.0
Pediatrics	2	10.0
Total	20	100.0

4.2.2. Quantitative Data

In this study we use open and closed ended questions and Likert-scale questions. The questionnaire was made up of 2 sections the first one was for demographics information and the second one was about the perception of Healthcare Providers on the use of telemedicine for cancer management.

4.2.2.1. Assessing the reliability of telemedicine

We assessed the opinions of healthcare providers for reliability of telemedicine at BCCEO using a numerical scale from 1 to 10, where 1 means low reliability, while 10 equals the highest level of reliability. We calculated the average of rating and found the average 5.75 and the mode was 8 whereby the total number of interview healthcare providers was 20. and many HCPs chose number 8 on scale.

4.2.2.2. Assessment of healthcare providers on scale about the effectiveness of telemedicine

We assessed the opinion of healthcare providers for the effectiveness of telemedicine at BCCOE using numerical scale from 1 to 10, where 1 means less effective, while 10 equals the highest level of effective. From their responses the level of effectiveness has a mean of 3.2 and mode was 8 among 12 respondents.

4.2.2.3. Perceived advantages of using telemedicine

On this topic, we wanted to ask HCPs about the benefits of telemedicine that they were aware of. The biggest perceived benefits among healthcare practitioners were increased patient involvement and satisfaction, offering treatments to multiple patients at the same time, and speedy communication with patients.

4.2.2.4. Challenges on the use of Telemedicine

On this topic, participants were asked to describe the common problems connected with the use of telemedicine in cancer management in healthcare settings. According to healthcare providers, the major hurdles were a lack of internet connectivity and patients' inadequate knowledge of telemedicine. Results are summarized in table 9

Table 9: challenges on the use of Telemedicine

	Number of participants who mentioned the advantages (N=20)
Limited skills on the use of computer	5
Patient's lack of telemedicine skills	12

Lack of integration of medical platforms	7
Lack of internet connectivity	16
Lack of enough telemedicine infrastructures	10
Other	4

4.2.2.5. Disadvantages of telemedicine

We wanted to ask the HCP about the disadvantages of telemedicine that could be encountered in healthcare, whether they are associated with the provider, patients, or technical issues. Difficulties resulting from the patient's symptoms, like deterioration of hearing and psychotic disorders, and the Impossibility to personally examine the patient were the most common disadvantages provided by the participants.

4.2.2.6. Telemedicine makes scheduling appointments simple.

We asked healthcare providers for their thoughts on how simple it is for patients to schedule appointments via telemedicine, and a large percentage of respondents said it is really simple. Figure 3 summarizes the findings.

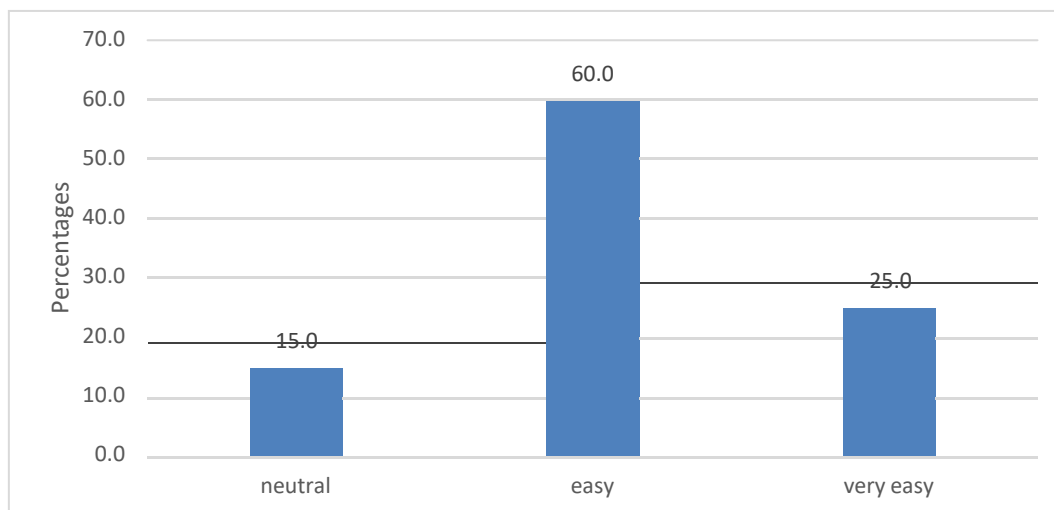


Figure 3: Bar graph showing HCPs' response to telemedicine appointment scheduling simplicity.

4.2.2.7. Better Healthcare services can be provided through telemedicine

On this question, we wanted the participants to agree or disagree with the fact that telemedicine can help provide better care services compared to the usual way of providing services to patients. The high number of participants strongly agreed. Results summarized in figure 4

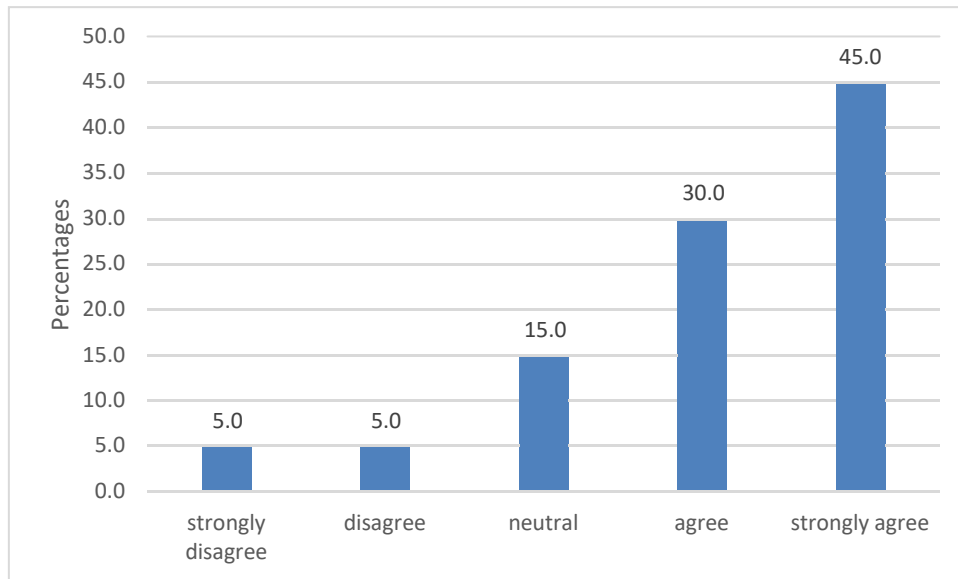


Figure 1: A bar graph depicting healthcare providers' reactions on how improved healthcare services can be delivered through telemedicine

4.2.3. Thematic Analysis Results for Healthcare Providers

4.2.3.1. Meaning of telemedicine

In this question, the main purpose was to find out how healthcare providers understand the term telemedicine, most of them, defined it as the technology used to provide healthcare services, others were saying that it is the use of audio or visual means to consult, diagnose or manage a patient.

“Telemedicine refers to the provision of audio and video-based healthcare services to one or more patients”

“Telemedicine in my opinion is the provision of healthcare services using technology, because it is possible to help patient when you are not with him/her physically”.

“It is the way of using technological tools to provide health services, eg computer, telephone or any other tools that uses”.

“Telemedicine refers to the delivering of healthcare services remotely”.

“Telemedicine, I can call it e-medicine where patients and health providers meet online.

4.2.3.2. Telemedicine description in healthcare setting

The intent of this question was to ask the healthcare providers how telemedicine would be operating with in healthcare setting. 12 out of 20 providers responded that, using telemedicine in healthcare setting you need to be having internet connection and technological tools like computer as well as staff that are skilled in information technology.

“In healthcare settings you need to be having internet connection, video and audio recorder tools”.

“Hospital should have internet, special room for telemedicine and IT Supporters team”.

“Telemedicine technology involves booking appointment, diagnosis, treatment and follow-up”.

“High financial statuses for the institution that want to adopt it, good infrastructures, IT Experts with in the hospital are basic necessities for the use of telemedicine with in the healthcare setting”

4.2.3.3. Comparison between telemedicine services and physical encounter with healthcare providers

At this question, 12 out of 20 providers indicated that it is good and advantageous to use telemedicine for treatment and other medical related services because it saves time and it responds to the problem of shortage of healthcare providers we have in our country. However, most of our patients are not familiar with the use of technology, and is more convenient for them to have physical encounter with the provider.

“Generally telemedicine can benefit everyone that means a patient and provider. However, patients are really comfortable with physical encounter because they are not familiar with using technology”.

“Integrating telemedicine within healthcare services is an incredible act, nevertheless our clients have limited knowledge about it and consequently it cannot be reliable”

“From my experience, it's good to treat cancer patients physically than using technology, because they are used to physical encounter than online”

“It depends on the country/community setting, in our setting it seems to be complicated, even impossible as the education level of our patients is really low, their economic status is another issue”.

4.2.3.4. What they like most and least about telemedicine

Many providers replied that; telemedicine makes work easier, saves time and money spent for transport therefore it is really important in healthcare providers. On the other hand other few have said that it is expensive and requires technical skills that many patients and providers do not have.

“Telemedicine saves time and it makes work easier but I think it is very expensive for the hospital to start using it”

“I like telemedicine because it fastens the work, however it requires extra knowledge”

"It can ease the work and spare patients from spending a lot of money, decrease patient-medical staff contact, and probably increase the quality of care."

“I don't know much about that technology, therefore I have no idea”

4.2.3.5. Telemedicine contribution to quality of service

At this question, many healthcare providers said that telemedicine contributes to quality of healthcare services primarily by time management, which involves providing services quickly and serving high number of patients with in short time and collect and stores patient's very easily.

”You can provide care service to high number of patients and it can solve the problem of shortage of healthcare providers”

“With telemedicine you can help many patients with similar case at once”

”It can help to store and collect patients information very easily”

"Saves time and spares doctors from work overload".

CHAPTER 5: DISCUSSION

Our study assessed both the perception of cancer patients and their health care providers about their perception for the use of telemedicine to care for cancer disease. We will discuss separately the findings from patients and those from healthcare providers.

Findings from patients showed that the majority of patients living with cancer who come for medical services at BCCOE are not aware of telemedicine and have never seen it operating at BCCOE. They think that it is impossible for cancer services to be provided via telemedicine because it is difficult to explain how cancer attacks when you are not with the provider physically. Most of them chose to see the provider in person rather than using telemedicine. On the other hand, they strongly agreed that they can benefit from telemedicine, especially when they want to book appointments, but other medical services could be provided in person.

Patients' knowledge on telemedicine is very low and high number of patients have not reached at primary six, no one has computer, only one person had smart phone, others use ordinary phones which cannot be connected to the internet nor used for telemedicine services that requires internet.

Most of the patients appreciate the services given to them at BCCOE even though the number of patients who comes for cancer care services is very high, they manage to give us service we need. However, there were a certain number of others who reported given poor services, one patient was complaining that it's been a week since he came to get medicine but he was not yet helped at the moment we were interviewing him.

Patients living with cancer reported that they are extremely concerned about their confidentiality while providing their health-related information to the healthcare provider, they only feel comfortable to share their information when they are in person with their provider. Additionally, from the little information they have on the use of telemedicine, they think it is expensive and their medical insurance cannot cover its expenses.

Results from healthcare providers showed that healthcare providers consider telemedicine as a reliable means of healthcare delivery for cancer patients. They also hope that telemedicine could help to improve the quality of healthcare services provided at BCCOE and provide a solution to the problem of shortage of healthcare providers in Rwandan health sector as well as in the oncology services. They also said that telemedicine will facilitate patients by minimizing the travel expenses and long distance they take to reach at the hospital.

Healthcare providers indicate that, though telemedicine is much more important in healthcare settings, it is associated with a lot of challenges such as patients' limited knowledge on the use of telemedicine, internet connectivity and unreliable transmission of information during telemedicine.

But healthcare providers said that, it is not easy for cancer patients at BCCOE to adopt the use of telemedicine due to their level of education, ability to buy electronic tools like smart phone and computer and difficult to access internet and most especially difficulties resulting from the patient's symptoms (i.e., like deterioration of hearing and psychotic disorders caused by the prescribed treatment). These disorders may hind the patients to access health care virtually.

Most especially for cancer patients they said that, it is better to have physical accessibility to their healthcare than telemedicine, because according to the experience they have with cancer patients they can choose on their behalf to continue physical accessibility because they think it is the one that they familiar with.

Healthcare providers reported that they don't have enough skills on the use of telemedicine though it is very important, they need to be trained and given knowledge on its use.

LIMITATIONS

This study was a cross sectional, it was limited to the patients who come for treatment and other follow-up at BCCOE where the majority of patients who come to this hospital are from low incoming settings and use Community Based Health Insurance (Mutuelle). Therefore, these results cannot be generalized to the entire population of cancer patients in Rwanda. Future research should also consider cancer patients who attend other hospitals like Rwanda Military Hospital and King Faisal Hospital.

CHAPTER 6. CONCLUSION

Patients with cancer report that they have limited knowledge on the use of telemedicine and lack tools that would facilitate the use of telemedicine. Even though they think that telemedicine would strongly help them in one way or another, they still feel comfortable meeting the providers in person. Their healthcare providers also think the same, even though they have high knowledge of the use of telemedicine. They still think that cancer patients' conditions cannot be managed virtually.

Therefore, Cancer patients are not ready to use telemedicine and their healthcare providers supports the idea of helping them through physical contacts regardless the advantage of telemedicine to the healthcare services, cancer patients need physical encounter due different reasons provided.

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APPENDICES

APPENDIX NO 1: INFORMED CONSENT FORM FOR PATIENTS TO PARTICIPATE IN A RESEARCH STUDY

Introduction

Hello, my name is **Anitha Batete**. I am a student for Master of Science in Health Informatics program at the University of Rwanda, and I would like to invite you to participate in my research project, "**Perception Of Healthcare Providers And Cancer Patients On The Use Of Telemedicine For Cancer Management: A Case Study Of Butaro Cancer Center Of Excellence**." We need information about your experience regarding accessing healthcare services using information technology. We would like for you to complete our questionnaire. The goal of this study is to see what you think about accessing treatment using technology (telemedicine). All information is completely confidential, and your name will not be associated with any of your responses. Your participation in this study will cause no risk to you and is completely voluntary. You can refuse to answer any questions, and you may stop participating in this study at any time.

You also have the right to ask further questions for more clarification and understanding.

In case of any other questions related to this study you can contact:

The researcher at phone number (Tel: +250784343952)

Chairperson of University of Rwanda CMHS IRB (Tel: +250788 490 522)

The Deputy Chairperson of CMHS IRB (Tel: +250783 340 040)

Consent

I

After reading and understanding the content of this consent form,

After having sufficient clarification about the purpose of this research,

After having enough explanation about all my concerns and taking into account that I am informed that I

have full right to participate or not to participate in this research

Taking into account that:

I have the right to withdraw from this research at any time,

I have been given opportunity to ask and get answers on my questions

I do hereby freely give my written consent to participate in this research and acknowledge to have a copy of this consent agreement.

Names, and signature of the participant

.....

Date:

Names, and signature of the investigator/ co- investigator

.....

Date:

INYANDIKO ITANGA UBURENGANZIRA BWO KUGIRA URUHARE M'UBUSHAKASHATSI

I. Intangiriro

Muraho, Amazina yanjye nitwa Anitha BATETE. Ndi umunyeshuri muri Kaminuza y'u Rwanda, nkaba ndimo gukorera impamyabumenyi y'ikiciro cya gatatu cya kaminuza mw'ishami ry'ikoranabuhanga mu buvuzi n'ubuzima. Nagirango nkusabe kuba wagira uruhare mu bushakashatsi ndimo gukora bugamije kureba ibijyanye n' imyumvire y'abaganga ndetse n'abarwayi ba kanseri ku bijyanye no kwivuzza ukoresheje ikoranabuhanga (telemedicine) mu guhangana n'indwara ya kanseri hano ku bitaro bikuru bya kanseri i Butaro. Dukeneye ko waduha amakuru ku bijyanye nuko ubona serivise z'ubuvuzi zifashisha ikoranabuhanga(telemedicine). Turagusaba gusubiza ibibazo twateguye kukubaza. Icyo tugamije ni ukumenya icyo utekereza ku kubona serivise z'ubuvuzi hifashishijwe ikoranabuhanga. Amakuru yose uri buduhe turayabika mw'ibanga kandi nta hantu na hamwe hari bugaragare izina ryawe. Kwemera kuduha amakuru muri ubu bushakashatsi nta ngaruka n'imwe bizakugiraho kandi ufite uburenganzirz busesuye

bwo guhitamo kudasubiza ikibazo ubajijwe igihe wumva utabishaka cyangwa ukaba wava muri ubu bushakashatsi igihe cyose ushakiye.

Mu gihe cyose haba hari ikibazo cyangwa ibisobanuro bikenewe bijyanye n' ubu bushakashatsi bishobora kubazwa aba bakurikira:

Anitha BATETE, umushakashatsi (Tel +25074343952)

Umuyobozi mukuru wa komite ishinze etike (ethics) muri Kaminuza y' u Rwanda/CMHS (Tel: +250788 490 522)

Umuyobozi mukuru wungirije wa komite ishinze etike (ethics) muri Kaminuza y' u Rwanda/CMHS (Tel: +250783 340 040)

II. Gutanga Uburenganzira

Njyewe

Nyuma yo gusoma neza no gusobanukirwa neza ibikubiye muri ubu bushakashatsi no muri iyi nyandiko itanga uburenganzira,

Nyuma yo guhabwa ibisobanuro bihagije bijyanye n' icyo ubu bushakashatsi bugamije

Nyuma yo guhabwa ibisubizo binoze ku mpungenge n' ibibazo nari mfite

Nshingiye kukuba mfite uburenganzira busesuye bwo kwemera cyangwa kutemera kwitabira ubu bushakashatsi

Nshingiye ku kuba mfite uburenganzira bwo kuba nava muri ubu bushakashatsi igihe icyo aricyo cyose, Nemeye **nta gahato gushyira umukono kuri iyi nyandiko** nk' ikimenyetso cyo kwemera kwitabira ubu bushakashatsi kandi ndahamya ko nahawe fotokopi y' iyi nyandiko itanga uburenganzira.

Italiki, amazina n'umukono by'utanze uburenganzira

.....

Italiki, amazina, n'umukono by'umushakashatsi

.....

APPENDIX No 2: INFORMED CONSENT FORM FOR HEALTHCARE PROVIDERS TO PARTICIPATE IN A RESEARCH STUDY

Introduction

Hello, my name is **Anitha Batete**. I am a student in Master of Science in Health Informatics program at the University of Rwanda, and I would like to invite you to participate in my research project, "**Perception Of Healthcare Providers And Cancer Patients On The Use Of Telemedicine For Cancer Management: A Case Study Of Butaro Cancer Center Of Excellence**." We need information about your experience regarding providing healthcare services using information technology. We would like for you to complete our questionnaire. The goal of this study is to see what you think about providing and accessing treatment using technology (telemedicine). All information is completely confidential, and your name will not be associated with any of your responses. Your participation in this study will cause no risk to you and is completely voluntary. You can refuse to answer any questions, and you may stop participating in this study at any time.

You also have the right to ask further questions for more clarification and understanding.

In case of any other questions related to this study you can contact:

The researcher at phone number (Tel: +250784343952)

Chairperson of University of Rwanda CMHS IRB (Tel: +250788 490 522)

The Deputy Chairperson of CMHS IRB (Tel: +250783 340 040)

Consent

I

After reading and understanding the content of this consent form,

After having sufficient clarification about the purpose of this research,

After having enough explanation about all my concerns and taking into account that I am informed that I have full right to participate or not to participate in this research

Taking into account that:

I have the right to withdraw from this research at any time,

I have been given opportunity to ask and get answers on my questions

I do hereby freely give my written consent to participate in this research and acknowledge to have a copy of this consent agreement.

Names, and signature of the participant

.....

Date:

Names, and signature of the investigator/ co- investigator:

.....

Date:

APPENDIX No 3 : Questionnaire for Patients

SECTION A: DEMOGRAPHIC DATA/ Igice cya A: Amakuru y'umwirondoro

Indicate your response by marking the appropriate box with an **X** / Erekena igisubizo cyawe ushyira akamenyetso ku gasanduku gakwiye ukoresheje akamenyetso ka X

1. **Indicate your gender by ticking in provided space/ Erekena igitsina cyawe ushyira akamenyetso mu mwanya watanzwe**

Female/Gore ☐

Male/C ☐

2. **Indicate your highest qualification/ Erekena impamyabumenyi yawe yo hejuru**

- Less than primary school/Munsi y'amashuri abanza ☐
- I complete primary school/Wasoje amashuri yisumbuye ☐
- I completed S3/Nasoje ikicro rusange cy'a,ashuri yisumbuye ☐
- I complete S6/Nasoje uwa 6 w'amashuri yisumbuye ☐
- I completed Bachelor degree/Nasoje ikicro cya 2 cya kaminuza ☐
- I completed Master's degree/Impamyabumenyi ya Master ☐
- Doctorate/Impamyabumenyi y'ikirenga ☐
- Other qualification, specify/ Iyindi mpamyabumenyi,yivuge.....

3. **What is your Job/ Ukora iki?**

.....

SECTION B/ Igice cya B: ASSESSING THE AVAILABILITY OF TOOLS USED FOR INFORMATION COMMUNICATION TECHNOLOGY AND TELEMEDICINE AMONG CANCER PATIENTS

Please, circle the appropriate option you choose/ *Nyamuneka ca akaziga ku gisubizo wahisemo*

No	Questions/Ibibazo	Responses/Ibisubizo
Q1	Cancer care services can be provided via telemedicine/services z'ubuvuzi bwa kanseri zishobora gutangwa hifashishijwe ikoranabuhanga	<i>a. Strongly agree/ndabyemera cyane</i> <i>b. Agree /Ndabyemera</i> <i>c. Neutral / Ndi hagati na hagati</i> <i>d. Disagree/Simbyemera</i> <i>e. Strongly Disagree/Simbyemera na gato</i>
Q2	How do you come to Butaro Hospital? <i>Wageze ute hano ku bitaro bya Butaro?</i>	<i>a. I use common transport/Nateze imodoka bisanzwe</i> <i>b. I have my own /family car/Mfite imodoka yanjye</i> <i>c. I hired a private car/nakodesheje imodoka</i> <i>d. I come by walking/Naje n'amaguru</i> <i>e. I used hospital car/ ambulance</i> <i>f. I came in partners in health's car/ Nazanye n'imodoka y'umushinga inshuti mu buzima.....</i>
Q3	Have you ever used any kind of telemedicine for your current disease? <i>Ese wigeze wivuza ukoresheje ikoranabuhanga?</i>	<i>a. Very frequently/ Kenshi cyane</i> <i>b. Frequently/ Kenshi</i> <i>c. Sometimes/Rimwe na rimwe</i> <i>d. Rarely/Ni gake</i> <i>e. Never/ Ntanarimwe</i>

Q4	What kind of telephone does you have/ <i>Ni ubuhe bwoko bwa telephone ufite?</i>	<i>a. None/Nta nimwe</i> <i>b. Ordinary phone/Telephone isanzwe</i> <i>c. Smart phone/ Telephone ya taci</i>
Q5	What kind of computer/ laptop do you have/ <i>Ni ubuhe bwoko bwa mudasobwa ufite?</i>	<i>a. None/Ntabwo</i> <i>b. Laptop/Mudasobwa ngendanwa</i> <i>c. Tablet/</i> <i>d. Desktop/Mudasobwa nini</i>
Q6	How can you access to internet? <i>Ni ubuhe buryo ukoresha kugirango ubone interinete</i>	<i>a. using cellular data/Nkoresha ama inite asanzwe</i> <i>b. using broadband/Nkoresha wayaresi</i> <i>c. I cannot access internet/Ntabwo mbasha gukoresha iyakure</i>
Q7	How often do you use an app for real video call (example: use of WhatsApp video, zoom...)/ <i>Ni ryari ukoresha videwo uvugana n'abantu?</i>	<i>a. Very frequently/ Kenshi cyane</i> <i>b. Frequently/ Kenshi</i> <i>c. Sometimes/Rimwe na rimwe</i> <i>d. Rarely/Ni gake</i> <i>e. Never/ Ntanarimwe</i>

Section C: Expectation and attitude of patients on use of telemedicine for care of patients with cancer

Q1	Do you think that patient with cancer may benefit the use of telemedicine for their care? <i>Wemera kwivuza ukoresheje ikoranabuhanga ku murwayi wa kanseri bimufitiye umumaro?</i>	<i>a. Strongly agree/ndabyemera cyane</i> <i>b. Agree /Ndabyemera</i> <i>c. Neutral / Ndi hagati na hagati</i> <i>d. Disagree/Simbyemera</i> <i>e. Strongly Disagree/Simbyemera na gato</i>
Q2	For which health care services do you think that may be provided through the use of telemedicine for patient with	<i>a. Booking an appointment/Gufata randevu</i> <i>b. Consultation/Kubonana na Muganga</i> <i>c. Treatment/Kwivuza</i>

	cancer/ <i>Ni izihe serivisi utekereza zishobora gutangwa hifashishjwe ikoranabuhanga (telemedicine) ku barwayi ba kanseri?</i>	d. Review of the doctors e. Others:
Q3	I may get a better care if I see the health care provider in person compared to healthcare through telemedicine/ <i>nabona ubuvuzi bunoze mouye na muganga imbona nkubone ugereraniye no kwivuza hakoreshejwe iyakure (telemedicine)</i>	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q4	I would prefer to see a health care provider in person rather than getting care using telemedicine/ <i>Nahitamo guhura na muganga imbona nkubone kuruta gukorehsa ikoranabuhanga</i>	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q5	It may be easy to arrange an appointment using telemedicine/ <i>Biroroha gusaba randevu wifashije ikoranabuhanga</i>	a. Very easy/<i>Biroroshye cyane</i> b. Easy/ <i>Biroroshye</i> c. Neutral/<i>Ntibyoroshye kandi ntibikomeye</i> d. Difficult/<i>Birakomeye</i> e. Very difficult/<i>Birakomeye Cyane</i>
Q6	The care provided using telemedicine would be adequate/ <i>Serivise zitangwa ku barwayi ba kanseri hifashishjwe ikoranabuhanga zirahagije kandi zirabanyuze</i>	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q7	The health care provider spent little time taking my medical history/ <i>Mugana akoresha igihe gito mu kumbaza ibijyanye nuko merewe</i>	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i>

Q8	I am worried that there would be less communication with the provider (than I normally receive in person) using telemedicine/ <i>mfite impungenge ko uburyo bwo kuganira/kuvugana na muganga nkoresha ikoranabuhanga budahagije/budatuma umuntu yisanzura</i>	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q9	I am worried that the patient 's privacy can be invaded during the telemedicine visit/ <i>mfite impungenge ko gukoresha ikoranabuhanga bishobora gutuma amakuru y'umurwayi yinjirirwa</i>	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q10	I am worried about the confidentiality of my private information being exchanged through the telemedicine visit/ <i>Mfite impungenge zijyanye nibungabungwa ry'amakuru anyunzwa mu buryo bw'ikoranabuhanga mu kuvura hifashishijwe iyakure (telemedicine)</i>	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q11	I am worried about the continuity of care (i.e., I do not see the same provider every time)/ <i>mfite</i>	a. Extremely worried/ <i>birahangayikishije cyane</i>

	<i>impungenge zijyanye n'uburyo nzakomeza kwivuza (kutabasha gukurikiranwa n'umuntu umwe)</i>	b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q12	I am concerned that my primary care provider would not get my visit information/ <i>Mfite impungenge zuko muganga wanjye atamenya/atabona amakuru yanjye yose n'uburwayi nivuza</i>	a. Extremely concerned/<i>Mfite impungenge cyane</i> b. Moderately concerned/<i>mfite imoungenge biringaniye</i> c. Somewhat concerned/<i>mfite imoungenge gake</i> d. Slightly concerned/<i>fite impungenge gake cyane</i> e. Not at all concerned/<i>Ntabwo mfite imoungenge</i>
Q13	I am concerned that my insurance would not cover my telemedicine visit/ <i>Mfite impungenge ko ubwishingizi bwanjye butazabasha kunyishyurira mu gihe nivuje nkoresheje ikoranabuhanga</i>	a. Extremely concerned/<i>Mfite impungenge cyane</i> b. Moderately concerned/<i>mfite imoungenge biringaniye</i> c. Somewhat concerned/<i>mfite imoungenge gake</i> d. Slightly concerned/<i>fite impungenge gake cyane</i> Not at all concerned/<i>Ntabwo mfite imoungenge</i>
Q14	I generally used telemedicine when my provider is not open (after hours, holidays, etc.)/ <i>Kenshi nakoresheje ikoranabuhanga nivuza mu gihe kitari</i>	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i>

	<i>amasaha yo gukora ya muganga</i>	
Q16	I am worried about the accuracy of the information from the telemedicine health care provider/ <i>Mfite impungenge ku makuru nzahabwa na muganga aciye mu buryo bw'ikoranabuhanga</i>	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>

Open ended questions

- What do you think about using telemedicine for getting medical treatment for cancer? Ese watubwira icyo utekereza ku guhabwa ubuvuzi bw' indwara ya kanseri hifashishijwe ikoranabuhanga mu buvuzi (telemedicine)?
- What can you say about your experience of getting health care services here at Butaro cancer center of excellence/ ese wansangiza kuri experience yawe ijyanye n'uburyo ubona serivisi z'ubuvuzi hano ku bitaro bya Butaro
- Would you rather use telemedicine while seeking treatment than physical encounter with your healthcare provider? Give reason to your answer? Ese wahitamo kuba wakoresha ikoranabuhanga igihe ushaka ubuvuzi kurusha guhura na muganga imbona nkubone? Tanga impamvu ku gisubizo cyawe
- What do you think are the pros and cons of using telemedicine in regards to the cancer treatment? Wambwira ibibi n'ibyiza ubona bijyanye n'uburyo bwo kwivuza ukoresheje ikoranabuhanga

Thank you very much/ Murakoze cyane

Signature/thumb impression:

APPENDIX No 4: Questionnaire for healthcare professional

**PERCEPTION OF HEALTHCARE PROVIDERS AND CANCER PATIENTS ON THE USE OF
TELEMEDICINE FOR CANCER MANAGEMENT:**

CASE STUDY OF BUTARO CANCER CENTER OF EXCELLENCE

SECTION A: DEMOGRAPHIC DATA OF THE RESPONDENT

Age:

☐ 20-30 years ☐ 31-40 years ☐ 41-50 years ☐ 51-60 years ☐ over 60 years

Sex:

☐ female ☐ male

Medical profession:

☐ doctor ☐ nurse ☐ physiotherapist ☐ paramedic ☐ midwife

Please add your highest level of study below (example AO nursing, master
of medicine in internal medicine):

.....

Please enter your current specialization below.

.....

SECTION B:

Q1: How do you assess in scale (from 1 to 10, where 1 is the lowest and 10 is the highest) effectiveness of telemedicine or potential effectiveness of using telemedicine for management of patients with cancer?

	1	2	3	4	5	6	7	8	9	10	
Lowest	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Highest
effectiveness											effectiveness

Q2: How do you assess in scale (from 1 to 10, where 1 is the lowest and 10 is the highest) reliability of telemedicine?

Lowest	1	2	3	4	5	6	7	8	9	10	Highest
Reliability	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	reliability

Q3: what could be Perceived advantages of using Telemedicine (multiple answers are possible)

- ☐ Reduced exposure to pathogens
 - ☐ possibility of providing medical advice to more patients at the same time
 - ☐ quick contact with patients
 - ☐ Increases patient engagement and satisfaction
 - ☐ Others:
-

Q4: What do you think may be the challenges to healthcare personnel for the use of telemedicine

- Limited skills on the use of computer
- Patients' lack of technical skills
- Lack of integration of medical platforms
- Poor internet connectivity
- Lack of enough telemedicine infrastructures
- Others:

Q5: Challenges for the patients for the use of telemedicine

- ☐ Lack of technical skills
- ☐ Privacy concerns
- ☐ Limited awareness on telemedicine services
- ☐ High cost for internet and telemedicine equipment
- ☐ Others:

Q6: What are the disadvantages of telemedicine in your opinion?

- ☐ impossibility to personally examine the patient
- ☐ unreliable transmission of information by the patient
- ☐ technical difficulties
- ☐ difficulties resulting from the patient's symptoms (e.g., deterioration of hearing, psychotic disorders)
- ☐ other

Q7: Please write below your own opinions, suggestions or observations about telemedicine:

.....

SECTION C:

Q1	Better healthcare to cancer patient can also be provided through telemedicine	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q2	The next time I would prefer to see a patient in person despite the possible inconvenience	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q3	It can be easy to arrange an appointment using telemedicine	a. Very easy b. Easy c. Neutral d. Difficult e. Very difficult
Q4	The health care provider can adequately take medical history when using telemedicine	a. Strongly agree/<i>ndabyemera cyane</i> b. Agree /<i>Ndabyemera</i> c. Neutral / <i>Ndi hagati na hagati</i> d. Disagree/<i>Simbyemera</i> e. Strongly Disagree/<i>Simbyemera na gato</i>
Q5	I am worried that there may be less communication with the patient when using telemedicine than communication done in person healthcare visit	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i>

		e. not at all worried/ <i>nta mpungenge biteye</i>
Q6	I am worried that patient 's privacy maybe invaded during the telemedicine visit	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q7	I am worried about the confidentiality of private information being exchanged through the telemedicine visit	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>
Q8	I am worried about the continuity of care (i.e., the patient may not see the same provider every time)	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>

Q9	I am concerned that the healthcare provider would not get prior visit information of the patient	a. Extremely concerned b. Moderately concerned c. Somewhat concerned d. Slightly concerned e. Not at all concerned
Q10	I am worried about the accuracy of the information from the patient through telemedicine consultation	a. Extremely worried/ <i>birahangayikishije cyane</i> b. Moderately worried/ <i>biteye impungenge cyane</i> c. Somewhat worried/ <i>biteye impungenge gahoro</i> d. Neutral/ <i>ntacyo nabivugaho</i> e. not at all worried/ <i>nta mpungenge biteye</i>

Open ended Questions

- How would you describe the use of telemedicine in healthcare settings for management of cancer patients?
- How would you compare telemedicine services and in person healthcare provision to patients with cancer?
- What do you like most and least about using telemedicine for care of cancer patients or in general?
- How does telemedicine help in terms of quality of services?

Thank you very much!

Signature

.....

Ethical Clearance copy



Ethical Clearance copy



REPUBLIC OF RWANDA
NORTHERN PROVINCE
BURERA DISTRICT
BUTARO HOSPITAL



Butaro, April 20, 2023
Our ref. /HB/EK/ETH/2023

BATETE Anitha

RE: Approval letter

Dear Anitha,

Reference is made to your letter requesting the permission to conduct research entitled "*Perception of Healthcare providers and cancer patients on the use of telemedicine for cancer management*". Butaro Hospital's Leadership is pleased to inform you that your request has been granted.

We take this opportunity to inform you that during the data collection, you are required to notify us your presence at the hospital, follow the existing policies, procedures and regulations applied in Butaro Hospital. Failure to comply with those policies, procedure and regulation will result in cancellation of your research activities.

Sincerely,

Dr Emmanuel KAYITARE
Lt Col
Director General of Butaro Hospital



P.O. BOX 59 MUSANZE; E-mail: butaro.hospital@moh.gov.rw;
Cell Phone: 0791782374; Twitter: @ButaroHospital; Facebook: Butaro Hospital

Approval letter copy