ACCESS TO SECONDARY AND TERTIARY PUBLIC HEALTH CARE IN KIGALI, RWANDA

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March, 2014

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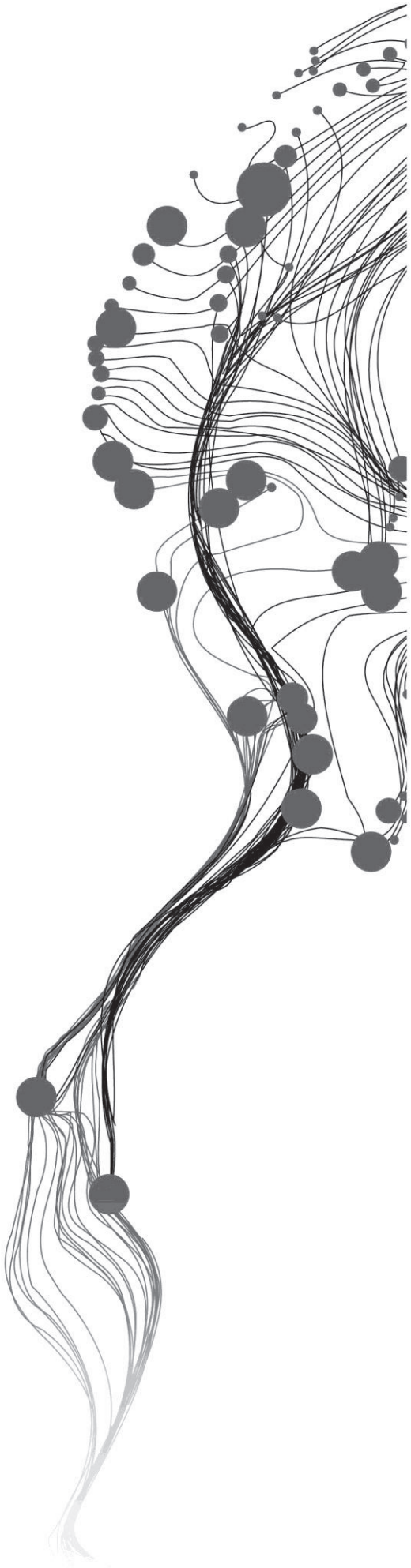

ACCESS TO SECONDARY AND TERTIARY PUBLIC HEALTH CARE IN KIGALI

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ABSTRACT

Health care has the potential to facilitate the realization of the Millennium Development Goals by offering access to secondary and tertiary health care. It is in this line that a study with an aim to assess access to secondary and tertiary public health care for people with community based health insurance was carried out in Kigali, Rwanda.

The study is based on other views of literature of access to health care, Rwandan health care system, primary data and secondary data. During this study, it has been demonstrated that access to health care is multi-tiered system composed by 5 dimensions such us geographic accessibility, availability, affordability, accessibility, accommodation. Operationalization was mainly based on secondary and primary data to examine variation in terms of 5 dimensions of access to secondary and tertiary health care. Statistical methods and GIS tools are used in analysis.

The results of this research showed that variation in access to secondary and tertiary health care exists in Kigali city based on five dimensions of access and across socioeconomic class. The dimension of acceptability, accommodation and affordability in general was not very problematic as shown the outcomes of this research for secondary and tertiary health care. The analyses show that availability of bed, availability medical staff, availability of drugs (under availability dimension), travel distance (under geographic accessibility dimension) were important causes of low satisfaction with access to secondary and tertiary health care and need high improvements in policy planning and implementation. The comparison based on outcomes of three public levels of health care in Kigali showed the similarities and variation in access to health care.

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LIST OF ABBREVIATIONS

CBHI	Community Based Health Insurance
CGIS	Center for Geographic Information System and Remote Sensing
CHUK	Centre Hospitalier Universitaire de Kigali
GIS	Geographic Information System
HC	Health Care
KM	Kilometer
MDGs	Millennium Developments Goals
MMI	Military Medical Insurance
NISR	National Institute of Statistics of Rwanda
PHC	Primary Health Care
RAMA	La Rwandaise d Assurance Maladies
SHC	Secondary Health Care
THC	Tertiary Health Care
WHO	World Health Organization

1. INTRODUCTION

This chapter gives an overall description about the research structure starting with a general introduction of study. The research problem is described, main objective and several sub –objectives are defined, followed by research questions to each sub-objective. The present chapter included the conceptual frame work of the research.

1.1. General introduction (Background and justification)

Health care is one of the most important aspects in the life of the human beings. According to Huerta & Källestål (2012), health care has the potential to facilitate the realization of the Millennium Development Goals by offering access to health care. It is also a basic human right and one of the key factors of social justice (Travis et al., 2010).

Many issues persist in access to health care which impede achieving the MDGs. Some of the issues facing the health care are relates to unequal distribution, high cost of services and lack of health personnel. According to Kalimenze (2011) health system contribute to create health care inequalities. Thus a well organized health system will help to tackle issues which are in health care. To bridge gap in the achievement of MDGs, as international targets, indicators are used to evaluate the development progress per country.

According to Szczepura (2005) access to health care is still defined as availability of a good quality of medical care linked to the need for it. For Penchansky and Thomas (1981) access to health care is a multidimensional concept. They identified 5 dimensions of access to health care services: accessibility (travel distance and travel time); availability (type and quantity of services); affordability (income and type of insurance); acceptability (patients' perceptions) and accommodation (institution organization). They argued that these dimensions can be used to evaluate access to health care. Those dimensions and variables are used to identify obstacles in access to health care. Obstacles related to distance, travel time, transport cost, service cost, income, equipments, waiting time, perceptions of people that can block people to have and obtain health care services. These obstacles have led to high morbidity, mortality and have created major barriers to economic growth. The lack of access to health care services is the major reason behind poor health outcomes (Whiting & Unwin, 2009). According to Kalimenze (2011), the issues of access should be addressed at macro level through developing policies for health planning.

Also in Rwanda, access to public secondary and tertiary health care remains an issue. Rwanda is located in East Africa with a population of 10.6 million people, population growth is at an average of 2.6% per year (National Institute of Statistics of Rwanda, 2012). The actual cost of health care per citizen per year is between $14-20; with one half of total actual cost comes from government sources and the remainder from international donors (Yale School of Medecine, 2013). To meet the health care needs of its population, the Government of Rwanda designed a Health Sector Policy in 2005 and a five year Health Sector Plan (2005-2009) in order to improve the economic welfare of the population and poverty reduction in the framework of good quality health care (Ministry of Health, 2005). But the issues are not yet solved.

The health system in Rwanda is a decentralized and multi-tiered system. It is composed of public health care and private health care. On one hand the public health care is provided through an organized

network that includes primary health care (local health clinics), secondary health care (district hospitals) and tertiary health care (referral hospitals). On the other hand the private health care system which is divided into five major levels such as clinic, specialty clinic, dispensary, polyclinic hospital and laboratory. Public and private health care are classified based on level of service they provide(Ministry of Health, 2012a).

The government of Rwanda has created three categories of public health insurance to deal with disparities in access to health care. The first is the Community-Based Health Insurance (CBHI) Scheme called Mutuelles de Santé made to improve access to health care of the poor and people who work in the informal sector. In 2011 the membership to CBHI covered over 90 per cent of the population in Rwanda (Ministry of Health, 2012b). The Membership is renewed every year. The second is la Rwandaise d'Assurance Maladie (RAMA) which was created for Government employees and was expanded to private sector workers involved in the formal economy. RAMA covered 2.3% of the population in 2007 (Saksena et al., 2011). The last is the Military Medical insurance (MMI) which is a mandatory scheme for defence personnel and their families and covered around 1% of the population in 2007 (Saksena et al., 2011). In addition the Government of Rwanda has encouraged creation of other private health insurances but they are not affordable for the poor.

Even if the three types of health insurance created by the Government of Rwanda are public, they also have some differences. The CBHI does not allow their users to go to secondary or tertiary health care without passing by a primary health care which is possible for RAMA and MMI users. At the sector level, each primary health care has a community based health insurance section. If a member of CBHI is sick, he has first to go to the primary health care. If they cannot help the patient, they refer her/him to the secondary health care which will send patient to tertiary health care if the case is serious. This research will focus on CBHI as it is used large majority of the population in Rwanda and is more or less affordable for the poor and people who work in the informal sector. Within the CBHI, there are two categories of users: the first category includes those who pay themselves their contributions and second category includes those whose contribution is paid by the government or donors.

In Kigali city, there is a lack of equality in access to medical services (International Health Economics Association, 2013). Even if there is health insurance policy, the cost of health care is still high for some people. Increasingly, the lack of health infrastructure caused by high population growth and insufficient availability of medical personnel and advanced equipments remain a challenge (Ministry of Health, 2012a). This study is an expansion of the research conducted by Murekatete (2010) which evaluated access to primary health care in Kigali. It will concentrate on access to public secondary and tertiary health care because the outcomes will help decision makers, planners, communities and others who are involved in development of policies to improve access to secondary and tertiary health care and there are no studies that have been done on this. In addition the expected output of this study is an academic product that would enhance and contribute to the body of knowledge and literature in the field of access to public secondary and tertiary health care in developing countries.

1.2. Research problem

Similarly to other developing countries, access to secondary and tertiary health care is considered in Rwanda as an important strategy to fulfil health for all population. In Rwanda challenges remain with regards to access to the secondary health care within an acceptable distance from inhabitants' areas, poor quality of care in health facilities, lack of medical human resource, lack of advanced equipments and the financial requirements for managing and provision of health care even if the health care situation has

improved (Ministry of Health, 2012a). Health care provision is one of many basic location based on social services to be provided with regard to the spatial distribution of the population (Russell, 1996).
Access to health care in Kigali city has become more inequitable, less accessible and less affordable, especially for the poor (Murekatete, 2010). One of the most affected includes unemployed, low income, homeless and persons without insurance. Huerta and Källestål (2012) argued that adoption of poor health policies, inaccessibility to basic health interventions and health inequities remains high in cities. Moreover the government has to make the most efficient use of available resources and to monitor trends in health equity and access to health care.

The Government of Rwanda put in place community based health insurance to allow the poor people and the people who work in informal sector access to health care. The CBHI is used by a large number of populations divided in two categories depending on their income. The first category includes people who pay contribution themselves while the second category includes people whose contribution is paid either by the Governments or by donors. For those whose contribution is paid by the government or others donors, the cost of medical services will be high as they have to pay a certain percentage of received health care. The cost of medical services is still very high and increases from primary health care to secondary and tertiary health care (Murekatete, 2010).

The growth of the city does not grow hand in hand with social services expansion such as health care. As a result the existing health system does not meet all the population needs. Therefore, the aim of this study was to assess and measure variations in access to secondary and tertiary public health care considering the users of community based health insurance using five dimensions of access to health care.

1.3. Research objectives

The main objective of this research is to assess access to public health care for people with CBHI in Kigali. The main objective is divided into the following specific objectives:

1. To define and operationalise the concept of access,
2. To describe Rwanda health care system,
3. To extract the main findings of previous research of access to primary health care in Kigali,
4. To analyze the dimensions of access to health care,
5. To compare the outcomes of access to different levels of public health care in Kigali.

1.4. Research questions

Specific objectives	Research questions
To define and operationalise the concept of access	a) How can the concept of access and theirs dimensions be defined? b) How the concept of access and their dimensions be operationalized?
To describe the Rwanda health system	a) What does the Rwandan health system look like? b) What parameters are needed to describe the Rwandan health system? c) How is health care insurance in Rwanda?
To extract the main findings of previous research of access to primary health care in Kigali	a) What are the main findings of access to primary health care in Kigali?

To analyze the dimensions of access to health care;	b) What is the current spatial distribution of public secondary and tertiary health care? c) Which areas are well and poorly serviced? d) What is current distribution of medical staffs and patients beds in secondary and tertiary health care? e) How the patients referred perceived the drugs availability? f) Are patients able to pay for the health care services provided by secondary and tertiary health care in Kigali? g) What is the medical staff attitude towards the patients? h) How long is the waiting time for secondary and tertiary healthcare service in Kigali?
To compare the outcomes of access to different level of public health care in Kigali	a) What are the similarities and differences outcomes of access to different level of public health care in Kigali?

Table 1.1: Question and specific objectives of research

1.5. Research framework

The research framework presented in figure 1.1 shows the dimensions in access and the indicators, considered to evaluate and to measure the present situation of access to secondary and tertiary health care in study area. Physical, socioeconomic condition of area and population information is relevant in this evaluation, as the need and perception on secondary and tertiary health care. The selection of relevant indicators led to the selection of primary and secondary data needed in the evaluation of access within the context of study area. Therefore different dimensions of access to secondary and tertiary health care and different methods (statistical and Geographic Information System) are considered in this study. The important dimension in access to be improved will highlight, in order to achieve better access to secondary and tertiary health care to all.

The data collected were extracted and entered into a spreadsheet using Statistical Package for social Science (SPSS.21) Software. Data analysis was conducted using the same software and in some cases excel was used also. Much of the analysis was based on descriptive statistical to summarize survey results. Physical analysis using GIS, statistical methods and interpretation of results was used to visualize the measurements and evaluation of indicators

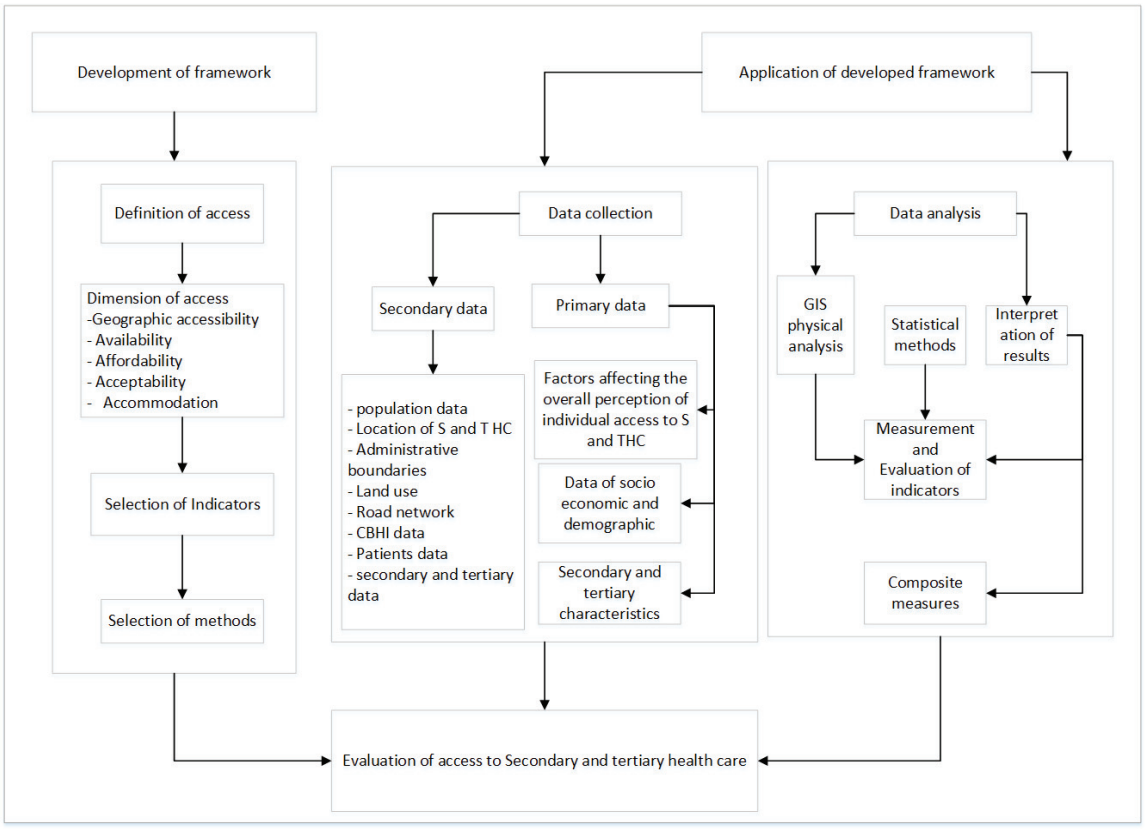


Figure 1.1 : Research framework

2. REVIEW OF THE CONCEPT OF ACCES AND THEIR DIMENSIONS TO HEALTH CARE

This chapter presents a review on definitions and concepts of access to health care. Detail definition of several dimensions and conceptual framework in evaluating access to secondary and tertiary health care adapted in this study are explained. Based on literature, issues of variation in dimensions of access are reviewed and different methodologies used to evaluate and measure access are been discussed.

2.1. Definition of access to health care

Access is explored by several studies as the general concept which includes more specific dimensions of fit between health care system and clients. According to Oliver and Mossialos (2004) access to health care relates to the relationship between demand and supply side aspects. Goddard and Smith (2001) also include the service delivery with four dimension such us availability, information, quality and costs relates to access. In this way the key element is information dimension.

Access to health care is a multidimensional concept. Peters et al. (2008) develop a framework of four dimensions, each has supply and demand aspect: 1) geographical accessibility describes the physical distance, or travel time and mode of transport; 2) availability include availability of right type of health care services, materials, and equipment; 3) financial accessibility include the relationship between the price of services and ability of users to pay for those services, protection from financial consequences of health expenses; and 4) acceptability include the responsiveness of health service providers to the social and cultural expectations of individual users and communities.

This framework which combines 4 dimensions of access to health care was suggested by Penchansky and Thomas (1981) as an important pillar to assess access to health care with accommodation as a fifth dimension. In this ways, access is active concept but relates to the communicative relationship between health care system and individuals. Moreover variations in each of these aspects of access might affect the patients.

2.2. Dimensions of acces to health care

Access is a general concept summarizing a set of 5 specific dimensions. The details about five dimensions are described below.

Geographic accessibility as first dimension is defined as interaction between the point of supply and the location of patients considering patients transportation expenses, distance and travel time (Penchansky & Thomas, 1981). However, Peters et al. (2008) are limited just on the distance or travel time between the service delivery location and the user but ignores the cost that it will take to get the health care. The dimension of accessibility has received more importance compared to other 5 dimensions of access to health care. That is why it even has numerous names like geographical accessibility used by Huerta and Källestål (2012) or spatial accessibility used by (Wang & Luo, 2005). For this research the term geographic accessibility will be used to evaluate travel distance.

The second dimension is **availability**. Penchansky and Thomas (1981) define the dimension of availability as the interaction of types of existing services and volume in relation to the patient volume and types of needs. It based on the importance of the supply of providers of health care utilities. Peters et al. (2008) use the same definition with high emphasis on the quality and type of services, materials and equipments.

The existence of services is not enough as long as the quality is poor and the type does not fit the needs. The equipment and medical human resources to use them will determine the type and the quality of service. This dimension has more importance to secondary and tertiary health care because they are serving big area and provide high level of health care service.

The third dimension which is **affordability**, is sometimes presented as financial accessibility to mean relationship of cost of services and providers insurance, existing health care insurance, ability to pay health prices (Penchansky & Thomas, 1981). They saw personal income as a key indicator to afford health care. According to McIntyre et al. (2009) it is the level of fit between the total costs and individual's ability to pay, in the situation of budget. The level of income is important to afford health care service. This affordability will be facilitated by health care insurance. This dimension has less importance according to availability in term of access to secondary and tertiary health care. This is because the case treated in this level of healthcare are more serious which means that equipments and medical human resources will come first than the money to be paid by patients.

Acceptability as the fourth dimension is defined by McIntyre et al. (2009) and Penchansky and Thomas (1981) as patients views about health care services and interaction with services providers. Goddard and Smith (2001) also emphasizes acceptability as an important dimension of access to health care because it generates solutions to barriers of access through supply side. Then the perceptions of the patients will determine their acceptability of the health care.

Some researchers like Obrist et al. (2007), Leisinger (2008) and Bagheri and Benwell (2005) use term of adequacy to talk about the fifth dimension which is **accommodation**. They define it as the level to which services are fixed to satisfy clients' expectations and needs. Penchansky and Thomas (1981) describe it as interaction between the way in which the available resources are fixed to receive patients and patients' ability to comply to that organization. Both definitions are referring to organization of services and resources. However McIntyre et al. (2009) define accommodation as period in which health care services are offered and the possible to individuals to attend these services in that period. This dimension has more importance in tertiary health care than secondary health care. Tertiary health care is dealing with critical cases which require high interventions, appointment and waiting time highly considered.

Few studies address the issue of variations in access to health care focusing on combination of dimensions of access. Fortney et al. (2000) interpret two geographic dimensions of access to health care like availability and accessibility as a supply concept relating to health care providers and the travel time. In this way access is a matter of location measured by identifying population ratios. However, simply physical distance or travel time from service delivery point to the user does not ensure that individuals receive health care. Russell (1996) interpret access as demand concept relating to ability to pay for the services. Increasing incomes of those who needs health care improve affordability to those in need and may increase the demand of services. However, affordability has generally been considered as relationship between the cost of services and ability of users to pay those services (Ikporukpo, 1987).
There have been several studies that have been undertaken across the globe relating to this study. One research was conducted in Yogyakarta, Indonesia by Shrestha (2010). The study used five dimensions (geographic accessibility, availability, affordability, acceptability and adequacy) to evaluate access to primary health care. The study used primary data collected by household survey. Variation of access was measured by developing indicators and comparison of three villages within study area. Access was evaluated across different health facilities users and socioeconomic classes using descriptive and explorative statistics. The study showed that variation in access exists between villages and across different socioeconomic classes. Geographic accessibility and affordability were not problematic as a result of

effective policy implementation. The analysis however showed that availability and adequacy were important causes of dissatisfaction of access to primary health care.

In Rwanda studies were conducted on accessibility to health care. One study in western province conducted by Huerta and Källestål (2012) assessing spatial coverage modelling of the primary health care network in the western province. This research focused on three different travel scenarios utilized by the population to attend the nearest primary health facility using two dimensions of access availability and physical accessibility. As a result, they found that regardless of which travel scenario is used, the majority of the population in the Western Province does not have geographic access to the existing primary health facility network. A second relevant case for this study was conducted by Murekatete (2010); a study which evaluated access to primary health care in Kigali. The study also evaluated five dimensions of access to health care. The results showed that accommodation was problematic but, geographic accessibility; availability; affordability and acceptability were not problematic as a result of effective of health insurance and good health system implementation. This research therefore is going to have an expansion focus on health facilities (secondary and tertiary health care), which will form an addition to the research done on primary health care.

Operationalization of access concept dimensions

Access to health care is a multidimensional concept which will be assessed using 5 dimensions explained above. The table 2.1 below describes the dimensions and their corresponding indicators to measure the dimensions.

Dimensions	Short explanation	Indicators	Author and year	Operationalization/ Methodology
Geographic Accessibility	The location of supply is in line with the location of users	-Travel distance -Mode of transport	(Penchansky & Thomas, 1981) (Obrist et al., 2007) (Higgs, 2004) (Murekatete, 2010) (Shrestha, 2010)	-Network analysis -Factor analysis -GIS based measure, -Descriptive statistics
Availability	The existing health care services and good answer clients' needs	-Human resources (number of medical doctors, number of nurse) -Equipments (number of patients' bed) -Drugs availability	(Penchansky & Thomas, 1981) (Obrist et al., 2007) (Fortney et al., 2000) (Murekatete, 2010) (Shrestha, 2010)	-Statistical analysis -Descriptive statistics
Affordability	The cost of services fit the clients 'income and ability to pay	- services cost -CBHI category - Income	(Penchansky & Thomas, 1981) (Obrist et al., 2007) (Murekatete, 2010) (Shrestha, 2010) (Khe et al., 2002)	-Statistical analysis, - Multiple linear regression -Descriptive statistics

Acceptability	The characteristics of the providers meets with those of the patients	Perceptions of patients -Information provision -Attitudes of medical staffs towards patients,	(Penchansky & Thomas, 1981) (Obrist et al., 2007) (Murekatete, 2010) (Shrestha, 2010)	Statistical analysis -Multiple regression -Descriptive statistics
Accommodation	The organization of health care match the patients 'expectations	-Waiting time - Opening hours - Cleanness	(Penchansky & Thomas, 1981) , (Obrist et al., 2007) (Leisinger, 2008)	Statistical analysis -Multiple regression -Descriptive statistical

Table 2.1: Dimension of access to health care and their indicators references

Based on table 2.1 the limited number of studies has considered separately various components during the operationalization process. It is necessary to identify a number of indicators of access to allow assessing how access reached or to determine where health services programs need the improvements in access. Multiple access studies have considered a range of indicators related to particular region or country. Behind this reason, indicators used to evaluate access dimensions are described based on the country or the region for fitting with reality.

Operationalization of geographical accessibility

Geographic accessibility is measured using travel impendence translated by travel distance between the locations of population residence and health care facilities.

Travel distance

In the utilization of health care travel distance is an important factor (Buor, 2003). Many researchers have emphasized on the effect of health care facilities utilization, and show that health services usage decreases with greater distances from the source of health care.

Travel time is another indicator used to measure geographic accessibility. It has become useful indicator in studies of access to health care. According to Amer (2007) to evaluate access to different types of health care, estimated time have been used. In operationalization of geographic accessibility dimension, longer travel time and greater distance to health care are taken as barriers to the utilization of health care services. The short distance and short time are considered as beneficial to the use of health care services. Travel distance to reach health care can be barriers or not because of others factors like transport mode.

Transport mode

Transport mode is a factor which influences health care accessibility. Inappropriate or expensive transport creates the obstacles for getting a good health care service. Affordable, adequate, efficient and safe transport in the developing country is limited and affects the ability to find in time health care service (Forster, 2009). As confirmed by Ministry of finance and economic planning (2007) people who do not have access to public and private transportation are more affected by health disadvantages. We conclude that, lack of transport; unaffordable transport system and bad condition of road network create the issues in emergency cases and long distance towards health care. This imposes people to walk long distance with more challenges than others who have other means of transport.

Operationalization of availability dimension

In evaluation of availability dimension, two kind of information is needed such as resources available for offering health care and the size of population(world health Organization, 2006). Available resources include number of health care facilities, number of workers, number of beds, availability of drugs, technology availability etc. The availability dimension is evaluated considering the types of resources with the size of population, such as the number of patients visited health care par year, the number of population served per health care, the number of beds and number of inpatients par year, while the population is recorded according to the administrative structure of physical entity (world health Organization, 2006). In brief dimension of availability can measured by spatial and no –spatial factors.

Operationalization of affordability

Affordability dimension is explained by people ability and willingness to pay for health care. Multiples studies show that ability of patients to pay the health care services affects the use of services. The ability to pay is included different factors like income, community based health insurance category and services cost. In Rwanda community based health insurance category include people paid community based health insurance contribution by own pocket, people paid community based health insurance contribution by government or by donors. Services cost include treatment cost, drugs cost, laboratory cost and hospitalisation cost. These indicators affect affordability dimension in access to secondary and tertiary health care.

Operationalization of acceptability

Goddard and Smith (2001) explained acceptability dimension as service provision and it is an important dimension of access to health care as it generates solutions to barriers of access through supply side. Then the perception of the patients will determine their acceptability of the health care. Within dimension of acceptability of access, the indicators recognized by the literature affects health care are information provision and attitude of medical personnel towards patients (McIntyre et al., 2009). These two indicators were used to measure acceptability dimension in this study.

Operationalization of accommodation

Accommodation is described as the level to which services are fixed to satisfy clients' expectations and needs (Obrist et al., 2007). Penchansky and Thomas (1981) describe it as interaction between the way in which the available resources are fixed to receive patients and patients' ability to comply to that organization. Operationalization of this dimension in this study is based on cleanness, opening hour, waiting time for consultation and waiting time for obtaining results (e.g labo tests) indicators. Tertiary health care facility is dealing with critical cases which require high consideration of waiting time for consultation and waiting time for results indicators.

2.3. Conceptual framework for access to health care

Access to public secondary and tertiary health care will be assessed through a conceptual framework, figure 2.1 which considers access as multidimensional concept based on interaction between individuals and health care system. The framework will be based on understanding five dimensions of access and the associated indicators described before.

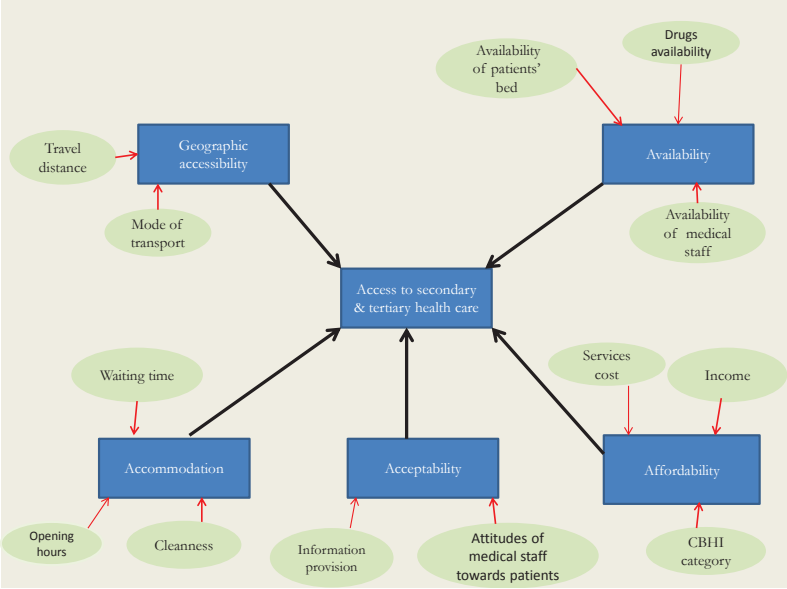


Figure 2.1: Conceptual framework

This study provides the most detailed clarification for assessing the access concept, especially the linkages among the various access dimensions, and presents a comprehensive conceptual framework for evaluating access and analyze if all dimensions are equally relevant to secondary and tertiary health care in Kigali. The proposed conceptual frame work recognizes access as the outcome of a process involving the interplay between the five dimensions of access. This atomization of the concept allows us to focus on specific aspects of the access to secondary and tertiary health care, and to develop precise outcome indicators of health system for evaluative purposes.

2.4. Measuring dimensions of access to secondary and tertiary to health care

The main objective of the present study is to evaluate access to secondary and tertiary public health care using 5 dimensions proposed in literature by (Penchansky & Thomas, 1981). The need of evaluating each dimensions of access individually recognized in literature in order to measure the overall access to secondary and tertiary health care with certain norms or from perspective of users. To develop quantifiable indicators and to clarify the concept of indicator of each dimension is a commonly accepted method in evaluating access to secondary and tertiary health care.

2.4.1. Developing indicators to quantify and to measure dimensions of access

The main idea of indicators is to simplify the complex phenomenon, to quantify, to measure, to evaluate and to communicate the results. Indicators also used to monitor the area which needs the priority policy intervention. To develop indicators helps to measure or to evaluate variation for each dimension of access to secondary and tertiary health care across several socio-economic groups. It means indicators used to measure inequalities in different aspect of access. Confirmed by Mrtinez (2005) benefit of using indicators to evaluate inequalities is to communicate in simple way, to detect and to quantify variation.

Considering purpose and functions, the indicators are categorized into three groups (Parnell & Poyser, 2001). Mrtinez (2005) explained in details three categories below.

- Descriptive or baseline indicators: explained existing situation of some system. It means data collected for each indicator.

- Normative or target indicator: Normative indicators allow setting the projected target or goal to be achieved. They help evaluation and comparison of existing situation based on certain standard established by policies.
- Performance or outcome indicators: They allow verifying if the targeted goals achieved from policy side and check if users are satisfied with results.

This study based on development of descriptive indicators demonstrates the existing situation of access to secondary and tertiary health care across different socio economic groups of population, considering five dimensions of access. The need of opinions and experiences of users towards the present conditions of access to secondary and tertiary health care is focused on development of indicators. Considering five dimension of access, indicators were elaborated referring to the issues raised for each dimension.

2.4.2. Analyzing and measuring indicators

The development and the measurement of indicator have been a main concern in evaluating access in health care study. Several methods like statically and Geographic Information System methods are applied to measure dimension of access to health care in Kigali. Statistical methods such us factor analysis, correlation, multi regression and descriptive statistics are applied to analyze the nature and relation between several types of data collected on various aspects of research (Field, 2000). In addition Ware Jr et al. (1983) used satisfaction indicator as a principal element of utilization and other relate it as outcome of utilization.

Geographic information System played a great role in analyzing the indicators and displaying outcome. Geographic information system is appropriate tools in measuring physical accessibility to health care and also it have capacity to store, manage manipulate physical and attribute data in order to analyze and visualize physical information (Black & Ebener, 204). Guagliardo (2004) has described measuring physical dimensions of access like availability and geographic accessibility.

The present research concentrates on physical and no physical aspects of access. Simple road network can be applied to discover the influence of physical dimensions in access to secondary and tertiary health care in Kigali city and descriptive statistics applied to measure no physical aspects. The perceptions of population in different aspect concerning secondary and tertiary health care are used to validate the conclusion of study.

Measurement or evaluation of access to secondary and tertiary health care can be done from two aspects: Subjective and objective indicators. Objective and subjective indicators can be described separately to measure them. The paragraph below will develop more about objective and subjective indicators.

2.4.3. Subjective and objective indicators

Objective and subjective indicators are use to evaluate access to health care. Development of both subjective and objective indicators becomes important in this domain. Das (2008) confirmed the importance of objective and subjective indicators to evaluate the quality of life, where in the study domain health care play an important role. Based on literatures objective indicators help to evaluate facts such as education level, income of house hold per month, distance used to reach type of health care, cost paid of health services etc.

The subjective indicators evaluate or measure the opinion of people or perception on some item, their satisfaction or dissatisfaction of the health care services or level of income. Veenhoven (2002) explained that the objective indicators supply information about present state of social problems and the effects of trying to solve these problems, on the other hand subjective indicator are evaluated using likert scale like

very satisfied, satisfied neutral, dissatisfied and very dissatisfied. It means in the questionnaires related to subjective measures the respondents express their agreement to a level of statement.

It is useful to focus on link between outcome from objectives and subjective indicators, because both indicators present some contradictory conclusions about the relationship. Foo (2000) suggested using subjective and objective indicators in order to complement the limitation of specific indicators. To summarize and as mentioned above, the study is linked to subjective and objectives indicators because they are key indicators for evaluating the access to secondary and tertiary public health care especially in case of Rwanda .

2.5. Conclusion

This chapter reconsidered essential definitions and concepts used to explain access to secondary and tertiary health care by different researchers. Five dimensions of access generally used to measure and to assess access to health care were explored. A model was developed to measure and to evaluate access to secondary and tertiary health care. This participated in developing conceptual framework of this research.
To measure access to secondary and tertiary health care both approaches subjective and objective were used. Development of objective and subjective indicators for each dimension of access were used these approaches in order to measure them. In this study the indicators were played a great role for quantifying and measuring the dimension of access to secondary and tertiary health care.

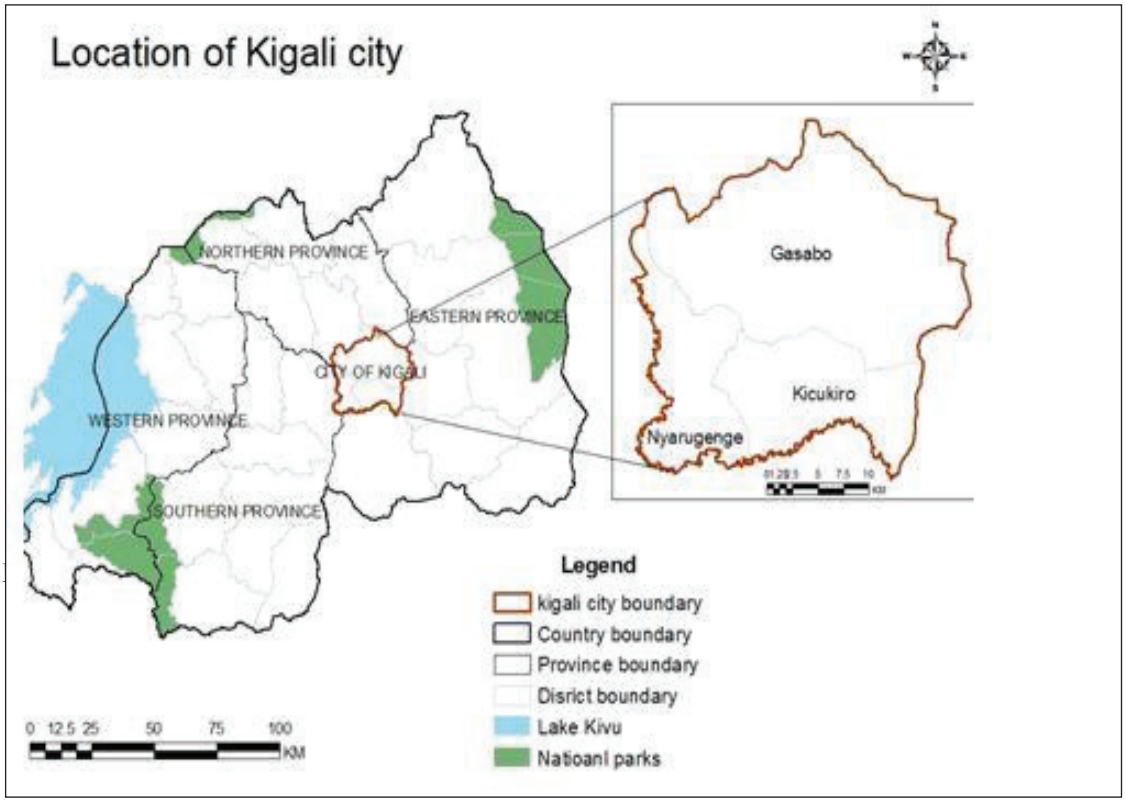
For developing methodology of this study overview of several statistical methods and GIS tools applications are very important. Variation and relationship in access to secondary and tertiary health care can be found from statistical analysis and GIS can be used to examine spatial variation in access to health care, to help interpretation of outcomes and to know spatial characteristics of Kigali as study area.

3. STUDY AREA DESCRIPTION AND RWANDA HEALTH SYSTEM

This chapter presents a brief description on the study area. The description includes the physical characteristics, surface area, administrative units, geographic location, demographic characteristics and spatial expansion. It provides overview of Rwandan health system.

3.1. General description of study area

The City of Kigali is located in the central part of the country. It is the capital city and largest city of Rwanda. It is one of 5 provinces of country (largest national administrative unit). Kigali was established as the capital of Rwanda in 1907 by the German colonists, it is connected with the rest of the country, by the road network, which makes the city the most important economic place of the nation.



3.1.1. Physical characteristics

Kigali City is constructed on a hill that extends on four hills separated by valleys. The lower part is elevated around 1400 m while the highest is about 1845 m above sea level. The highest hill is Mount Kigali, with 1850 m of elevation. Kigali City has leaps from one mountain to another. These breaks are due to different limitations like existence of flood plains swamps and steep slopes. The settlements were mostly developed on gently sloping hillsides and on flattened hilltops (Ruousseil & Pau, 1990). Kigali city is located near the confluence of two main rivers in the county, namely Nyabarongo and Nyabugogo.

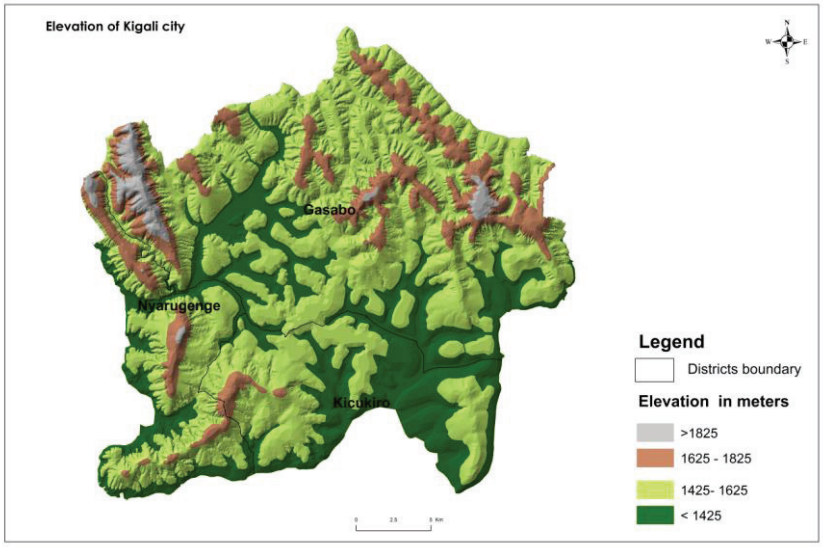


Figure 3.2: Elevation of Kigali City
Source: NISR, 2006

3.1.2. Administrative units

The city of Kigali is divided into three districts that are Gasabo, Nyarugenge and Kicukiro. These districts have 35 sectors which are subdivided into 161 cells. These cells are also divided into 1061 villages. Kigali City had had three major divisions of administrative boundaries. The first division has occurred with decree-law nº 11/97 of 20/04/1979 from which the defined area was 112 km2. The second revision was obtained from the presidential order nº 896/90 of 27/11/1990, to include an additional area of about 237 km2, which conferred to the city a total area of approximately 349 km2. The last revision, based on the law nº 29/2005 of 31/12/2005 after which Kigali city total area was adopted to be 730 till now (The Republic Of Rwanda, 2005).

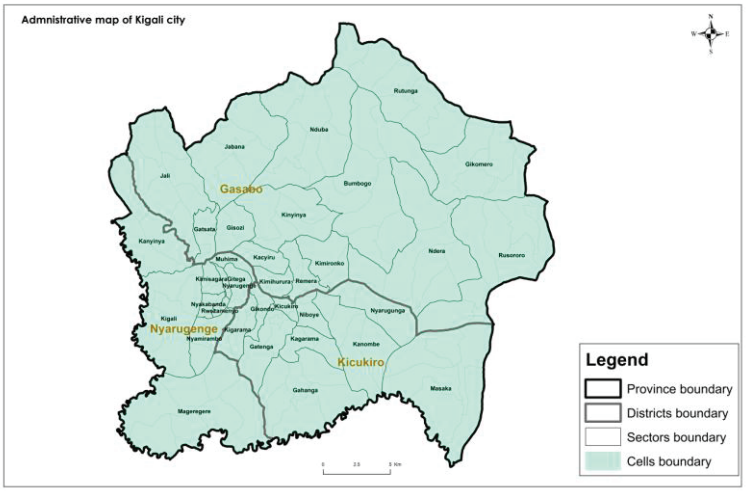


Figure 3.3: Administrative map of Kigali City
Source: NISR, 2006

3.1.3. Spatial expansion and demographic characteristics

During the period of colonial, the rate of growth for Kigali was too low where it was extended to a small area of Nyarugenge hill. After the independence of Rwanda of 1962 some activities have been moved to Kigali, the city started to grow and expand to hills like Nyamirambo, Gikonde, Kimihurura and Kacyiru.

After 1994, an extraordinary expansion has been noted where over 800,000 of people returned in Rwanda from exile especially from countries like Uganda, Burundi, Kenya and Congo, etc. Most of those retuned people have chosen to stay in Kigali City because it is where they could get the job and the security. This has increased the population of Kigali city and its expansion. In addition to this, during this period there was a remarkable rural-urban migration of many Rwandans in order to search for jobs and better standard of living because the city was grown up. In Kigali city, the population is 1.1 million on a 730 square kilometre of land, men constitute 48.4% of the population and women are 52.6% (National Institute of Statistics of Rwanda, 2012).

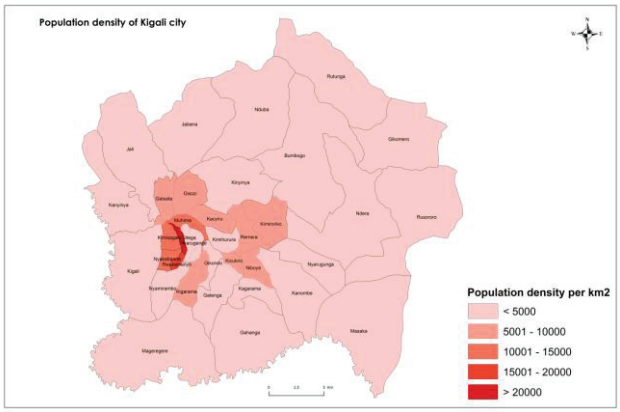


Figure 3.4: Population density
Source: NISR, 2006

3.1.4. Land use

Due to the revision of administrative boundaries which extended Kigali in rural area, currently over 70% of Kigali City total area is located in rural and only 13% is occupied by urban land use. In this urban area, the total formal area is about 30% while the informal area constitutes 70% (Murekatete, 2010). Since 1994, the urbanized area has shown a considerable level of new settlements and economic activities. In the same way population growth, the number of business and industrial establishment has increased significantly. The increase of business has put pressure on infrastructure so that in these days administrative authorities of the city states that there is a necessity to develop more infrastructures like schools health facilities and roads to keep pace with the population growth.

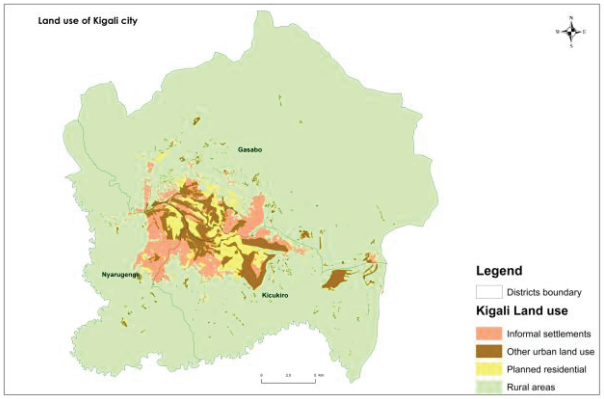


Figure 3.5: Land use of Kigali City
Source: NISR, 2006

3.1.5. Health care facilities

Kigali city has 7 hospitals, four secondary health care facilities (Masaka, Muhima, Kibagabaga and Rwanda Police health care) and three tertiary health care facilities (Rwanda Military Hospital, University Centre Hospital of Kigali and King Faisal Hospital). There are also thirty three primary health care facilities located in different parts of the city.

3.2. Rwanda Health System

As introduced in chapter 1 the health system in Rwanda is a decentralized and multi-tiered system. It is composed of public health care and private health care. On one hand the public health care is provided by through an organized network that includes primary health care (local health clinics), secondary health care (district hospitals) and tertiary health care (referral hospitals). On other hand the private health care system which is divided into five major levels such as clinic, specialty clinic, dispensary, polyclinic hospital and laboratory. Public health care are classified based on level of service they provide and coverage area and private health care are classified based on level of service they provide (Ministry of Health, 2012a).

Rwanda has almost five tertiary health care facilities, 40 secondary health care facilities and 413 primary health care facilities serving a population of nearly 11 million people. Community health workers have been elected in each village, cells and sectors, these workers are compensated through a system of cooperatives. These include a system of performance based financing and community health insurance that covers more than 90 percent of the population with minimal co payment. The government raises roughly $4 out of the $24 in annual per capita public healthcare spending. Donor funding accounts for the remainder, although the government hopes to improve this balance over the next 10 years (Ministry of Health, 2012a).

3.2.1. Health care facilities

In Rwanda, healthcare service delivery is composed by three main packages:

- Preventive services like pre consultation, maternal and child care, family planning services, and epidemiologic checking activities.
- Curative services, providing consultations, management of chronic illness, nutritional rehabilitation, observation before hospitalization, normal deliveries, minor surgical interventions, and laboratory testing.
- Promotional health services related to information, health education and communication, psychosocial support; nutritional activities related to small farming and food preparation, hygiene and sanitation (National Institute of Statistics of Rwanda, 2012).

3.2.2. Organisation, administration and public health care management

Currently, the management of health care services is decentralized; it means that it starts to sector level up to national level (National Institute of Statistics of Rwanda, 2012). Public health care are classified based on level of service they provide and population served (Ministry of Health, 2012a). The organizational structure of health care in Kigali is closely aligned to the decentralized administrative structure. The administrative structure is the some in the country. At the sector level, each primary health care is coordinated and managed by administrator in collaboration with district. The secondary health care is coordinated and managed at the district level with collaboration of Ministry of health. At the province level and national level, the services provided at the tertiary health care are coordinated by Ministry of health.

- **Sector-level**: a primary health care should serve approximately 50,000 people. Each sector must have at least one health center for primary care.

- **District-level**: a health district is comprised of multiple sectors, with approximately 250,000-500,000 people in each district. Each district has at least one hospital providing secondary care
- **National level**: this is the level providing tertiary care and it is made up by teaching hospitals.

With regard to operating day per week and hours per day, all 4 secondary and tertiary health care surveyed are operational every day of the week. For opening hours, all 3 secondary and 1 tertiary health care facilities visited are open 24 per 24 hours. Primary health care facilities operate 5 days in week and open 10 hours per day.

3.2.3. Rwanda National Health policy

In Rwanda, primary health care delivery is the main focus of health policy. The goal of the policy is reduction of child mortality, improvement maternal health, fighting against HIV/AIDS and other diseases, and to reduce malnutrition in relation to millennium development goals. The important element is to maximize access of primary healthcare services for the whole people through institutional capacity strengthening, increase human resources in the quality and quantity, geographic accessibility improvement, enhancement of the availability and affordability of drugs along with the improvement of the quality of services in the control of diseases (Ministry of finance and economic planning, 2007).

3.2.4. Health care financing

The major source of funds for health sector is the Government of Rwanda budget, which is given to the Ministry of the Health through the Ministry of Finances and Economic Planning, the assistance from international partners or non-governmental partners of the Ministry of Health and contributions from the population through prepayment programs or out-of-pocket.
The percentage of the national budget designated for the public health budget was 4.7 % in 2006 (National Institute of Statistics of Rwanda, 2008). The money allocated in health sector is lower than the minimum suggested by the World Health Organization. It is considered that to provide public health care of minimally acceptable quality in a developing country, a minimum budget of US$45 per capita per year must be allocated, which is more than the current Rwandan expenditure per capita for health (Rusa & Fritsche, 2007).

3.2.5. Community based health insurance (CBHI)

As earlier described in chapter 1 the government of Rwanda has created 3 categories of public insurance to deal with disparities in access to health care. The first is the Community-Based Health Insurance (CBHI) Scheme called Mutuelles de Santé made to improve access to health care to the poor and people work to the informal sector. In 2011 the membership to CBHI covered over 90 per cent of the population in Rwanda (Ministry of Health, 2012b). The Membership is renewed every year. The second is La Rwandaise d'Assurance Maladie (RAMA) which was made for Government employees and was expanded to private sector workers involved in the formal economy. RAMA covered 2.3% of the population in 2007 (Saksena et al., 2011). The last is Military Medical insurance (MMI) which is a mandatory scheme for militaly personnel and their families and covered around 1% of the population in 2007 (Saksena et al., 2011). In addition the government of Rwanda has encouraged creation of other private health insurances but they are not affordable for the poor. This study concentrates on CBHI because it is used by large part of population in Rwanda and more affordable for the poor and people work to the informal sector.

Historical Evolution of CBHI

Rwanda is one of the poorest countries in the world. The health status of the Rwandan population has improved significantly in recent years (Ministry of Health, 2012b). Rwanda has experimented multiple approaches in order to finance and operate a sustainable health care system. Following the 1994 Genocide, user health fees introduced in the mid-seventies were abandoned and primary, secondary health care was provided free of charge in most facilities. In 1996, only two years later, the country re-introduced the direct payment system. It means that health care was no longer affordable for the majority of the population and consequently health care utilization dropped again.

In 1999 the government started the testing of pre-payment; community based health insurance in three districts of the country in order to make health services more accessible to the poor. The testing of pre-payment provided positive results of the one year pilot phase, efforts to establish more community based health insurance, increased and expanded throughout the country.

In 2007 already 75 per cent of the population was registered in the community based health insurance (Ministry of Health, 2012b). In the same year, based on rapid expansion community health insurance, law was passed and for providing the guiding legal framework for the system. The law no 65/2007 not only regulates the cross subsidization of the community based health insurance, but also stipulates health insurance as being compulsory for the population.

Organizational Structure

The organizational structure of CBHI is closely aligned to the decentralized administrative structure of the country. The CBHI system is uniform, it means the services covered by the CBHI, premium payments, and administrative structure is the same in the country. At the sector level, each primary health care has CBHI section staffed with an administrator and an accountant. Following the decentralized structure, the CBHI is coordinated and managed at the district level with each of the 30 districts in the country CBHI fund. Each CBHI office at the district level is staffed with a director, in charge of the management of the CBHI and an auditor to oversee and check the billing process at the district hospitals. At the national level, the services provided at the tertiary health care are paid for by the National Risk Pool.

Considering the financing of the services offered at the sector level, services offered at the primary health care are financed though membership contributions of the population registered. At the district, the financing is composed of funds from the district, the CBHI sections and transfers from the risk pool and other partners. The National Risk Pool is mainly funded by the Government and through cross-subsidization with other insurance schemes(Ministry of Health, 2012b).

Operation of community based health insurance

Even if the three type of health insurance created by the government of Rwanda are public, they also have some differences in term of access to health care. The CBHI does not allow their users to go to secondary or tertiary health care without passing by primary health care which is possible for RAMA and MMI users. At the sector level, each primary health care has a CBHI section. If a member of CBHI is sick, he has first to go to the primary health care. If they cannot help the patient, they transfer him to the secondary health care which will send patient to tertiary health care if the case is serious. For the users of MMI and RAMA choose where to go without any condition. Within the CBHI, they are two categories of users: the first category those who pay themselves their contribution and second category include those whose contribution is paid by government or others donors.

Regarding to service payment in three secondary and one tertiary health care facility surveyed, the CBHI users paid 10% of total service cost and 90% of total service cost is paid by insurance. CBHI patients referred to secondary and tertiary health care must present their insurance membership card and referral document from primary or secondary health care. According to the law no 65/2007, all community based health insurance users visited secondary or tertiary health care without referral document from primary to secondary health care or from to secondary to tertiary health care pay 100% of total services cost.

4. METHODOLOGY

This chapter comprises the methodological approach to address the research questions of this study. It describes how the process of data collection was prepared and collected. The present chapter is subdivided into 4 main phases like exploration of empirical studies and literature of access to health, Pre- field work preparation, field work and data processing. The methods applied in carrying out ground survey, interviews are reported in this chapter.

4.1. Data collection

This phase comprises of pre-data collection (sampling strategy and formulation of questionnaires for data collection) and actual data collection. This study focused on three public secondary and one tertiary health care facility in Kigali city which are Muhima, Kibagaba and Masaka as secondary health care and Centre Hospitalier Universitaire de Kigali as tertiary health care. Interview was concern with members of households using CBHI in three cells selected and administrative personnel who worked in three secondary and one tertiary health care provided the information needed.

Each district in Kigali city has a secondary health care, Nyarugenge district has Muhima secondary health care, Gasabo district has Kibagabaga Secondary health Care and Kicukiro district has Masaka secondary heath care and all district referred in one tertiary health care namely CHUK(see figure 4.1). The Community based health insurance is coordinated and managed at the district level with each of the three districts namely Gasabo, Kicukiro and Nyarugenge in the Kigali city holding a community based health insurance fund. Each community based health insurance office at the district level is staffed. Each community based health insurance section at the district level has a list of community based health insurance members referred to secondary health care from all primary health care in district and a list of community based health insurance members referred to tertiary health care from secondary health care.

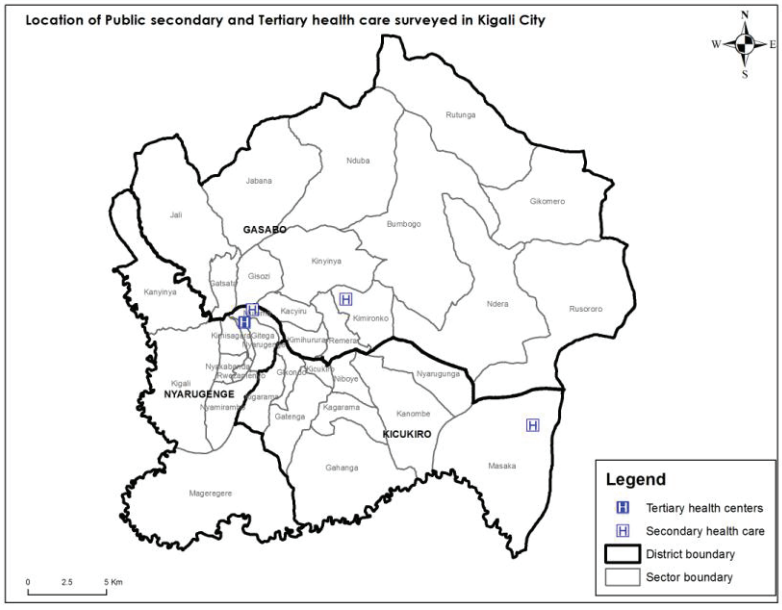


Figure 4.1: Public secondary and tertiary health care in Kigali City
Source: NISR, 2006

4.2. Data collection strategy

Based on the limitation of time and financial resources, we collected data from 300 households using CBHI referred to secondary and tertiary health care from three selected cells within Kigali city. Second, we collected data from 4 personnel in charge of administration and human resources from three secondary and one tertiary health care facility. We finished with guided interview with head of each community based health insurance office at the district level.

4.2.1. Cell selection

Kigali City has three districts, 35 sectors and 161cells. The purpose was to select one cell for each district. The sample of three sectors was draw from a list of 35 sectors available in three districts which each district we selected one sector. Two sectors namely Muhima (Nyarugenge District) and Kimironko (Gasabo District) are urban area and third sector namely Masaka (Kicukiro District) is rural sector. Thus the final sample was chosen one cell in each selected sector.

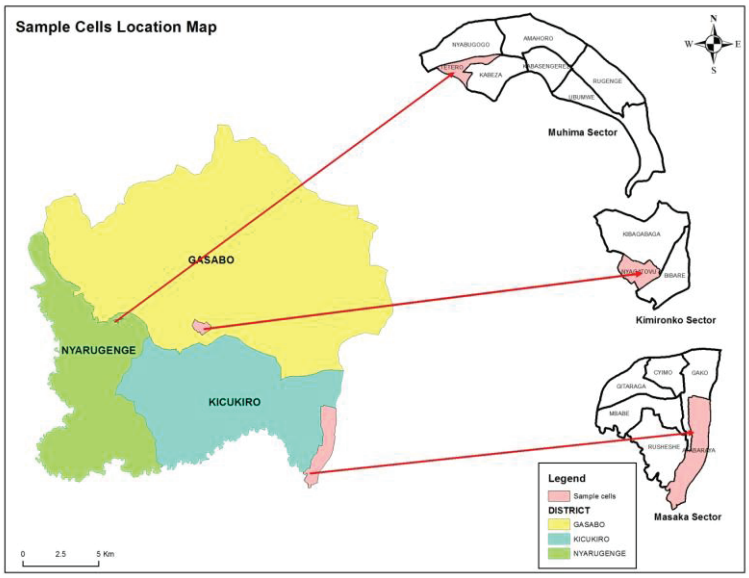


Figure 4.2: Localization of sample cells in Kigali City
Source: NISR, 2006

4.2.2. Household member's selection

This study was done on members of community based health insurance referred to secondary and tertiary health care. In household data collection, we used the list of people using community based health insurance referred in secondary and tertiary health care in one year from July 2012 to June 2013. It means the sampling frame was the list of patients using community based health insurance referred to secondary and tertiary health care found in community based health insurance office based on secondary health care for each district. First the random sampling was used to select 70 members of households referred to secondary health care which use the community based health insurance for each cells selected. Second random sampling was used to select 30 members of households referred to tertiary health care which use the community based health insurance for each cells selected. The SPSS software is used to select 100 members of households referred to secondary and tertiary health care for each cell selected.

The interviewee was a person above the age of 18 years (considered as adults). To know the location of patients from household referred to secondary and tertiary health care, we asked the committee of community health workers at the sectors level and cell level because, they know very well the location of all patients, the category of insurance of all population in the cell and all patients visited primary health

care, secondary health care and tertiary health care. The table 3 shows all number of patients referred to secondary health care and tertiary health care for each cell selected.

District	Secondary health care facility	Sector or PHC selected	Cell selected	Patients referred to SHC	Selected Patients	Patients referred to THC	Selected patients
Nyarugenge	Muhima	Muhima	Tetero	3991	70	152	30
Gasabo	Kibagabaga	Kimironko	Nyagatovu	441	70	49	30
Kicukiro	Masaka	Masaka	Ayabaraya	215	70	44	30
Total				4647	210	245	90

Table 4.1: Sample patients referred to the secondary and tertiary heath care using CBHI

The table shows that Muhima secondary health care located in Nyarugenge district referred more patients to secondary health care and tertiary health care than Kibagabaga and Masaka. 210 patients selected were referred to three secondary health care facilities and 90 patients selected ware referred to one tertiary health care facility namely CHUK.

4.2.3. Selection of personnel from secondary and tertiary health care facility

The convenience sampling method was used to choose staffs members in charge of different services in three secondary health care facilities and one tertiary health care facility. One staff was required for each health care because in this research the staffs were not the main target group. Three secondary and one tertiary health care, the chosen staff member was staff in charge of administration and human resources. For getting more information on community based health insurance, guided interview was done with three heads of CBHI office at the district level.

During semi-structured interviews the questionnaire was the principal instrument used. Two kinds of questions were composed. The first kind of questions was comprised of closed questions which needed yes or no answers and the question needed to choose right answers from a list of several multiple possible options. The second kind of questions was comprised the open questions which the patients were given their answers without leading them.

4.3. Data collection

4.3.1. Primary data

In study area household survey was done in the selected cell along with 2 field assistants in the local language. Individual perceptions about different aspects of patients using CBHI referred to secondary and tertiary health care was carried out through structured questionnaire from 30th September to 16th October 2013. To obtain good results from household survey, the questionnaire was explained well to the field assistants and translation of questionnaire was done. The household survey criterion was that the respondent were patients referred to the secondary and tertiary health care or patient care taker above the age of 18 years, because the respondent was able to give the detail information about the whole household such us income level. In this phase the community health workers was very useful to know the selected respondents from household in the cell selected.

4.3.2. Secondary data

Census data for Kigali City for a year 2012 was obtained from the Rwandan National Institute of Statistics. Spatial data like administrative boundary, land use, road net work data and location of public

secondary and tertiary health care in study area was obtained from the Center for Geographic Information System and Remote Sensing at the National University of Rwanda.

Secondary data related to organisational structure of CBHI and Rwandan health care system was collected from districts office, public secondary and tertiary health care, those data are the total number of the patient using CBHI referred to secondary and tertiary health care in three districts of Kigali city, number of medical human resources in secondary and tertiary health care, education levels of staffs and number of beds.

Research questions	Collected data	Data source	Methods	Analysis
How can the concept of access and theirs dimensions be defined?	Literatures and empirical studies	Journals, books, theses, internets, reports	Literature review	Syntheses and summary
How the concept of access and their dimensions be operationalized?	Literatures, empirical studies expectations of providers and patients, characteristic of providers and patients	Journals, books, theses, internets, reports, household survey, interview with personnel and head of CBHI	Literature review, developing indicators for each dimensions of access	Syntheses and summary
What does the Rwanda health system look like?	Rwanda health policy, CBHI data, level of health care	Report, journals, empirical studies	Literature review,	Syntheses and summary
What parameters are needed to describe the Rwandan health system?	Organization, management, health care financing and standards	Report, journals, empirical studies	Literature review,	Syntheses and summary
What are the main findings of access to PHC in Kigali?	Main findings of access to primary health care in Kigali	Theses	Literature review,	Syntheses of finding
What is the current spatial distribution of secondary and tertiary health care?	Spatial factors (geographic location), individuals perceptions	Center for geographic information system and remote sensing	Measuring the spatial indicators using GIS	Road net work
Which areas are well and poorly served?	Spatial factors (geographic location and distance)	Center for geographic information system and remote sensing	Measuring the spatial indicators using GIS	Road net work
What is current distribution of medical staffs and patients beds in secondary and tertiary health care?	Number, qualification of staffs and number of patients beds for each health facility	Report from SHC and THC	Measuring using statistic method and comparison	Evaluating and comparing staffs, beds with population served and patients treated for each health facility

How the patients referred and staffs perceived staffs, drugs and patients beds availability	Patients and staffs perceptions	Households survey, staffs survey and interview with head of CBHI at district level	Measuring perceived level of satisfaction using descriptive statistics	Evaluating individuals' perception on drugs, medical staff and patients beds availability
Are patients able to pay for the health care services provided by secondary and tertiary health care in Kigali?	Individuals perception	Household survey, interview with head of CBHI at district level and administrative staff of SHC and THC	Measuring perceived level of satisfaction with affordabilit y dimension	Evaluating individuals' perception income and category of CBHI, Descriptive statistics
What is the medical staff attitude towards the patients?	Individuals perception	Household survey, interview with head of CBHI at district level and administrative staff of SHC and THC	Measuring perceived level of satisfaction with acceptabilit y dimension	Evaluating individuals' perception on age and gender, Descriptive statistics
How long is the waiting time for secondary and tertiary healthcare service in Kigali?	Individuals perception	Household survey, interview with head of CBHI at district level and administrative staff of S and THC	Measuring perceived level of satisfaction with accommod ation dimension	Evaluating individuals' perception over waiting and appointments, Descriptive statistics
What are the similarities and differences outcomes of access to different level of public health care in Kigali?	Findings for each level of health care in Rwanda	Empirical studies, results of analysis	Comparing different results for existing situation for each level of health care	Comparison of different results from different study

Table 4.2: Research objectives, research questions, data collected, methods and analysis

To help understanding the concept of access and evaluate the five dimensions of access, two sources of information were used: a review of previous studies (literature review) on health access (see in chapter 2), and data from field work (primary data or secondary data). In order to answer research question from specific objective, the critical reflection of definition of access concept and five dimensions of access was reviewed through literature explored from various authors. The Rwanda health system was described on the basis at annual report from Ministry of health and Ministry of Local Government.

Assessment of geographic accessibility through current spatial distribution of secondary and tertiary health care was measured using road network. Brabyn and Skelly (2002) and Christie and Fone (2003) considered road network analysis as more accurate method for evaluating accessibility in terms of travel distance. These researchers confirmed that the evaluation of catchments/service areas are commonly used in accessibility analysis (Brabyn & Skelly 2002). In the use of health services variations are more strongly associated with road and GIS has been used to assess health care needs; analyze access to health services and understand disparities in access to health care (Tanser et al., 2006).

In order to evaluate availability, affordability, acceptability and accommodation dimensions; fieldwork was important for collecting data from households using CBHI referred to secondary and tertiary health care, staffs from secondary and tertiary health care service through questionnaire and interview with head of community based health insurance at the district level.

4.4. Post field work

After field work, first data collected from primary source, questionnaire and interviews, was processed and entered in SPSS software. Required translation was done, because, most of the questionnaire was in local language (Kinyarwanda). Second data obtained from secondary data was checked and prepared for using in data analysis.

4.5. Data anaysis

Analysis of socio economic data was important because of their influence in access to health care. In this study, analysis was based on the subjective perception of patients referred to SHC and THC. Also data related to indicators collected from households' survey explained section 4.3 were relevant as being directly related to the five dimensions like geographic accessibility, availability, affordability, acceptability and accommodation.

In this study several indicators were analyzed using statistical method and spatial analysis using Arc GIS software tools. In statistical analysis, the results of descriptive analysis (means standard deviation, sum, percentages, frequencies, graphs, maximum range, minimum) was used to know and to compare satisfaction level of patients referred to secondary and tertiary health care based on indicator like services cost, information provision, attitudes of medical personnel towards patients, waiting time, cleanness etc. cross tabulation table also was used to know the differences and relationship between the indicators.

The spatial analysis using Arc GIS software tools focused on the proximity analysis. The distribution of secondary and tertiary health care was showed using the proximity analysis. The analysis of access to secondary and tertiary health care was assessed with proximity analysis using road network based on travel distance indicator. It was used to find the distance from location of population to location of secondary and tertiary health care. It was allowed to calculate the population well served and not well served.

4.5.1. Standardization of indicators used to evaluate access

Different indicators used were evaluated in several units and scale and standardized to see variation in satisfaction level with each indicator under dimension. The transformations into linear scale which convert the original indicators scores to standardized scores and combination are required to allow comparison of dimension of access. Based on type of indicators used in this study, maximum standardization is considered and formula for this transformation method is used by (Sharifi et al., 2004).

$$Cost\ indicator = 1 - \frac{score - lowest\ score}{highest\ score}$$

$$Benefit\ indicator = \frac{Score}{Highest\ score}$$

We used maximum standardization in this study because the indicators are measured on a ratio scale and the standardized values are proportional to the original values. Based on type of indicator, the cost or benefit, the score was 0 or 1. Zero (0) was considered as negative impact and one (1) was considered also to positive impact. Based on formula, standardization of all indicators used was done and calculation was executed in order to develop summary scores using statistical tools to assess overall performance of access to secondary and tertiary health care in Kigali.These summary scores allow knowing the level of realization towards the targets.

4.5.2. Developing and evaluation of overall summary score of access dimensions

Summary scores were developed for all dimension of access to health care by combining more than one indicator into a single value. It helps to aggregate large number of indicators and make easier to understand the data. This was found very important for planners and policy maker because it showed very clear which dimension need more attention than others. The selected indicators were standardized and adopted values between 0 and 1. The created summary score also range 0 to 1 and the higher score, the better is access attainment. The comparison was made after analysis of the five dimensions between the scores of access for each dimension in order to find areas which need intervention regarding dimension as whole.

4.5.3. Comparison of access dimensions attainment between healthcare

Using spider chart five dimensions scores were compared between secondary health care, compared also in overall secondary health care and tertiary health care in order to ranks them in terms of good or poor access to health care. The ranking of dimensions of access using spider chart show clearly the dimension of access which need high attention and improvement than others.

4.5.4. Comparison of three level of public healthcare system in Kigali

One of the objectives of this research was to compare three level of public health care system in study area. It was relevant to compare the outcomes of three level of public health care because of knowing the level of health care performed well and the dimension of access for each level of public health care presented the issues and need high attention. As discussed earlier in section 3.2 the public health care is provided through three level of health care namely primary, secondary and tertiary health care. Rwandan standards and the health policies were considered in the analysis. Spatial data information to secondary and tertiary health care was used to make the maps showing spatial variation from location of health care facility to location of population which includes patients in study area. The numbers of medical staffs working in public health care in Kigali obtained from Ministry of health are used to compare three level of public health care. Tables were prepared to show variation in population medical staffs ratio. Descriptive statistics like cumulative percentage, was considered to compare three level of public health care in Kigali related to access to health care

5. ACCESS OF CBHI USERSTO SECONDARY AND TERTIARY PUBLIC HEALTH CARE

This chapter gives an overview of general characteristics of community based health insurance patients referred to secondary and tertiary health care. Individual indicators of 5 dimensions of access are analyzed and the views from both staff and patients are presented through individual indicators. This chapter presents also the main findings of primary health care and comparison between 3 levels of public health care in Kigali city.

5.1. Measuring dimensions of access to secondary and tertiary health care

Evaluation of objective and subjective indicators (section 2.4) selected under each dimension of access to secondary and tertiary health care is done using descriptive statistics and GIS. Only subjective indicators were selected to measure perceptions of respondent on related items. In the household and staff survey, all questions were asked about subjective and objective factors on each dimension of access to secondary and tertiary health care.

5.2. Socio-demographic characterictics

The details of demographic and socio-economic data related to patients' gender, level of education, age, household income per month and employment status are described below in table 5.1. The aim of describing different characteristics based on the facts that can influence access to secondary and tertiary health care facilities.

Socio economic characteristics	**Categories**	**PHC (%)**	**SHC (%)**	**THC (%)**
Gender	Females	72	55	68
	Males	28	45	32
Age	18-20	5	3	1
	20- 30	56	43	50
	31-40	23	31	20
	41- 50	10	11	17
	> 51	4	11	12
Education level	Non educated	27	19	20
	Primary	49	43	43
	Vocational	10	13	11
	Secondary	8	19	21
	Tertiary	1	5	4
Income in Us dollar per month	<$200 (low income)	99	95	97
	200-$400 (medium income)	1	3	2
	>$400(higher income)	0	2	1
Employment status	Unemployed	72	69	70
	Government employees	4	3	9
	Private and informal sector	23	27	21

Table 5.1: Socio- economic characteristic of patients of three level of health care in Kigali

Age: In the household survey, the age of community based health insurance ranges is between 18 and 70. Considering three level of health care in Kigali, table 5.1 shows the highest percentages of patients are in the range age of 20-30. The reason behind is that in general, the population of Rwanda are composed of high percentage (65%) of youths on age less than 35 years (National Institute of Statistics of Rwanda, 2008).

Gender: Considering three levels of public health care in Kigali, the table 5.1 shows, the higher percentage of female than male. The population composition by sex in Kigali city shows 51.6% for males and 48.4% for females (National Institute of Statistics of Rwanda, 2012). The number of females interviewed was more than males, because females are more visited health care facilities than males.

Education level: Based on table 5.1, the 3 level of health care in Kigali have high percentage of patients with completed primary education level and low percentage of patients reported completed university level. Based on national data, the populations of Rwanda are dominated by a high percentage of people with primary level of education (60%) and 40% of illiterate (National Institute of Statistics of Rwanda, 2002).

Employments status: Based on table 5.1, the three level of health care in Kigali have high percentage of patients declared unemployed and low percentage of patients reported employees of government for example 72% of patients unemployed. All Rwandan population who don't have formal job or a contract declared unemployed, same the people who work in agriculture sector, is the reason behind the high percentage of patients unemployed. Based on national data, Rwanda unemployment rate averaged was 30% in 2008 (National Institute of Statistics of Rwanda, 2008).

Income: Considering three levels of public health care in Kigali, the table 5.1 shows, the higher percentage of patients with low income less than $200 per month and the low percentage of patients with high income above $400 per month for example 99% of patients with low income less than $200 per month for primary and 1% of patients with high income above $400 per month for tertiary health care. The community based health insurance are composed with people of low income is the reason that the percentage of patients with high income above $400 per month is very low. In general majority of people treated by public health care, are the users of CBHI. Most of them are women, young people and people with low income. Finally are people with primary level education and some without employment.

5.3. Secondary and tertiary health care characteristics

The description of some characteristics from three secondary and one tertiary health care facility surveyed based on data collected regarding number of the population served, patients referred from July 2012 to June 2013, availability of human resources (number and education levels of staff), opening day per week and operating hours per day and the number of patients beds.

In 1997, norms were established regarding availability of resources and health care coverage. These norms stipulate coverage of 20000 people per primary health care and 200000 people for secondary and tertiary care, with one secondary health care facility (district hospital) per district.

Name of health facility	Population coverage	Patients visited health care	CBHI patients referred to SHC	%	CBHI patients referred by SHC to THC	%
Muhima	284.860	61.758	53.749	87	4.071	8
Kibagabaga	530.907	43.007	39.063	91	2.476	6
Masaka	319.661	27. 209	24.009	88	2113	9
CHUK	1.13 5.42 8	111.844	8.660	8		

Table 5.2: Population served by health care and attendance rates from July 2012 to June 2013

Regarding health ministry norm related to the total number of population served and population served for each health care shows in table 5.2. Three secondary health care facilities and one tertiary health care facility serve more than 200.000 people. Kibagabaga secondary health care located in Gasabo district serve more than double and Centre Hospitalier Univestitaire de Kigali serve more than 5 times.

Regarding patients that use secondary and tertiary health care shows in table 5.2. Muhima secondary health care treated more patients than Kibagabaga and Masaka. Comparing patients visited health care and patients with CBHI, Kibagabaga secondary health care has a high percentage of patients referred with CBHI while Masaka secondary health care has a high percentage of CBHI patients referred by SHC to THC. Centre Hospitalier Univestitaire de Kigali as tertiary health care received patients from Kigali city and patients from all country with health insurance and patients without health insurance. Those who don't have health insurance paid full medical services cost. Is the reason behind, Centre Hospitalier Univestitaire de Kigali received more patients.

Considering community based health insurance patients referred, Muhima secondary health care received more patients referred than Masaka and Kibagabaga and referred more to tertiary health care than Kibagabaga and Masaka. The reason behind is that Muhima secondary health care is located in informal urban area where live many people with low income, Masaka secondary health care is located in rural area where the population density is low and Kibagabaga secondary health care is located in formal urban area where live population with middle income and high income compared with others secondary health care in Kigali city.

5.4. Individual indicators of the five dimensions analysis

All indicators selected to measure access to secondary and tertiary health care described in the following section, with purpose to assess variation in term of access to health care. The indicators are grouped and developed into 5 dimensions of access to health care. Those dimensions are geographic accessibility, availability, affordability, acceptability and accommodation.

5.4.1. Geographic accessibility

The measurement of geographic accessibility by means of travel distance is used objective indicators. Also subjective questions were asked on how patients feel about the mode of transport, travel time, travel distance used to go to the secondary and tertiary health care. The answers related to subjective questions were recorded from very satisfied to dissatisfy or from very good to very bad (explained in chapter 4).
In order to measure travel distance to secondary and tertiary health care, GIS was used and results were compared to the answers of patients. Results obtained show the area and number of population which are well served and not served for each secondary and tertiary health care. Based on Rwandan norms (figure 5.1) all users of community based health insurance are referred to one secondary health care in the district. It means all primary health care in the district refer community based health insurance patients in one

secondary health care called district hospital and three secondary health care in Kigali city referred community based health insurance patients (figure 5.2) to one tertiary health care facility.

Geographical accessibility using road network

Geographic accessibility defined as interaction between the point of supply and the location of patients considering patients transportation expenses, distance and travel time (Penchansky & Thomas, 1981). Road network analysis is considered an accurate method for evaluating accessibility in terms of travel distance and time (Brabyn & Skelly 2002) and (Christie & Fone, 2003). The following map show variation in access to health services using road network.

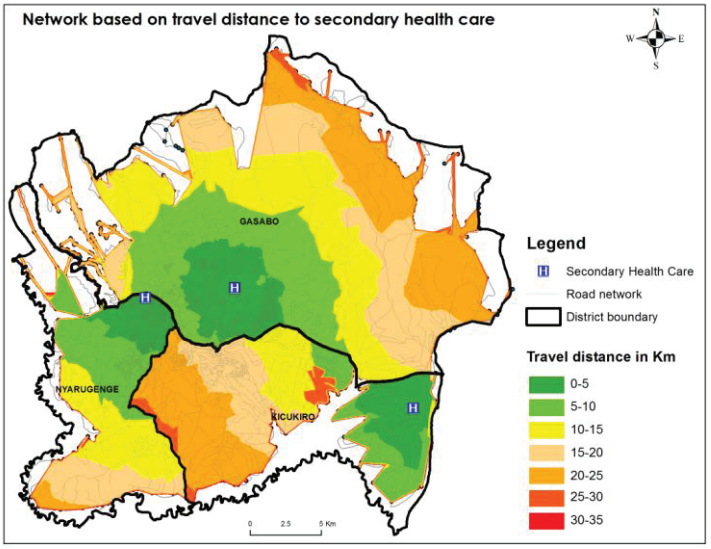


Figure 5.1: Net work based on travel distance to secondary health care facilities

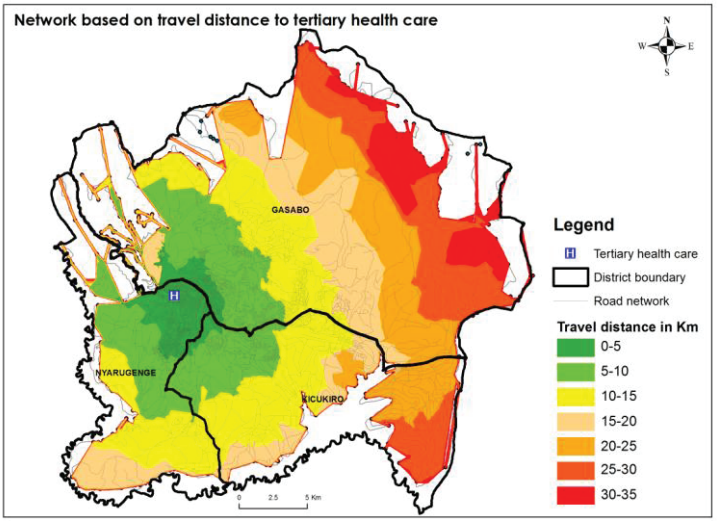


Figure 5.2: Network based on travel distance to tertiary health care

Figure 5.1 and 5.2 show the travel distance used to reach secondary health care and tertiary health care using road net work. The results show the area and number of population size which are well served and not served using the road net work. The Rwandan norm stipulates that less and equal 10 Km travel distance as area well served and more than 10 Km areas are not well served.

Regarding the area well or not well served: the northern and eastern part served by Kibagabaga secondary health care located in rural area in Gasabo district are not well served while, urban area are well served.

The Western and Southern part served by Masaka secondary health care facility located in urban area and small part located in rural area in Kicukiro district are not well served, while the area well served are located in rural area. The southern part served by Muhima secondary health care located in rural area in Nyarugenge district is not well served, while the all urban area are well served.

Considering tertiary health care the north Eastern part and South Eastern part of Kigali city are not well served, while all urban area is well served. The table 5.3 below shows in details the number of population well served and not well served.

Name	Population served	Travel distance (KM)	% of population per breaks	Population served and not served	% of population served and not served
Muhima	284.860	0-5	67	234.366	82
		5-10	15		
		10-15	10	50494	18
		15-20	5		
		20-25	3		
Kibagabaga	530.907	0-5	32	302.274	57
		5-10	25		
		10-15	14	228.633	43
		15-20	16		
		20-25	9		
		25-30	3		
Masaka	319.661	0-5	10	78.996	25
		5-10	15		
		10-15	14	240.665	75
		15-20	18		
		20-25	35		
		25-30	8		
CHUK	1.135.428	0-5	26	699.213	62
		5-10	36		
		10-15	13	436.215	38
		15-20	10		
		20-25	8		
		25-30	4		
		30-35	3		

Table 5.3: Population distribution within different travel distance using road network

The table 5.3 shows the population distribution within different travel distance and the population well and not well served. The populations well and not well served are calculated using GIS for getting the real number. The secondary health care with high percentage of population served is Muhima (82%), because is located near city center in informal urban area with population of low income and more than 70% of population served live in urban area, while Masaka secondary health care have low percentage (25%) because is located in rural area near boundary of Kigali city (figure 5.1).

Considering the population of Kigali city to tertiary health care facility called "Centre Hospitalier Universitaire de Kigali" (CHUK), 62% of populations are well served, while 38% of populations are not well served. This tertiary health care receives the patients referred from three secondary health care located in Kigali City. Based on figure 5.1 and 5.2 the majority of population well served are located in urban area except Masaka secondary health care and majority of population which are not well served are located in rural area except Masaka secondary health care.

Perception of patients referred to secondary and tertiary health care to travel distance

For secondary and tertiary health care, views from community based health insurance patients referred to each secondary health care; all 3 secondary health care and 1tertiary health care are analyzed.

Travel distance	Perceptions from SHC facilities in %			Perceptions from overall SHC in %	Perceptions from THC in %
	Muhima	Kibagabaga	Masaka		
Very close	46	17	0	21	34
Close	46	76	9	43	27
Far	4	4	16	8	6
Too far	1	0	41	15	28
Much too far	3	3	34	13	5
	100	100	100	100	100

Table 5.4: Perception from patients referred to secondary and tertiary health care to travel distance

Table 5.4 shows high percentage of patients referred to Muhima and Kibagabaga secondary health care located in urban area happy with short distance travelled to reach secondary health care, while high percentage of patients referred to Masaka secondary health care unhappy with long distance that they need to travel.

The high percentage of patients referred to secondary health care located urban area motivated by their location, good infrastructures, good transport system, short distance travelled to reach secondary health care and the low cost of transport, while low percentage from patients referred to secondary health care located in rural area related to the high cost of transport, long distance, bad system of transport and bad infrastructure used to reach health care.

Considering the views from patients referred to secondary and tertiary health care to travel distance, the table 5.4 shows the quite similar high percentage of patients referred to secondary and tertiary happy to short distance travelled to reach secondary and tertiary health care increase from tertiary to secondary health care. Table 5.4 shows also quite similar low percentage of patients referred unhappy to long distance travelled to reach secondary and tertiary health care decrease from fro tertiary to secondary health care.

The high percentage of patients referred to secondary health care motivated by location of secondary health care, distribution, low transport cost, short distance, while the high percentage of patients referred to tertiary health care motivated by location of tertiary health care, low transport cost, short distance travelled to reach the tertiary health care said by the interviewees.

Accessibility is good for Muhima and Kibagabaga secondary health care but problematic for Masaka secondary health care .Accessibility of tertiary health care is perceived unproblematic by many two thirds respondents.

Mode of transportation

Overall walking is the mode of transport used by patients referred to the secondary and tertiary health care.

Transport mode categories	Name of health facilities			Mode of transport used by patients referred to overall SHC in %	Mode of transport used by patients referred to THC in %
	Mode of transport used by patients referred to Muhima SHC in %	Mode of transport used by patients referred Kibagabaga SHC in %	Mode of transport used by Patients referred to Masaka SHC in %		
Ambulance	4	6	3	3	19
Own car	3	6	0	3	12
Taxi/bus	4	8	4	5	19
Taxi/ voiture	9	4	0	5	7
Motorbike	6	3	79	30	4
Walking	73	73	14	53	39
Traditional transport (ingobyi)	1	0	0	1	0
	100	100	100	100	100

Table 5.5: Mode of transport used by CBHI patients referred to secondary and tertiary health care

Table 5.5 shows high percentage of community based health insurance patients referred to Muhima and Kibagabaga secondary health care located in urban area used walking as mode of transport, on contrary Masaka secondary health care located in rural area have a low percentage. The reason behind is the short distance of patients referred to Muhima and Kibagabaga secondary health care, composition of community based health insurance (people with low income) and location of Muhima and Kibagabaga.

Motorbike is the mode of transport more used by the patients referred to Masaka secondary health care located in rural area because of affordable cost of transport, long distance, bad roads, and unavailability of public transport. Table 5.5 also shows no patients used own car and traditional transport to reach Masaka secondary health care. The reason behind is the long distance, location of Masaka secondary health care, bad roads and composition of community based health insurance.

Considering the views from patients referred to secondary and tertiary health care to transport mode, the table 5.5 shows high percentage of patients referred to secondary and tertiary health care used walking as mode of transport increase from secondary health care to tertiary health care. Table 5.5 shows also ambulance and taxi/bus as second mode of transport used by patients referred to tertiary health care while motorbike as second mode of transport used by patients referred to secondary health care.

Categories	Mode of transport							%
	Ambulance	Taxi bus	Taxi voiture	walking	Motorbike	Personal car	Traditional transport	
<$200 (low income	3	6	5	73	9	3	1	100
200$400(medium income)	14	0	0	72	14	0	0	100
>$400(higher income)	3	5	5	53	30	3	1	100
18-20	11	0	0	68	21	0	0	100
21- 30	13	0	0	75	12	0	0	100
31-40	0	7	7	59	24	3	0	100
41- 50	4	0	4	69	17	6	0	100
> 51	5	7	3	43	38	3	1	100

Table 5.6: Mode of transport and some socio characteristics of patients referred to secondary health care

Table 5.6 shows high percentage of patients with low, middle and high income referred to secondary health care used walking as mode of transport to reach secondary health care. Second mode is motorbike used by high percentage of patients with high income and low income referred to secondary health care. In addition walking as mode of transport is used by high percentage of patients referred to secondary health care had range ages between 20-30 years.

The second mode of transport used by patients referred had a range age between 20-30 years is the ambulance because this range age is composed by high number of pregnant which is used more ambulances than others patients. The reason behind is that, ambulance is usually used to transport pregnant women from primary health care to secondary and tertiary health care in public mobilization campaign to encourage women to deliver, while at hospital, to reduce on the number of women delivering outside hospital without doctors' attention, to reduce on mortality rate and also risk of dying during delivery. Finally this range also is composed by youth with low income is the reason behind account high percentage of patients using waking as mode of transport.

Categories	Mode of transport							%
	Ambulance	Taxi bus	Taxi voiture	walking	Motorbike	Personal car	Traditional transport	
<$200 (low income	22	18	4	42	4	10	0	100
200-$400 (medium income)	0	17	33	33	0	17	0	100
>$400 (high income)	0	29	14	14	14	29	0	100
18-20	10	0	0	71	0	19	0	100
21- 30	0	25	0	75	0	0	0	100
31-40	0	20	20	40	0	20	0	100
41- 50	14	7	7	54	7	11	0	100
> 51	26	26	6	23	4	15	0	100

Table 5.7: Mode of transport and some socio characteristics of patients referred to tertiary health care

Table 5.7 shows, high percentage of patients with low income and middle income referred to tertiary health care used walking as mode of transport to reach tertiary health care, while high percentage of patients with high income referred to tertiary health care used own car and taxi bus. In addition walking mode of transport is used by high percentage of patients referred to tertiary health care had all range ages except range age more than 51 years. Ambulance and taxi bus is the second mode of transport used by patients referred to tertiary health care had a range age more than 51 years. Ambulance is used by more patients had more than 51years referred to tertiary health care because this range is composed by high number of old population with low income.

Main issues related to geographical accessibility for secondary and tertiary health care facilities

The results for geographical accessibility indicated main issues based on the following indicators of access: travel distance. For secondary health care, the long distance related to long time used to reach secondary health care affect the community health insurance patients live in rural area for Muhima and Kibagabaga secondary health care and urban area for Masaka secondary health care. For tertiary health care the long distance affect community based health insurance patients live in rural area. In addition, the results show that, all three public secondary health care in Kigali and one public tertiary health care still serve a population number bigger than the limit number (200.000) suggest by Rwandan norms. This indicator for secondary and tertiary health care not presented an issue, but need improvements for people live in rural area for Muhima and Kibagabaga secondary health care, people live in urban area for Masaka secondary health care and people live in rural area for tertiary health care.

Main findings related to geographical accessibility for primary health in Kigali

In Kigali city the primary health care in rural area appear to serve limited number of population compared to those located in urban area. The reason is that, the majority of the people are concentrated in the urban area. There is an issue related to accessibility in terms of the population served by primary health care in urban area, while Rwandan norms suggest a maximum of 20000 people per primary health care. The results show that 19 out of 25 of primary health care in Kigali serve a population number larger than the limit number (Murekatete, 2010).

The results from analysis of geographical accessibility dimensions indicated other main findings based on the following indicators of access: travel time and travel distance. This explained by the high percentage

(71%) of total population located in rural area have to walk more than 90 minutes to reach the Primary health care, while 80% of total population located in urban area walk less than 90 minutes. It means the majority patients from rural area are not well served considering this norm.

Dimensions	Indicators	Primary health care	Secondary health care	Tertiary health care
		%	%	%
Geographic accessibility	Population well served in urban area	79	61	83
	Population well served in rural area	21	39	27
	Population well served in Kigali city	66	55	62
	Walking as mode of transport	75	53	39

Table 5.8: Comparison of three public level of health system based on geographic accessibility dimension

Table 5.8 shows high variation percentages of patients visited three level of public health system. Table 5.8 shows also high percentage of population live in urban area well served by tertiary health care. The reason behind is that, high density of population in Kigali is in urbanized area (70%). The population in this area travels short distance because they move on a small area. In addition table 5.8 shows also the second high percentage of population live in urban area in Kigali city well served by primary health care than secondary level of health care system, because of distribution and larger number of primary health care facilities in Kigali.

High percentage of patients visited primary health care used walking as mode of transport and increase from primary health care to tertiary health care because of distribution of primary health care, short distance travelled to reach primary health care and patients visited health care are not very ill.

5.4.2. Availability

In order to evaluate the availability dimension, first the report from secondary health care facility and Ministry of health was analyzed. Second questions were asked to staffs member in charge of administration of each secondary and tertiary health care visited regarding number of patients' beds, qualification and number of medical staff and availability of drugs. Also the community health based health insurance patients referred to the secondary and tertiary health care were asked about their satisfaction and perceptions to patients' beds, medical staffs and availability of drugs. Regarding medical human resources norms established by Ministry of health, secondary health care facility needs 20 generalist doctors, 116 nurses and 34 midwives (Ministry of Health, 2012c).

Name of health care	Patients visited HC	Specialist doctors		Generalist doctors		Midwives	Nurses	
		Number	/1000	Number	/1000	Number	Number	/1000
Muhima	61.758	5	0.08	31	0.5	No data	76	1.2
Kibagabaga	43.007	6	0.13	48	1.1	No data	127	2.9
Masaka	27.209	3	0.11	47	1.7	No data	103	3.7
CHUK	111.844	45	0.40	63	0.6	178	216	1.9

Table 5.9: Medical staff and patients' distribution per secondary and tertiary health care from July 2012 to June 2013

Based on table 5.9, Muhima secondary health care facility has a larger absolute number of patients than Kibagabaga and Masaka secondary health care. Regarding medical staffs Muhima secondary health care has fewer number of specialist doctors than Kibagabaga secondary health care and less generalist doctors and nurses than Kibagabaga and Masaka secondary health care facility. Comparing ratio of each secondary health care, Muhima secondary health care facility, one staff like doctors or nurses treated more patients Compared to others secondary health care facilities.

Name of health care	Population served by HC	Specialist doctors		Generalist doctors		Midwives	Nurses	
		Number	/1000	Number	/1000	Number	Number	/1000
Muhima	284.860	5	0.02	31	0.10	No data	76	0.3
Kibagabaga	530.907	6	0.01	48	0.10	No data	127	0.2
Masaka	319.661	3	0.01	47	0.14	No data	103	0.3
CHUK	1.135.428	45	0.04	63	0.55	178	216	0.2

Table 5.10: Medical staff and population distribution per secondary and tertiary health care facility from July 2012 to June 2013

Table 5.10 shows populations served by each health care facility and distribution of medical staffs. Kibagabaga secondary health care facility has a large absolute number of populations compared to Masaka and Muhima secondary health care. Regarding medical staffs Kibagabaga secondary health care has high absolute number of staffs than others secondary health care facilities. Considering ratio of each secondary health care, Kibagabaga secondary health care facility, one staff have to serve more population compared to others secondary health care facilities.

For encouraging people to visit Masaka secondary health care as new (open in 2011) health care and located in rural area, the government policy allocates more staffs said by head of community based health insurance in Kicukiro district. Kibagabaga secondary health care facility has a larger absolute number of staffs because it serves more population and has more partners than others secondary health care facilities.

Considering the norm related to medical staff and absolute number of medical staff for each secondary health care facility, there is no issue in three secondary health care regarding doctors. Muhima and Masaka secondary health care facilities have few nurses compared with norm. For midwives we don't have data from all three secondary health care facilities, nurses are using to do activities related to midwives.

Regarding staff for tertiary health care, CHUK there is no official norm regarding to medical human resources.

Name of health care	Patients visited health care	Patients beds	
		Absolute number	/1000
Muhima	61.758	142	2.2
Kibagabaga	43.007	173	4
Masaka	27.209	104	3.8
CHUK	111.844	546	4.8

Table 5.11: Distribution of patients beds based on patients treated by health care facility to July 2012to June 2013

Table 5.11 shows the distribution of beds for each health care based on patients visited health care. Kibagabaga secondary health care has a high number of beds, while Masaka secondary health care has a low number of beds. Muhima secondary health care has large number of patients and low number of beds comparing to Kibagabaga secondary health care. Considering health care beds ratio Muhima secondary health care has few beds than others secondary and tertiary health care facilities and CHUK has more beds than each secondary health care facility. The reason behind is that, many patients visited tertiary health care are indoor patients and many patients visited secondary health care is outpatients.

Name of health care	Population served	Patients beds	
		Absolute number	/1000
Muhima	284.860	142	0.5
Kibagabaga	530.907	173	0.3
Masaka	319.661	104	0.3
CHUK	1.13 5.42 8	546	0.5

Table 5.12: Distribution of patients beds based on population served by health care

Table 5.11 shows the distribution of beds for each health care based on population served by health care. Considering health care beds ratio Kibagabaga and Muhima secondary health care has fewer beds than Masaka secondary health care. It means that the patients' beds in Masaka and Kibagabaga secondary health care is an issue compared to Muhima secondary health care. Kibagabaga secondary health care has a higher absolute number of beds and a low ratio than others secondary health care because it serves more population compared to Muhima and Masaka secondary health care.

Indicators	Likert scale	Perception from Muhima SHC in %	Perception from Kibagabaga SHC in %	Perception from Masaka SHC) in %	Perceptions from SHC In %	Perception from THC in %
Availability of medical staffs	Very satisfied	17	19	20	19	16
	Satisfied	16	19	23	19	22
	Neutral	21	21	16	21	21
	Unsatisfied	30	24	21	24	23
	Very Unsatisfied	16	17	20	17	18
		100	100	100	100	100
Availability of patients beds	Very satisfied	47	49	54	50	49
	Satisfied	29	18	10	19	9
	Neutral	10	9	13	11	4
	Unsatisfied	7	16	11	11	37
	Very unsatisfied	7	8	12	9	1
		100	100	100	100	100
Availability of drugs	Very satisfied	53	31	47	45	42
	Satisfied	20	19	27	21	21
	Neutral	10	16	19	15	18
	Unsatisfied	9	27	4	13	10
	Very unsatisfied	8	7	3	6	9
		100	100	100	100	100

Table 5.13: Perceptions of patients referred to secondary and tertiary health care to availability of staffs, drugs and patients beds

Regarding to availability of medical staffs, the table 5.13 shows small variation in perception of patients referred to secondary and tertiary health care facilities in satisfaction level to availability of staff. Muhima and Kibagabaga secondary health care located in urban area have a high percentage of patients referred unsatisfied to availability of staffs. While Masaka secondary health care located in rural area has high percentage of patients referred satisfied to availability of staff. The percentage of patients referred to secondary and tertiary health care unsatisfied to availability of staffs is higher compared to the percentage of patients referred happy with availability of staffs. In addition the satisfaction level of patients referred to secondary and tertiary health care to availability of staffs is quite similar.

Regarding to availability of beds, the table 5.13 shows variation in perception of patients referred to secondary and tertiary health care facilities satisfied and not satisfied to availability of beds. Muhima and Kibagabaga secondary health care located in urban area and Masaka located in rural area have a high percentage of patients referred satisfied to availability of beds and the percentage increases from rural to urban area. Muhima secondary health care facility has high percentage of patients referred satisfied to availability of beds than others secondary health care facilities. In general secondary health care and

tertiary health care have small variation between perceptions of patients referred happy and unhappy to availability of patients' beds. High percentage of patients referred to secondary health care facilities happy compared to the patients referred to tertiary health care facility to availability of beds

Regarding to availability of drugs, the table 5.13 shows high variation in perception of patients referred to Muhima, Kibagabaga and Masaka secondary health care and small variation in perception between patients referred to secondary and tertiary health care facilities to availability of drugs. The percentage of patients referred to secondary and tertiary health care satisfied to availability of drugs is higher than the percentage of patients referred unsatisfied to availability of drugs. Kibagabaga secondary health care facility located in urban area has a high percentage of patients referred unsatisfied compared to Masaka and Muhima secondary health care facilities, while Muhima (located in urban area) and Masaka (located in rural area) secondary health care facilities have quite high percentage of patients referred happy to availability of drugs. Comparing the satisfaction level of patients referred to Muhima and Kibagabaga secondary health care, there is a larger variation related to perceptions to availability of drugs, because Muhima secondary health care is located in informal urban area and Kibagabaga secondary health care is located in formal urban area. Table 5.13 shows also quite similar high percentage of patients referred to secondary and tertiary health care happy to availability of drugs.

In general the results from analysis show the low satisfaction of patients referred to three secondary and one tertiary health care to availability of staffs, because of larger number patients visited secondary and tertiary health care compared to medical staffs. The results show also high satisfaction of patients referred to three secondary and one tertiary health care to availability of beds, because the large number of patients visited secondary health care is outpatient and tertiary health care facility have more beds to help indoor patients. Finally the results show high satisfaction of patients referred to three secondary and one tertiary health care to availability of drugs because of low cost of drugs. It means patients referred to secondary and tertiary health care with community based health insurance paid 10% of total cost of drugs.
The staffs from three secondary and one tertiary health care facilities declared that community based health insurance patients don't have access to special and expensive drugs. In some cases patients referred with community based health insurance bought drugs in private pharmacies and government doesn't cover the cost confirmed by patients' interviewed. In addition the staffs declared also, lack of specialist medical staffs, generalist doctors and beds occurs by high number of patients visited secondary and tertiary health care. For availability dimension the issue is lack of medical staffs, patients' beds and availability of some drugs is not issues but need some improvements.

The results for availability dimension indicated main issues based on the following indicators of access: availability of medical staff, availability of patients' beds and availability of drugs. For secondary and tertiary health care, lack of medical staffs showed by large number of patients referred and a small number of medical staffs. The low satisfaction of patients referred to secondary and tertiary health care, presented a big issue and affected the community based health insurance patients. Availability of patients' beds and availability of drugs affected the community based health insurance patients and are not presented big issues but need improvements.

According to Murekatete (2010), primary health care in Kigali have an issue related to lack of medical staffs and medical staff qualification. The patients used primary health care need to increase number of medical staffs in some services because of higher number of population visited primary health care.

Comparing three public level of health care based on availability dimension, all three public level of health care in Kigali have a shortage of medical staffs. Regarding patients' beds and availability of drugs is not a

problem for primary and secondary health care because many patients visited primary and secondary health care are outpatients and high risk cases are immediately referred and drugs are available. For secondary and tertiary health care patients' beds and availability of drugs need improvements because of large number of indoor patients for tertiary health care and shortage of some special drugs.

5.4.3. Affordability

In order to measure the dimension of affordability the perceptions questions were asked to patients referred to secondary and tertiary health care about health service cost, income and category of community based health insurance as explained in section 2.2 which influence the capacity of patients to pay health care cost.

Cost of services	Perceptions from Muhima SHC in%	Perception from Kibagabaga SHC in%	Perceptions from Masaka SHC in %	Perceptions from overall SHC in %	Perceptions from THC in %
Very satisfied	89	90	93	91	73
Satisfied	3	3	1	3	7
Neutral	2	3	1	2	7
Unsatisfied	3	1	3	2	3
Very unsatisfied	3	3	2	2	10
	100	100	100	100	100

Table 5.14: Perceptions of patients referred to secondary and tertiary health care to services cost

Regarding to services cost, the table 5.14 shows high satisfaction of patients referred to secondary and tertiary health care. The high satisfaction increases from urban area to rural area and from tertiary to secondary health care facilities. The large variation between the percentages of patients referred to secondary health care and tertiary health care result to the high cost of services in tertiary health care than secondary health care. The table 5.14 shows Muhima, Kibagabaga secondary health care located in urban area and Masaka secondary health care located in rural area have a high quite similar of percentage of patients referred satisfied to services cost, because all patients interviewed used community based health insurance and paid 10% of total services cost.

Income	Income of patients referred to Muhima SHC in %	Income of patients referred to Kibagabaga SHC in %	Income of patients referred to Masaka SHC in %	Income of patients referred to overall SHC in %	Income of patients referred to THC in %
<$200 (Low income)	93	90	87	90	80
200-$400 (Medium income)	6	9	6	7	7
>$400(Higher income)	1	1	7	3	13
	100	100	100	100	100

Table 5.15: Perceptions of patients referred to secondary and tertiary health care to income

The table 5.15 shows, high percentage of patients referred to secondary and tertiary health care with low income (< $200) decrease from Muhima and Kibagabaga secondary health care located urban area to Masaka secondary health care located in rural area and from secondary to tertiary health care facilities. The low percentage of patients referred to secondary and tertiary health care with high income (> $400) increase from urban area to rural and from secondary to tertiary health care.

From data analysis, 82% of patients referred to secondary health care paid community based health insurance contribution by own pocket, 15% of patients referred paid CBHI contribution by government and 3% of patients referred paid CBHI contribution by donors, while 93% of patients referred to tertiary health care paid community based health insurance contribution by own pocket and 7% of patients referred paid CBHI contribution by government. The patients who paid CBHI contribution by government or by donors are very poor, when are referred to secondary or to tertiary public health care they had a problem to pay 10% of total services cost. In some cases the government covers all medical services cost confirmed by staffs and patients interviewed. Even if services cost is not an issue for high percentage of patients referred paid CBHI contribution by own pocket, services cost presented an issue for fewer patients referred paid by government or by donors and some cannot afford.

The results from analysis of affordability dimension for secondary and tertiary health care based on the indicators of access like income, services cost and CBHI category. These indicators affected community based health insurance patients referred. In general service cost indicator not presented an issue for patients referred using CBHI, because of health insurance successful. The patients referred to secondary and tertiary health with CBHI pay 10% of total services cost, but there is large variation between the services cost in secondary and tertiary health care due to the high cost of services in tertiary health care compared to secondary health care.

Primary health care, affordability dimension indicated that services cost affected primary health care users. This indicator is not presented issues for patients with health insurance, but for those without insurance service cost presented issues. Service cost in Kigali city for primary health care is not presented an issue because above 95% of patients treated by primary health care had health insurance confirmed by Murekatete (2010).

Comparing three public level of health care based on affordability dimension, all 3 public level of health care in Kigali have a high satisfaction to services cost. 90% of patients visited PHC, 94% of patient referred to SHC and 80% of patients referred to THC. The high satisfaction to services cost is quite similar for patients visited PHC and patient referred to SHC but decrease from SHC to THC. Even if above 95% of patients visited public health care had health insurance and paid 10% of total services cost, amount paid increase from primary health care to tertiary health care because of high cost treatments services, high cost of drugs and high cost of hospitalization services which is cost higher in tertiary and secondary health care than primary health care. It means the 10% of services cost in tertiary health care is higher than 10% of services cost for primary health care.

All three public levels of health care in Kigali are visited by high percentage of patients with low income less than $200 per month, 99% of patients visited PHC, 95% of patient referred to SHC and 97% of patients referred to THC. The composition of CBHI includes people with low income and peoples work in informal sectors in Kigali.

5.4.4. Acceptability

Considering the perceptions of patients about the interpersonal relationships with medical Staff, acceptability indicators were measured. The patients referred were asked questions regarding how they felt about information provision and attitudes of medical personnel towards patients theirs answers were summarized in table 5.16.

Indicators	Likert scale	Satisfaction level from patients referred to Muhima SHC in %	Satisfaction level from patients referred to Kibagabaga SHC in %	Satisfaction level from patients referred to Masaka SHC in %	Satisfaction level from patients referred to overall SHC in %	Satisfaction level from patients referred to THC in %
Attitudes of medical personnel towards patients.	Very good	51	46	81	60	59
	Good	31	33	14	26	29
	Neutral	12	10	3	8	8
	Bad	6	5	2	4	4
	Very bad	0	6	0	2	0
		100	100	100	100	100
Information provision	Very satisfied	49	44	70	54	55
	Satisfied	34	40	24	33	30
	Neutral	10	9	6	8	9
	Unsatisfied	1	3	0	3	2
	Very Unsatisfied	6	4	0	2	4
		100	100	100	100	100

Table 5.16: Perceptions of patients referred to secondary and tertiary health care based on indicators of acceptability dimension

Regarding to attitudes of medical personnel towards patients, the table 5.16 shows large variation in perception of patients referred to secondary and tertiary health care facilities satisfied and unsatisfied to attitudes of medical personnel towards patients. Table 5.16 shows that Masaka secondary health care located in rural area has high percentage of patients referred satisfied to attitudes of medical personnel towards patients compared to Muhima and Kibagabaga located in urban area. Muhima and Kibagabaga secondary health care located in urban area have a quite similar high percentage of patients referred satisfied to attitudes of medical personnel towards patients.

Table 5.16 shows also high percentage of patients referred to secondary and tertiary health care satisfied to attitudes of medical personnel towards patients. The satisfaction levels to attitudes of medical personnel towards patients from patients referred to secondary and tertiary health care is quite very similar. The high satisfaction levels to attitudes of medical personnel towards patients increase from secondary to tertiary health care and from urban area to rural area.

Regarding to information provision, table 5.16 shows high satisfaction of patients referred to secondary and tertiary health care facilities. Table 5.16 shows also higher satisfaction to information provision from patients referred to Masaka secondary health care facility located in rural area compared to Muhima and Kibagabaga secondary health care facilities located in urban area. The high satisfaction increase from secondary health care located in urban area to secondary health care located in rural area.

The high satisfaction to information provision from patients referred to secondary and tertiary health care is quite similar and the small variation increase from tertiary health care to secondary health care. In general there is high satisfaction to information provision and to attitude of medical personnel toward patients increase from secondary health care located in urban area to secondary health care located in rural area because of government efforts to allocated more staffs and others incentives to encourage people to be treated in secondary health care facility located in rural area. The high satisfaction to information provision and to attitude of medical personnel towards patients from patients referred to secondary and tertiary health care is quite very similar, because of more regular staffs training and monitoring from Ministry of health and Kigali city.

The results from analysis of acceptability dimension for secondary and tertiary health care based on the following indicators of access: information provision and attitudes of medical personnel towards patients. These indicators not presented issues but needs some improvements because above 85% of patients referred to secondary and tertiary health care are satisfied to information provision and attitudes medical personnel towards patients.

In Kigali city the primary health care, acceptability dimension based on the indicators of access like information provision and attitudes medical personnel towards patients. These indicators are not presented issues because they had high percentage of patients visited primary health care very satisfied with information provision and medical personnel towards patients (Murekatete, 2010).

Acceptability	**Primary health care**	**Secondary health care**	**Tertiary health care**
	%	**%**	**%**
High satisfaction of medical personnel towards patients	60	85	88
High satisfaction of information provision	70	87	85

Table 5.17: Comparison of three level of public health care system based on acceptability dimension

The table 5.17 shows high satisfaction of patients visited three level of public health care system to attitudes of medical personnel towards patients and information provision. The high satisfaction of patients increases from primary to tertiary health care. Tertiary and secondary health care have regular staffs training and monitoring from Ministry of health and city of Kigali which is influence health services delivery. The low satisfaction of primary health care compared to secondary and tertiary health care result also of large number of primary health care and its management, because primary health care controlled by sector and district and secondary and tertiary health care controlled by Ministry of health.

5.4.5. Accommodation

Accommodation was evaluated using objective and subjective indicators. Indicators of accommodation considered cleanness of secondary and tertiary health care and the time spent by patients waiting for result and consultation.

Indicators	Waiting time	% of patients referred to Muhima SHC	% of patients referred to Kibagabaga SHC	% of patients referred to Masaka SHC	% of patients referred to overall SHC	% of patients referred to THC
Waiting time for consultation	< 10 min	43	55	71	30	30
	10-30 min	29	31	14	35	60
	30min - 1hour	4	6	6	14	10
	>1hour	23	7	9	20	0
	No answers	1	0	0	1	0
		100	100	100	100	100
Waiting time for results	1Hour	69	14	30	65	80
	Half day	14	31	47	20	17
	Entire day	6	20	17	6	3
	>1 day	11	33	6	9	0
	No answers	0	2	0	0	0
		100	100	100	100	100
Cleanness	Very clean	74	67	97	79	100
	Clean	20	24	2	15	0
	Neutral	4	6	1	4	0
	Dirty	2	1	0	1	0
	Very dirty	0	2	0	1	0
		100	100	100	100	100

Table 5.18: Perceptions of patients referred to secondary and tertiary health care

Regarding to waiting time for consultation, table 5.18 shows high percentage of patients referred to Muhima, Kibagabaga and Masaka secondary health care waited consultation less than 10 minutes, but there is also large variation in percentage of patients referred to secondary health care about waiting time for consultation less than 10 minutes. Muhima secondary health care has a low percentage (43%), while Masaka secondary health care has a high percentage (71%) of patients waited consultation less than 10 minutes. Muhima secondary health care also has a high percentage of patients referred waited consultation more than 1hour. The reason behind is that, Muhima secondary health care has more patients referred and less medical staffs than Masaka and Kibagabaga secondary health care (table 5.9).

Considering patients referred to secondary and tertiary health care to waiting time for consultation, the table 5.18 shows similar percentage of patients referred waited consultation less than 10 minutes and high percentage of patients referred waited consultation 10 to 30 minutes. The percentage of patients referred waited consultation increases from secondary to tertiary health care. The table 5.18 shows also high percentage (20%) of patient referred to secondary health care waited consultation more than 1hour, while no patients referred to tertiary health care waited consultation more than 1 hour.

High percentage of patients (90%) referred to tertiary health care waited consultation less than 30 minutes, while 65% of patients referred to secondary health care waited consultation less than 30 minutes, because tertiary health care has more new and advanced equipments, advanced technology, specialized and skilled medical personnel and treats high risk cases which are needs rapid interventions.

Regarding to waiting time for results, the table 5.18 shows large variation in percentage of patients referred to secondary health care about waiting time for results. High percentage of patients referred to Muhima secondary health care waited results in 1hour, high percentage of patients referred to Kibagabaga secondary health care waited results more than 1 day, high percentage of patients referred to Masaka secondary health care waited results half day. Muhima secondary health care has high percentage of patients referred waited results for short time than others secondary health care because of his location, new and advanced equipments and advanced technology.

Considering patients referred to secondary and tertiary health care to waiting time for results, table 5.18 shows high percentage of patients referred waited result less than 1 hour increase from secondary to tertiary health care and quite similar percentage of patients referred waited results half day. The table 5.18 shows also low percentage of patients (9%) referred to secondary health care waited for results more than 1day, while no patients referred to tertiary health care waited results more than 1day. Tertiary health care has more specialist, new and advanced equipments and new advanced technology which are reduced time for waiting results.

Regarding to cleanness, table 5.18 shows high percentage of patients referred to secondary and tertiary health care happy with cleanness to secondary health care and tertiary health care. Considering three secondary health care, Masaka secondary health care has higher percentage of patients referred happy to cleanness compared to Muhima and Kibagabaga secondary healthcare. Masaka is new hospital with new infrastructures.

Considering patients referred to secondary and tertiary health care to cleanness, table 5.18 shows high percentage of patients referred happy with cleanness in secondary and tertiary health care. The percentage increases from secondary to tertiary health care. The table 5.18 shows also high percentage (100%) of patient referred to tertiary health care happy with cleanness in tertiary health care, because of regular monitoring and regular budget allocated by government for this purpose. The budget allocated by government decrease from tertiary to secondary health care.

In general, the results from analysis show high satisfaction of patients referred to secondary and tertiary health care with waiting time for consultation less than 30 minutes. High satisfaction of patients referred to secondary and tertiary health care waited results less than half day.

The results from analysis of accommodation dimension for secondary and tertiary health care based on their indicators of access not presented issues but need improvements. Cleanness, waiting time for consultation and waiting time for results needs improvements in secondary health care than tertiary health care. Considering three secondary health care waiting time for results needs improvements in Masaka and Kibagabaga secondary health care compared to Muhima secondary health care.

According to Murekatete (2010), primary health care, accommodation dimension indicated issues related to the following indicators of access: waiting time for consultation, waiting time for results and cleanness. These issues were showed by low satisfaction of respondents visited primary health care, for example 38% of patients visited primary health care are satisfied with cleanness in the primary health care, 15% of patients visited primary health care waited results more than half day and 37% of patients visited primary

health care waited consultation more than 30 minutes. Most patients visited primary health care need to use technologies in health services.

Accommodation dimension	Primary health care	Secondary health care	Tertiary health care
	%	%	%
Waiting time for consultation>30min	15	34	10
Waiting time for results > half day	37	15	3
Satisfaction of cleanness	38	94	100

Table 5.19: Comparison of three level of public system based on accommodation dimension

Source : Adapted data from Murekatete (2010) and data from survey 2013

The table 5.19 shows the high percentage of patients referred to secondary health care waited consultation more than 30 minutes because of lack of medical staffs and high number of patients visited secondary health care. Table 5.19 also shows high percentage patients visited primary health care waited results more than half day. The time used to wait results more than half day decrease from primary health care to tertiary health care because of new and advanced equipments, advanced technology, specialized and skilled medical personnel in the tertiary and secondary health care than primary health care.

Finally the table 5.19 shows the high satisfaction of patients referred to secondary and tertiary health care happy to cleanness. The percentage of patients visited health care happy to cleanness decrease from tertiary to primary health care, because of no regular budget allocated in primary health care for cleanness purpose and no regular monitoring.

5.5. Evaluation of overall dimensions of access to secondary and tertiary health care

After standardization and combination (explained in section 4.5) of used indicators required for development of secondary health care dimensions, scores were compared using a spider chart. General overview of secondary health care dimensions has revealed a low performance level of geographic accessibility (0.64) and high performance of affordability (0.94), as shown by figure 5.3. These scores refer to the result obtained in section 5.4 and figure 5.1.

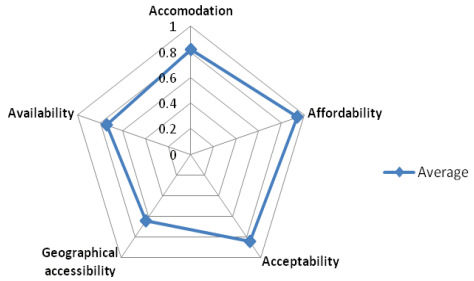


Figure 5.3: Performance of dimension of access based on secondary health care...

However, the performance levels of secondary health care dimensions differ among three secondary health care facilities. Geographical accessibility dimension and availability dimension were a big issue for all secondary health care. Geographical accessibility has the lowest score (0.34) for Masaka secondary health care as shown by figure 5.4. The reason behind can be related with the findings of section 5.4.

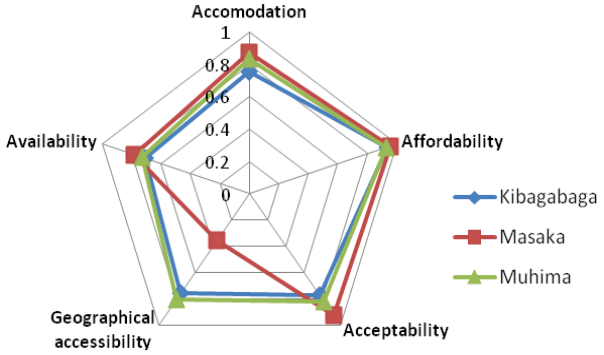


Figure 5.4: Performance of dimension of access within secondary health care

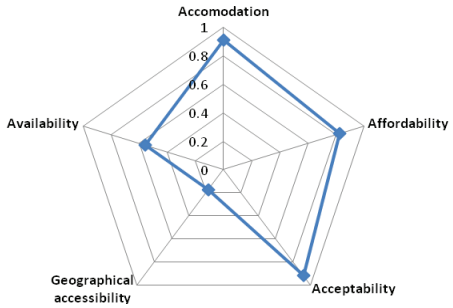


Figure 5.5: Performance of dimension of access based on tertiary health care

Overview of tertiary health care dimensions has revealed a low performance level of geographic accessibility (0.17) and high performance of acceptability (0.92), as shown by figure 5.5. Affordability, acceptability and accommodation scored higher values as compared to geographic accessibility and availability dimension for tertiary health care. These scores refers to the result obtained in section 5.4 and figure 5.2, where availability of medical staffs , availability of drugs, availability of patients beds and travel distance for people live in rural area were found to be a big issues of patients referred .

Comparison of three level of public health care system

Dimensions of access	Indicators	PHC	SHC	THC
Geographic accessibility	Travel distance	++	+	+/-
Availability	Medical staffs availability	+	+/-	+/-
	Availability of Patients beds	++	+/-	+/-
Affordability	Services cost	++	++	+
Acceptability	Information provision	+	++	++
	Attitudes of medical staffs towards patients	+	++	++
Accommodation	Waiting time for consultation	+	+/-	+
	Waiting time for results	+/-	+	++
	Cleanness	-	++	++
	Opening hours	+	++	++

Legend
++: Very positive
+: Positive
+/-: Neutral
-: Negative

Table 5.20: Comparison of three level of public health care system based on dimension of access[1]
Source: Adapted data from Murekatete (2010) and data from survey 2013

[1] Availability dimension and geographic accessibility measured using Rwandan norm, but others dimensions measured using level of satisfaction of patients treated by three level of public care

Table 5.20 shows dimensions of access and their indicators used to measure access to three level of public health care in Kigali. It shows the results from analysis of each indicator which were allowed to compare three level of public health care, namely primary health care, secondary health care and tertiary health. Table 5.20 shows, first the indicators well performed for primary level of public health care such us travel distance, services cost and availability of beds. Second the indicators well performed for secondary health care like opening hours, cleanness, and attitudes of medical staffs toward patients and information provision. Thirds indicators well performed for tertiary health care like waiting time for results, cleanness, opening hour and information provision.

The table 5.20 also shows the indicators presented issues and need high attention for each level of public health care in Kigali. Indicators like waiting time for results and cleanness presented the issues for primary health care. Indicators such us medical staffs availability, waiting time for consultation and availability of patients beds presented issue and need high improvements for secondary health care while travel distance, number of beds and medical staffs availability indicators presented issues and need high improvement for tertiary health care. Considering the dimension of access to three level of public health care system as whole the dimension of accommodation appeared most problematic for primary health care, dimension of availability appeared most problematic for secondary health care and dimension of geographic accessibility and availability dimension appeared also most problematic for tertiary health care.

5.6. Conclusion of chapter

In general the analysis of individual dimensions of access to secondary and tertiary health care showed the indicators of access need high improvements than others: travel distance under dimension of geographical accessibility, availability of medical staffs and availability of Patients beds under availability dimension, services cost for people paid community based health insurance contribution by Government or donors under affordability dimension, waiting time for consultation and for results under dimension of accommodation for patients referred to Kibagabaga and Muhima secondary health care. Considering the dimension of access to secondary and tertiary health care facilities as whole, the dimension of geographic accessibility and availability dimension appeared to be the most problematic based on secondary and primary data analysis, while in primary health care the dimension of accommodation presented an issue.

6. REFLECTION ON RESULTS AND RECOMMENDATIONS

The present chapter discusses the results of analysis obtained to address research sub objectives of this study. Within this chapter, the definition of access, definition of dimension of access and its operationalization are discussed. Results from Variation of access between individual indicators used to operationalize access dimension are recalled, followed with comparison of 3level of health system in Rwanda. The assessment of level of sub objectives reached the conclusion and recommendations for possible future research included in this chapter.

6.1. Reflection on results

- **Definition of access concept to secondary and tertiary health care and its operationalization**

The main objective of this research was to assess access to secondary and tertiary public health care for people with community based health insurance in Kigali. Multiple phases were integrated towards the access definition and its operationalization in order to find a structure that can be used to evaluate access to health care in my study area.

The access to secondary and tertiary health care was defined based on the literature review related on access to health care. For the first and second research questions under objective one, it has been found necessary to define it by using a literature review related to that. In addition, it has been noted that the best way for defining access is to consider its multidimensional concept constituted by mainly five concepts which are geographical accessibility, availability, affordability, acceptability and accommodation (Penchansky & Thomas, 1981). Finally, the proper way of operationalzing concepts of access was to select indicators that have different aspects of health services users and health care system characteristics, by considering both services user and outcome like satisfaction. Those dimensions were relevant in this study because of their contribution to the evaluation of access to health care through indicators as mentioned in chapter two and also help the researcher to understand the definitions and concepts as stipulated in the same chapter.

In line with third, fourth and fifth research questions under objective two, Rwandan health system are described as public health care and private health care (Ministry of Health, 2012a). The public health care includes primary health care, secondary health care and tertiary health care. Two level of health care like secondary and tertiary health care have been considered by looking five dimensions of access to health care in Kigali. Regarding public Rwandan health care insurance, community based health insurance was used in this study and described among 3 others public insurance in section 3.5, it is used by larger number of population in Rwanda and more affordable for the poor and people work in the informal sector (Ministry of Health, 2012b). Rwandan health system seems to be very important in this research, because of their influence in accordance to the policy and regulations. It is also important for facilitating the people to benefit health assurance. This will provides access to secondary and tertiary health care.

- **Measuring access to secondary and tertiary health care**

The measurement of access dimensions is included in the five research sub objective. The combination of various methods like Geographical Informal Systems and quantitative methods such as statistics methods was used to assess access to secondary and tertiary health care. First Geographical information systems

used to demonstrate and to measure spatial indicators of access dimension, such as travel distance, for geographical accessibility. Second the statistics methods were used to measure non spatial indicators such us waiting time, cleanness, medical staff, drugs, beds, services cost, income, and information provision etc, for understanding various dimension of access.

Empirical studies for evaluating access to health care, indicators related to geographic accessibility and availability of health care has been important. Reference was able to show important variation component of access, while measuring health care service variation.

In Rwanda, it was impossible to find health norms related to all five dimensions of access. In general, available norms for geographical accessibility are related to population served by secondary health care, travel distance to the secondary and tertiary health care and number of medical staff by secondary health care.

Considering travel distance to secondary and tertiary health care, the norm stipulates a maximum distance of 10 Km to reach secondary and tertiary health care. However this norm is used in rural area and in urban area because it was the only available related to travel distance in Rwanda.

The results from analysis of travel distance to secondary health care shown that in urban area, this norm is fulfilled with 61% of population including community based health insurance patients, while in rural area it is still difficult to be attained 39% of people cannot reach the proposed secondary health care within that distance (table 5.8 and figure 1).Two out of three secondary health care are located in urban area, short distance, good transport system in urban area influence access to secondary health care by people from urban area.

However, this dimension in general, was not found to be the major issue in two secondary health care (Muhima and Kibagabaga), but for third secondary health care was problematic only 25% of population are well served for Masaka secondary health care (figure 5. 1 and table 5.3). 75% of patients referred and treated by Masaka secondary health care reported to reach secondary health care are too far and much too far table (5.4). This due to the long distance between the location of secondary health care and the location of population, rather due to the users of community based health insurance not have preference to visit nearest secondary health care in Rwanda, but proposed secondary health care.

For tertiary health care, this dimension in general, was not found to be the major issues in population from urban area 83% of people live in urban area are well served, but it is an issue for people from rural area, 27% of people live in rural are well served (table 5.8.) This due to the long distance, inappropriate transport system, distribution of health care, bad condition of road network used to reach secondary health care.

Considering the population served by three secondary health care facilities, the results of analysis shown that there are still issues in that matter. The policy of Rwandan norm specifies that the maximum number of population to be served by secondary health care in their geographical area should not be more than 200000. However the physical analyses shown that all three secondary health care in study area serve more than the fixed number (table 5.2).

Regarding to medical staff under dimension of availability, the analysis was based on appreciation from community based health insurance referred to secondary and tertiary health care (primary data) and secondary data from each secondary and tertiary health care in Kigali city. The Rwandan policy standard

stipulates that secondary health care needed 20 generalist doctors, 116 nurses and 34 midwives. Considering the norm establish by Ministry of health and number of medical staff for each secondary health care, number of generalist doctors in all secondary health care meet the Rwandan norm, but for number of nurses Muhima and Masaka don't meet the Rwandan norm. Comparing all secondary health care with medical staffs' ratio and patients referred, Muhima secondary health care has more issues than Masaka and Kibagabaga (table5.9). Considering population served, Kibagabaga secondary health care has more issues related to availability of staffs than others (table 5.9 and table 5.10). The reason behind is that from July 2012 to June 2013 Muhima Secondary health care facility treated more patients compared others secondary health care facilities and Kibagabaga secondary health care serves more people than others secondary health care in study area.

Considering patients beds, the analysis was based on secondary data from each secondary and tertiary health care and appreciation from community based health insurance referred to secondary and tertiary health care (primary data). In general the results from analysis showed a lack of beds in three secondary and one tertiary health care. Based on patients treated in all secondary health care, Muhima secondary health care has more issues related to patients' beds than others, but based on population served Kibagabaga secondary health care has more issues related to availability of beds than others (table 5.11 and table 12).
Regarding availability of drugs, the analysis was based on appreciation from community based health insurance referred to secondary and tertiary health care (primary data). In general the results showed satisfaction of availability of drugs 66% of community based health insurance referred to secondary and 63 % of community based health insurance referred to tertiary health care (table 5.13).

Regarding indicators related to affordability, the results from analysis has shown that the majority of community based health insurance referred to secondary and tertiary health care have a low income (less than $200) 90% for secondary and 80% for tertiary health care. The community based health insurance was manifested a high level of satisfaction with medical services costs (table14). Even if the treatment cost and drugs costs are not an issues, community based health insurance referred to secondary and tertiary health care reported don't have access to special and expensive drugs. The results show also the high percentage of community based health insurance paid the contribution for own pocket 82% for secondary and 93% for tertiary health care.

In important step seems to have been achieved for secondary and tertiary health care is related to acceptability dimension. The results from analysis of some acceptability dimension indicators have shown a successful phase in terms of information provision and attitudes of medical personnel towards patients. This was showed by high level of satisfaction from patients referred to tertiary health care, where 85% of patients referred are very satisfied with information provision and 88% of patients referred are also very satisfied with attitudes of medical personnel towards patients (table 5.16). The staffs were confirmed that the high satisfaction of community based health insurance referred related to secondary and tertiary health care based on staffs regular training and regular monitoring from Ministry of health.

Regarding accommodation, the results from analysis has shown that the majority of community based health insurance users have high satisfaction with cleanness to secondary and tertiary health care (table 5.18). The community based health insurance users were manifested a satisfaction with waiting time for consultation and waiting time for results (table 5.18). Even if the waiting time for consultation and waiting time for results are not major issues, community based health insurance referred to secondary health care reported that these elements need improvements. As reported by staffs from secondary and tertiary health

care, the successful of cleanness in secondary and tertiary health care result to the regular budget allocated by Ministry of health.

- **Comparison of results from three level of public health care in Kigali**

Comparative analysis based on three level of health care such us primary, secondary and tertiary health care showed variation and similarities in socioeconomic characteristics and dimension of access. Majority of patients treated in all three public levels of health care used walking as mode of transport. As patient continue to tertiary health care from primary health care, walking as a mode of transport decreases. All three public levels of health care in Kigali have a shortage of medical staffs. There a need for improvements of secondary and tertiary health care patients' beds and drugs. However, on primary level, this is not a problem because of many patients at primary health care are outpatients and those with serious issues or high risk cases are immediately referred to secondary health care.

High percentage of population in Kigali city is well served by primary health care than other levels of health system, because of distribution and large number of primary health care in Kigali. Thus, the people living in urban area are more served by all three levels of health care compared to people living in rural area. There is a high satisfaction of patients who treated in three levels of public health care system and the level of satisfaction of indicators like attitudes of medical personnel towards patients and information provision has increased from primary to tertiary health care (table 5.17). Tertiary and secondary health care have regular staffs training and monitoring from Ministry of health and city of Kigali. The low satisfaction was observed on primary health care compared secondary and tertiary health care and this is due to large number of patients on primary health care and its management.

High percentage of patients visiting primary health care waits medical results more than half day and this time decreases from primary health care to tertiary health care because of more new and advanced equipments, advanced technology, specialized and skilled medical personnel than primary health care (table5.19).
There is high satisfaction of patients treated in secondary (94%) and tertiary (100%) health care and low satisfaction of patients treated in primary health care (38%) to cleanness and this percentage decreases from tertiary to primary health care due to the fact that there is no annual budget allocated in primary health care for cleanness purpose and lack of regular monitoring in primary health care facilities.

6.1.1. Main findings for secondary and tertiary healthcare in Kigali City

The results from analysis of individual dimensions of access to secondary and tertiary health care have shown the indicators of access needs improvements: travel distance under dimension of geographical accessibility, availability of medical staffs and availability of patients' beds under availability dimension, services cost for people paid CBHI contribution by Government or donors under affordability dimension. Considering the dimension of access to secondary and tertiary health care facilities as whole, the dimensions of geographic accessibility and availability appeared to be the most problematic based on secondary and primary data analysis

The major objective of this study was achieved. Access has been defined and evaluated in Kigali city as study area using five dimensions of access to health care based on people with community based health insurance patients referred. Therefore there are still possible areas for more studies to complete it or to make some improvements. Some recommendations are needed for future research development that can enhance the findings of this research.

6.2. Recommandations

➢ Researchers

- This research has focused on public health care. Future research should include other type of health care such as private health care or traditional health care for assessment and improving multiple aspects of access to health care system and users in Kigali.

- The research considered one type of public health insurance which is community based health insurance. In future other research should include other public insurance like RAMA, military medical insurance and private insurance to see the variation within type of insurance.

➢ Health planner

- The important recommendation addressed to health planners in Kigali City is to establish sufficient norms which can be used to assess multiple indicators of five dimensions of access to health care as explained in this research.

➢ Decision maker

- The major recommendation addressed to decision makers is to change the law n° 65/2007 oblige the community based health insurance users to go to the proposed secondary health care and approve new law allow community based health insurance users to go to the nearest secondary health care, because the new could make secondary health care more accessible and affordable.
- Decision maker must increase the number of tertiary and secondary health care in Kigali
- This research has demonstrated that the dimensions of affordability, acceptability and accommodation are improved. The Government of Rwanda should take into account the geographic accessibility and availability dimensions in order to facilitate the citizens' access to secondary and tertiary health care.

LIST OF REFERENCES

Amer, S. (2007). Towards Spatial Justice in urban health services planning. *International Institute for Geo-Information science and earth observation.* (Enschede,International Institute for Geo- Information science and earth observation), 299.

Bagheri, N., & Benwell , G., L. (2005). Measuring spatial accessibility to primary health care.The 17 th Annual colloquium of the Spatial Information research Centre. *Dunedin, 6*.

Black, M., & Ebener, S. (204). Using Gis to measure physical accessibility to health care. *International health conference World Health Organization*.

Brabyn, L., & Skelly , C. (2002). Modeling population access to New Zealand public hospitals. . *Int J Health Geogr, 1*(3).

Buor, D. (2003). Distance as a predominant factor in the utilisation of health services in the Kumasi metropolis. *GeoJournal, 56*(Ghana), 145-157.

Christie, S., & Fone, D. (2003). Equity of access to tertiary hospitals in Wales: a travel time analysis. *Oxford Journals, 25*(4), 344-350.

Das, D. (2008). Urban quality of life: A case study of Guwahati. *Social indicators research 88*(2), 297-310.

Field, K. (2000). Measuring the need for primary health care: an index of relative disadvantage. *Applied Geography, 20*(4), 305-332.

Foo, T. S. (2000). Subjective assessment of urban quality of life in singapore. *Habitat international, 24*(1), 31-49.

Forster, G. (2009). Access to health services:Intermediate modes of transport in resource poor areas. *Conference on Transport Solution for Access to Health care in Rural Africa., 5(* London, Transaid).

Fortney, J., Rost, K., & Warren, J. (2000). Comparing alternative methods of measuring geographic access to health services. *In: Health Services & Outcomes Research Methodology 1(2000)2, pp. 173–184*.

Goddard, M., & Smith, P. (2001). Equity of access to health care services: theory and evidence from the UK. *Soc Sci Med, 53*(9), 1149-1162.

Guagliardo, M. F. (2004). Spatial accessibility of primary care: concepts, methods and challenges. *International Journal of Health Geographics 3*(3).

Higgs, G. (2004). A Literature Review of the Use of GIS-Based Measures of Access to Health Care Services. *Health Services and Outcomes Research Methodology, 5*(2), 119-139.

Huerta, M., Ulises , & Källestål, C. (2012). Geographical accessibility and spatial coverage modeling of the primary health care network in the Western Province of Rwanda. *International Journal of Health Geographics, v11*, 11.

Ikporukpo, C. O. (1987). An analysis of the accessibility of public facilities in Nigeria. *Socio-Economic Planning Sciences, 21*(1), 61-69.

International Health Economics Association. (2013). How Healthy are Health Policies: Evaluating policies in health care, health care access and health care financing .

Kalimenze, D. D. (2011). *Evaluation of access to primary healthcare : a case study of Dar es Salaam* (Part of

Khe, N. D., Toan, N. V., Xuan, L. T. T., Eriksson, B., Hojer, B., & Diwan, V. K. (2002). Primary health concept revisited: Where do people seek health care in a rural area of Vietnam? *Health Policy, 61*(1), 95-109.

Leisinger, K. M. (2008). Access to heath care - what matter ? Novaratis foundation for Sustainable development:. *8*.

McIntyre, D., Thiede, M., & Birch, S. (2009). Access as a policy-relevant concept in low- and middle-income countries. *Health Economics Policy and Law, 4*(2), 179-193.

Ministry of finance and economic planning. (2007). Health policy and development. Kigali: Government of Rwanda.

Ministry of Health. (2005). Health Sector Policy (pp. 17). Kigali: Government of Rwanda.

Ministry of Health. (2012a). *Ministerial Instruction/Min/2012 defining the functioning norms of private health establishments in Rwanda.* Kigali: Government of Rwanda.

Ministry of Health. (2012b). *Mutual Health Insurance and the Contribution to Improvements in Child Health in Rwanda.* Kigali: Government of Rwanda.

Ministry of Health. (2012c). *service package for health facilities at differentlevel of service delivery.* Kigali: Ministry of health.

Mrtinez, J. A. (2005). *monitoring intra urban inequalities with GIS- based indicators: with a case study in Rosario, Argentine* Utrecht University ITC.
Murekatete, M. R. (2010). *evaluating access to primary health care the case of kigali Rwanda.* MSc Thesis.University of Twente Faculty of Geo-Information and Earth Observation (ITC), Enschede.
National Institute of Statistics of Rwanda. (2002). 2002 population and housing census
National Institute of Statistics of Rwanda. (2008). Service provision assesment survey 2007. (pp. 685). calveton, UsA: Government of Rwanda.
National Institute of Statistics of Rwanda. (2012). 2012 Population and Housing Census (pp. 23). Kigali: Government of Rwanda.
Obrist, B., Nelly, I., Christian, L., Ahmed, M., Christopher, M., Rose, N., Hassan, M. (2007). Access to health care in contexts of livelihood insecurity: A framework for Analysis and Action. *Plos Medicine, 4*(10), 1584-1588.
Oliver, A., & Mossialos, E. (2004). Equity of access to health care: outlining the foundations for action. *J Epidemiol Community Health, 58*(8), 655-658.
Parnell, S., & Poyser, M. (2001). The value of indicators as a tool for local government, democratising local government: The south african experment. (University of Cape Town Press), 251- 260.
Penchansky, R., & Thomas, J. W. (1981). concept of access: definition and relationship to consumer satisfaction. *In: Medical Care, 19(1981)2, pp. 127-140.*
Peters, D. H., Garg, A., Bloom, G., Walker, D. G., Brieger, W. R., & Rahman, M. H. (2008). Poverty and access to health care in developing countries. [Article]. *Reducing the Impact of Poverty on Health and Human Development: Scientific Approaches, 1136*, 161-171.
Ruousseil, G., & Pau, N. (1990). Geographie et amenagement dans l' Afrique des grands lacs. Bordeaux,. (Universite de bordeaux III).
Rusa, L., & Fritsche, G. (2007). Rwanda: Performance-Based Financing in Health, pp. 105 - 115.
Russell, S. (1996). Ability to pay for health care: Concepts and evidence. *Health Policy and Planning, 11*(3), 219-237. doi: 10.1093/heapol/11.3.219
Saksena, P., Antunes, A. F., Xu, K., Musango, L., & Carrin, G. (2011). Mutual health insurance in Rwanda: Evidence on access to care and financial risk protection. *Health Policy, 99*(3), 203-209.
Sharifi, M. A., van Herwijnen, M., & van den Toorn, W. H. (2004). Spatial decision support systems (pp. 234). Enschede: ITC.
Shrestha, J. (2010). *Evaluation of access to primary healthcare : a case study of Yogyakarta, Indonesia.* University of Twente Faculty of Geo-Information and Earth Observation (ITC), Enschede.
Szczepura, A. (2005). Access to health care for ethnic minority populations. *Postgrad Med J, 81*(953), 141-147.
Tanser, F., Gijsbertsen, B., & Herbst, K. (2006). Modelling and understanding primary health care accessibility and utilization in rural South Africa: An exploration using a geographical information system. *Social Science & Medicine, 63*(3), 691-705.
The Republic Of Rwanda. (2005). *Official Gazette Of The Republic Of Rwanda.* Kigali.
Travis, C. B., Meltzer, A., & Howerton, D. (2010). Gender and Health-Care Utilization. In J. C. Chrisler & D. R. McCreary (Eds.), *Handbook of Gender Research in Psychology* (pp. 517-540): Springer New York.
Veenhoven, R. (2002). Why social policy needs subjectives indicators. *Social indicators research, 58*(1), 33-46.
Wang, F., & Luo, W. (2005). Assessing spatial and nonspatial factors for healthcare access: towards an integrated approach to defining health professional shortage areas. *Health & Place, 11*(2), 131-146.
Ware Jr, J. E., Snyder, M. K., Wright, W. R., & Davies, A. R. (1983). Defining and measuring patient satisfaction with medical care. *Evaluation and Program Planning, 6*(3–4), 247-263.
Whiting, D., & Unwin. (2009). Urbanization and health. *international Journal for epidemiolgy, 38*(6).
world health Organization. (2006). Measuring availability and accessibility coverage. result of the GIS capacity and data availability analysis. *Southern African netowk on equity in Health*(Zambia), 17.
Yale School of Medecine. (2013). Office of Global Health

APPENDICES

Appendix 1: Questionnaire of households' patients referred to secondary and tertiary health care

Questionnaire Nº…….. Date of interview……
Interviewer name: ……Secondary or tertiary`` health care name:…….

Introduction

My name is INGABIRE Emmanuel, I am a student at the Twente University in faculty of ITC; I am conducting research for MSc degree in urban planning and management. Its aim is to assess access to public secondary and tertiary health care. Perceptions of households patients referred to secondary and tertiary have enormous value for a successful completion of this study and will participate to health care improvements. The interview will be conducted in private between the respondent and interviewer. Your responses to this questionnaire will be treated with strict confidentiality, and your names will not be mentioned anywhere, hence, your honest comments and cooperation will be highly appreciated. We will not keep you for long; 20 minutes are enough for the interview.

I General information of the respondents (the patient referred to secondary and tertiary or the care taker)

1. Are you using community basic health insurance (CBHI)?

2. Residence of patient: District…….sector……..Cell……Village……..

3. Fill the information in the following table

The patient	Age of the respondent	The respondent is the head of household	Number of household members
a) ☐ Man alone b) ☐ Woman alone c) ☐ Man/women With child(child is patient) d) ☐ Other, specify		a) ☐ yes b) ☐ No	

4. What is your level of education?

a) ☐ No education
b) ☐ Primary
c) ☐ Vocational Training/ Tronc commun / A3/TVET
d) ☐ secondary
e) ☐ Tertiary

4. Do you have a job?

a) ☐ No
b) ☐ Yes
c) ☐ Don't know

If yes, what kind of job?.....

NB: If you don't have a job, go to question number 7

5.Who is your employer?

a) ☐ Public institution
b) ☐ Private institution
c) ☐ Self employed
d) ☐ Retired
e) ☐ Other, please specify……..

6. What is your average monthly income of household in Rwandan francs?

a) ☐ < $200
b) ☐ 200- $400
c) ☐ >$400

7. **How do you appreciate patient's beds in the secondary health care?**

a) ☐ Very good
b) ☐ Good
c) ☐ Neutral
d) ☐ Bad
e) ☐ Very bad

8. If an equal number of male and female medical personnel is available, to whom will you prefer to visit for check up?

a) ☐ Male medical personnel
b) ☐ Female medical personnel
c) ☐ Does not matter for male medical personnel
d) ☐ Does not matter for female medical personnel
e) ☐ Does not matter at al

9. How satisfied are you with personnel treatment from secondary health care personnel?

a) ☐ Very good
b) ☐ Good
c) ☐ Neutral
d) ☐ Bad
e) ☐ Very bad

10. Are you satisfied with availability of medical staffs?

a) ☐ Very satisfied
b) ☐ Satisfied
c) ☐ Neutral
d) ☐ Unsatisfied
e) ☐ Very unsatisfied

11. Are you satisfied with availability of drugs (medicament)?

a) ☐ Very satisfied
b) ☐ Satisfied
c) ☐ Neutral
d) ☐ Unsatisfied
e) ☐ Very unsatisfied

12. **What type of medical personnel age that you prefer taking care of you?**

a) ☐ 20-30 age
b) ☐ 30- 40 age
c) ☐ 40-50 age
d) ☐ 50-65age
e) ☐ Does not care

13. Are you satisfied by the manner the medical personnel is listening to you?

a) ☐ Very satisfied
b) ☐ Satisfied
c) ☐ Neutral
d) ☐ Unsatisfied
e) ☐ Very Unsatisfied

14. Are you satisfied by the information provided to you?

a) ☐ Very satisfied
b) ☐ Satisfied
c) ☐ Neutral
d) ☐ Unsatisfied
e) ☐ Very unsatisfied

15. Are the operating hours convenient for you?

a) ☐ Yes
b) ☐ No
c) ☐ Does not matter

If not convenient, why? ……

16. What do you think about the waiting time in the secondary health care?

a) ☐ Very short
b) ☐ Short
c) ☐ Neutral
d) ☐ Long
e) ☐ Very Long

17. **Could you estimate the time you spent waiting for consultation?**

a) ☐ Less than 10 min
b) ☐ 10- 30 min
c) ☐ 30 min -1 hour
d) ☐ More than 1 hour
e) ☐ They did not receive me.

18. Could you estimate the waiting time for results?

a) ☐ 1hour
b) ☐ Half day
c) ☐ Entire day
d) ☐ More than 1 day
e) ☐ Long time (please specify)……..

19. What are other services that you waited for too long?

…….

18. How the cleanliness of the facility?

a) ☐ Very clean
b) ☐ Clean
c) ☐ Neutral
d) ☐ Dirty
e) ☐ Very dirty

20. Which category of CBHI do you fit in?

a) ☐ You pay CBHI contribution on your own
b) ☐ By Government
c) ☐ Donors

Which Donors?.....

21.What is your perception on service offered by the CBHI in secondary health care?

a) ☐ Very Good
b) ☐ Good
c) ☐ Neutral
d) ☐ Bad
e) ☐ Very bad

22. Did you visit secondary health care after referred by PHC?

a) ☐ Yes
b) ☐ No
c) ☐ Don't know

If No, how much money did you pay?.....

23.What mode of transport did you use to reach secondary health care?

a) ☐ Ambulance
b) ☐ Own car
c) ☐ Tax/Bus
d) ☐ Tax/voiture
e) ☐ Motorbike
f) ☐ Traditional transport (ingobyi)
g) ☐ Walking

(for walking answer **the question** nº 28)

24. If you paid transportation, how much money did you pay?.....RWF

25. What do you think about the money you spent on transportation?

a) ☐ Very cheap
b) ☐ Cheap
c) ☐ Moderate
d) ☐ Expensive
e) ☐ Too expensive

26. What do you think about the travel time from home to the secondary health care?

a) ☐ Very short
b) ☐ Short
c) ☐ Normal
d) ☐ Long
e) ☐ Very Long

27. Could you estimate the travel time from home to the secondary health care facility…..minutes……hours

28. What do you think about the distance you travelled?

a) ☐ Very close
b) ☐ Close
c) ☐ Far
d) ☐ Too far
e) ☐ Much too far

29. Do you climb hills/mountains to go to secondary health care?

a) ☐ The terrain is flat
b) ☐ The slope is not steep
c) ☐ The slope is moderately steep
d) ☐ The slope is too steep

30. List three positive things that you appreciate in the secondary health care you visited?

……

31. List three negative things that you don't appreciate in the secondary health care you visited?

……
…….

Appendix 2: Interview with secondary and tertiary health care personnel

Secondary or tertiary health care name …… Interviewer name: ……
Position of interviewee……Location ……
Date: ……
Duration: …….
This survey is for study purpose to understand the existing in accessing public secondary and tertiary health care in the city of Kigali, Rwanda. Perception of staffs is important value for a successful completion of this study. Your responses to this questionnaire will be treated with strict confidentiality. Your cooperation and comments will be highly appreciated.

1. **In which year did this service start?.....**
2. **Type of services** ……..
3. **Number of medical doctors**
   a) Male ……. b) Female…….
4. **Number of nurse**
   a) Male……. b) Female……
5. **Medical assistants**

   a) Male……. b) Female……
6. **Number of patients bed**
   a) …….for general secondary care
   b) …… for emergency case
   c) ……. For indoor patients (admitted for few days)
7. **Does this secondary have all laboratories and equipments required for secondary health care?**
   a) ☐ Yes b) ☐ No
8. **Does this secondary health care provide any extra service or treatment equipments that others don't have?**
   a) ☐ Yes b) ☐ No
   If yes, what…….
9. **Is appointment required?**
   a) ☐ Yes b) ☐ No
   If yes can it be done by telephone call a) ☐ yes b) ☐ No

If yes, before……..hours or …….day

10. **Number of CBHI patient attendance in year 2012 - 2013?**……..
11. **Opening hour ……**
12. **Does this secondary health care provide emergency service?**
    a) ☐ Yes b) ☐ No
    b) Number of ambulance…….. d) ☐ don't have it
13. **Patients using CBHI have problem in paying personnel service contribution?**
    a) ☐ Yes b) ☐ No
    If yes which problem……
14. **How far does the CBHI cover the cost?**
    a) Cover all the cost

    b) Cover partially (……..% of total health cost).