UNIVERSITY OF NAIROBI

Masters Project

DETERMINING FACTORS THAT INFLUENCE THE DISTANCE TRAVELLED BY PATIENTS SEEKING FOR OUTPATIENT HEALTH CARE IN KENYA

By

NGUGI MWENDA

REGNO: X53/8191/2017

A PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN HEALTH ECONOMICS AND POLICY IN THE SCHOOL OF ECONOMICS

October 2021

DECLARATION

This research project is my original work and has not been presented in any other institution or university.

Ngugi Mwenda Registration Number: X53/8191/2017

Signed  Date: **12-October- 2021**

This research project has been submitted for examination with my approval as the university supervisor

Dr. Moses Muriithi,

Senior Lecturer,

School of Economics,

University of Nairobi, Kenya

Signed: … 

Date: …11/10/2021…….

DEDICATION

I dedicate this project work to the love of my grandfather, my main guy and Dr P.N.K

ACKNOWLEDGEMENT

I am grateful to my research supervisor and lecturer, Dr. Moses Muriithi for his great guidance during the development of this project. The idea for this project was conceptualized and based on his publication, "The determinants of health seeking behavior in Nairobi slum, Kenya".

To my colleague and friends Steve Musyoka and Yvonne Ronoh, am thankful for the motivation you offered me when carrying out this research. To all my classmates I say thank you.

I want to mention in a special way Mr Mutua Kakinyi who provided the Kenya Household Expenditure and Utilization Survey (KHHEUS) and Noah Mutai for help in proof reading this document. Am grateful to my parents for the support and prayers that have seen me complete this journey strong. Finally, my greatest gratitude is to God the creator of the universe, provider of peace and resources for seeing me this far.

TABLE OF CONTENTS

List of Figure

List of tables

ABBREVIATIONS

KHHEUS-Kenya Household Expenditure and Utilization Survey

KNBS-Kenya National Bureau of Statistics

OOP-Out of Pocket Spending

UN-United Nations

WHO-World Health Organization

MOH-Ministry of Health

LMIC-Lower Middle Income Countries

GOK-Government of Kenya

NGO-Non-Governmental Organizations

FBO-Faith Based Organizations

KES-Kenya Shillings

HIV-Human Immune Deficiency Virus

TB-Tuberculosis

UHC-Universal Health Coverage

GDP-Gross Domestic Product

DALYS-Disability-Adjusted Life Years

KIHBS-Kenya Integrated Household Budget Survey

VIF-Variance Inflation Factor

ABSTRACT

Access to uncompromised health care is a basic human right championed by both the UN and enshrined in the Kenyan constitution 2010. Every citizen is supposed to have ease of access to a health facility and get proper medical care irrespective of their financial status. Outpatient care is a key determinant of a healthy population in two main ways. (1) The progression from a simple to a complicated health problem, if well attended to earlier could be diverted and (2) it has a direct effect on the financial effect on households in Kenya. Previous studies have reported catastrophic effects as a result of Out of Pocket (OOP) spending on health care leading to as many as 1.1 million Kenyans to poverty every year. Report by the Kenya Household Health and Utilization Survey indicated that Kenyans spend 48.4 Billion on health care through OOP spending of which outpatient care accounted for 78%. This shows the need to investigate the outpatient care access as it is a huge contributor to catastrophic spending among individuals in Kenya. The main aim of the study was to determine factors affecting patients' distance in seeking for outpatient health care in Kenya. This study utilized the binary probit regression model to assess the covariates that predict distance travelled to access outpatient care. The data utilized, was a secondary analysis of the Kenya Household Expenditure and Utilization Survey (KHHEUS) that was collected in 2018 with a primary focus of monitoring how Kenyans utilized outpatient and inpatient care in Kenya. We analyzed individual data on 6191 individuals who had complete data. Using the binary probit regression model, we reported results at 95% confidence interval whereby we determined that residence, facility type, mode of transport, education, and wealth index were associated with distance travelled to seek outpatient care. It is noteworthy that those who live in rural residence and the poorest travel long distance to access outpatient care. Therefore, the government should make policies that target increasing the number of outpatient health facilities, that are well equipped to handle more health cases that will see the rural travel short distance for care. Policies that will see a decrease in poverty also need to be formulated so that people can have financial freedom of accessing care wherever they wish and close to where they live.

CHAPTER ONE:
INTRODUCTION

1.1 Background

Outpatient care refers to treatment given in health facilities without being admitted. Most patients who seek outpatient care display mild characteristics of the illness conditions they have (Winpenny et al 2017). It is the most basic definition of primary health care, which is one of the solution to disease management as it provides the basic preventive strategies that make the health systems cheaper and thus reducing expenses and adverse outcomes such as mortalities (Azevedo & Azevedo 2017). The fact that the conditions of illness are non-serious, then theoretically, such patients have flexibility of choosing where to receive care and how long they are willing to travel to seek it.

In order to maintain an active population, then the health status of individuals in a given country should be a priority. That means that the health facilities should be available to all, and well equipped in terms of medicine and personnel. We can't discuss availability without addressing access, because no matter how well a facility is equipped, without access its usefulness cannot be fully realized by the person in need. According to (Gulliford et al 2002), access is defined by four aspects.

Availability of the services with adequate supply-A population of women who may be in need of caesarean delivery method, may find the services not available, and if available not adequate.

Financial, organizational and social or cultural barriers that may hinder fully utility of the given service. -Having more male birth attendants in regions such as the North Eastern which may discourage women seeking delivery at the hospital facilities due to cultural barriers.

Relevance of the service to the population in Need-This is particularly important because a hospital could be very well equipped to handle birth delivery issues, which may not be beneficial directly to men who would be suffering from motorcycle accidents. This facility remains not very helpful to the men in that context.

Equity of access- is the service only available to those who can afford? for example, some emergency services may not be available to the poor thus putting them at a disadvantage against the rich. Meaning the rich will have a better health outcome in case of an emergency, compared to the poor. With such aspects in life, then it is clear that different population will seek for the service on (1) Availability (2) affordability and (3) within reach. It is therefore important to investigate what factors determine access, especially on the outpatient care.

Patients would be willing to travel to a given health facility to seek care because of various reasons such as, medicine availability, qualification of medical staff, affordability of the services, short waiting time to see a physician, referrals, friendliness of the staff, privacy cleanliness of the facilities among others.

Goal 3 of the Sustainable development goals of the United Nations is about good health and well-being for all the people in a non-discriminative manner, in terms of age, gender or financial status among other factors (UN 2015). However, there has been a huge hindrance in achieving this and debates on the best possible way to get there have been ongoing. One of the directions that many countries are looking at is the Universal Health Coverage where healthcare is available and provided for all without any financial constrain to the patient or their household (Greer & Mendez 2015).

In order to achieve such, then it means that the health facilities should be accessible and have qualified personnel even at the lowest levels. This will enhance communities to be served efficiently and effectively.

Ease or difficulty in access to a health facility is mainly influenced by how far the patient is to the health facility. Therefore, distance has been identified as a key hindrance in achieving the universal health coverage efficiently. Shorter distances are supposed to have better health outcomes

Globally, longer distances have been associated with worse health outcomes (Kelly et al. 2016) . Though this cannot be quantified in the number of lives lost or morbidities in the patients, most studies have tilted the scale in favor of distance decay relationship, where frequency of access is determined by the ease.

However, unlike in the developed countries where longer distances are complemented by good road network infrastructure to ease access, in the Low-and middle-income countries (LMICs) it is not the case. For example, it could be easier to cover longer distance on a good road network at much shorter time than it is to cover relatively shorter distance on a bad road terrain (Bhatt & Bathija 2018).

In Africa, increase in mortality among pregnant women due to longer distance to access care for child birth have been reported (Quattrochi et al, 2020).

In Kenya, most of patients will use roads to access a health facility. Most of health facility are connected to a road network, which may be classified as paved or unpaved (earth/gravel). Most roads are unpaved (140,156.39KM), compared to the paved (21,295.11KM), causing a great challenge in access especially during some seasons like rainy ones (KNBS 2020). And most of the paved roads are mostly highways or found in the urban areas in major towns.

This imbalance in roads ratio means that access to a healthcare facility remain a challenge in Kenya, which is the most preferred channel of access. This means that poor patients in Kenya have to spend more cash on transport to access the health facilities and waste more man hours on the road (Kukla et al. 2017). It is therefore important to have mechanisms that shield patients from financial constraints while accessing care. Challenges in access have shown a decline in medical care need demand which has had a negative health outcome among the patients especially in the LMICs (O'Donnell 2007), beside proper access to healthcare being categorized as a basic human right by the World Health Organization (WHO 2021).

Medical treatment at any designated facility can be classified into inpatient or outpatient. While the former is defined by longer hospital stays for more than 24hours due to the complexity of the condition, the latter is characterized by a visit less than 24 hours. Due to the un complicated nature of a health conditions or illness, then there is a higher number of people seeking outpatient care than those seeking inpatient care (MoH 2014).

Most of the health facilities provide the outpatient care services including the public semi-private and private. Public facilities include the any facility whether referral hospital, county hospital health centers and dispensaries funded by tax payers. Semi-private include facilities subsidized by donors to offer the medical need that include mission health centers and dispensaries supported by NGOs and FBOs. Private facilities include individual or corporate owned facilities including private hospitals and clinics and large chemists and pharmacy shops (GOK 2014).

The Kenyan population has constantly increased over time creating a myriad of health related problems due to the fact that the health facilities are not sufficient enough to serve the increasing population. There is definitely the option of funding respective health need through seeking treatment in private hospitals but this could be out of reach for most of the population. With low employments, high illiteracy and a high age dependency burden then it means the few available resources are channeled towards other needs such as food and shelter. This increases vulnerability especially to the majority poor who mostly derive their livelihood by employment at informal sector with a meager pay(Faria 2020). Many Kenyans fall in this category of poor where the poverty index at 40% meaning they live below a dollar (1usd=110 KES) a day (Mejia-Mantilla 2020). With the high inflation and scarcity in opportunities, then it means that this group may be out of reach for health service as they have to use the cash to buy food. This beats the logic of indiscriminative access that

should be equal for all, especially when the facilities are out of reach and they are forced to walk long distance to access.

1.2 Statement of Problem

Access to uncompromised health care is a basic human right championed by both the UN and enshrined in the Kenyan constitution 2010. Every citizen should have ease of access to a health facility and get proper medical care irrespective of their financial status (WHO 2021).

Recently, the world bank projected that Kenya will have the greatest growth in the year and the fasted post covid-19 recovery economy in Africa. However, to ensure and sustain such a growth, then a stable National Health System needs to be in place.

What this means is that monies allocated for healthcare needs to be increased substantially to cover the loopholes that have existed for long in the system, however the decision makers are skeptical in increasing the funding thus leaving a huge gap that is supplemented by aid from developed countries who support several projects in the ministry including HIV and TB (Shiffman 2006).

To have an increase in health demand for the sick, then providing for proper accessibility for all to the health facility is desirable. The fairness in access is described as 'providing the needed service to the person in need at the right time in the right place' (Rogers et al 1999). Right place in our context would mean the facility where the patients is willing to seek care and not necessarily the nearest. The right place could be influenced by ability to pay, gender age or place of residence (Jordan et al. 2004).

Distance is the main determinant when it comes to equity in access of health care. Despite the fact that most health facilities are linked to road networks in Kenya, the terrain would determine ease or difficulty in access.

Outpatient care is a key determinant of a healthy population in two main ways. (1) The progression from a simple to a complicated health problem, if well attended to earlier could be diverted and (2) it has a direct effect on the financial effect on households in Kenya. Previous studies have reported catastrophic effects as a result of Out of Pocket (OOP) spending on health care leading to as many as 1.1 million Kenyans to poverty every year (Salari et al. 2019). Report by the Kenya Household Health and Utilization Survey indicated that Kenyans spend 48.4 Billion on health care through OOP spending of which outpatient care accounted for 78% (GOK 2014). This shows the need to

investigate the outpatient care access as it is a huge contributor to catastrophic spending among individuals in Kenya.

While most studies have focused on the effects of catastrophic spending through the OOP for outpatient care, few have focused on accessibility of the services. Most have focused on the actual amounts spend at the facilities as payment for the service, ignoring the distance covered to access the same. How long Kenyans are willing to travel to seek outpatient care will bring great benefits in formulating policies to encourage access. While we may not directly impose a monetary value to cost spend on distance covered, longer distances are associated with exhaustion and time wastage which could be potentially utilized in more meaningful activities.

To achieve the UHC, then debate on access cannot be ignored. Equity in access is a key determinant to achieve such. With existing research ignoring distance as a determinant of access, this study will analyze determinants of access by investigating what influences distance covered to access care. Existing knowledge gaps to inform policy for equity in access will researched.

1.3 Research Questions

i) What are the current distance patterns of patients seeking for outpatient healthcare in Kenya?

ii) What factors determine distance travelled by patients seeking for outpatient care in Kenya?

iii) Is there a better way to formulate policies that target outpatient care access to increase demand?

1.4 General Objectives

The general objective of this study is to determine factors affecting patients' distance in seeking for outpatient health care in Kenya**.**

Specifically, the objectives of the survey are to -:

i) To describe the current distance pattern of patients seeking outpatient healthcare in Kenya.

ii) To evaluate the factors that determine patients distance traveled to seek for healthcare access in Kenya

iii) To propose desirable policies that increase demand for outpatient care from objective 1 and 2 above.

1.5 Justification of the Thesis

It is clear that it is a fundamental human right to access primary care regardless of the financial status or region where an individual resides (Dassah et al. 2018). With a huge population growth of about 49 million people, and small constant increase in the number of health facilities, means that the few continue to be overstretched if the government has to guarantee a quality health for its citizens. Literature asserts that demand for outpatient is likely to triple in the next decade (Group 2020), and this is a reason to worry in developing countries due to the pressure that this may exert on governments that are having large debts and small growth in GDP

KHHEUS report indicated that the leading cause of catastrophic spending through OOP, is money spend for outpatient care. Outpatient care is the most sought among the ill, as it the most convenient to prevent a condition from deteriorating. If a condition is left unmanaged at an early stage, then it becomes prevalent and thus more expensive to treat leading to Disability-Adjusted Life Years (DALY) (WHO 2020).

KHHEUS reported that 19% of Kenyans sought out-patient services in Kenya (GOK 2014) in several health facilities, including private, public, NGO/FBO and local Pharmacist.

Among the people who sought care, women continued to exhibit more visits to the hospitals than men in Kenya. Latest research from Kenya shows that women continue to exhibit more visits per capita than men such that they had 4 visits per capita compared to men's 3 visits (GOK 2014).

Kenyans continue to bear high responsibility of health spending compared to GDP. For example, Treasury allocated 34.7 billion for use in MoH, however Kenyans continued to spend over 48.4 billion in outpatient. With the greatest out of pocket spending in cash linked to outpatient care. 6.2% of Kenyans continue to incur catastrophic spending in outpatient care alone (GOK 2014).

Despite numerous increases in number of health facilities, citizens still report large distances to access the outpatient care. Flexibility of choice of a given facility is determined by the fact that outpatient cases are not considered serious unlike inpatient where a closest facility may be preferred. Reports have indicated a negative impact on health outcome with longer distance, however, it is still important to investigate the reason why patients would prefer a facility that is far from reach when seeking care under out-patient care context.

1.6 Scope of the Study

With the increase in the number of people seeking outpatient care in the country with longer distances to access, there has been a corresponding increase in establishing more health facilities to handle these, especially in developing countries like Kenya. In this view, this present study analyzes the factors that are associated with distance travelled to access outpatient care by the sick. To this end the study will seek to establish the balance between choice and bypass by patients seeking outpatient care in 2018. The scope of this study is restricted to only the patients who sought outpatient care across all the forty-seven counties in Kenya, who had complete recorded information during the survey.

CHAPTER TWO:
LITERATURE REVIEW

2.1 Introduction

This chapter covers three areas. The first section provides the theoretical literature that will support this study. The second section provide empirical work that support the variables of choice to be used in this study, while the last section summarizes the empirical by showing the gap to be filled by this study.

2.2 Theoretical Literature

Grossman Theory for Health

The theory behind Grossman model is that an individual benefit directly from health and not healthcare. However, this concept seems complicated due to the fact that good health is derived from functioning healthcare. The individual's health is a function of several factors including gender, lifestyle, income of the individual, education level, poverty/income, among others.

In trying to estimate the amount of health needed by an individual, there are several considerations that need to be put into place which is a cumulative combination of, transport to a health facility, numbers of days admitted in case of inpatient care, charges for the consultation, charges for drugs or charges for counseling at the facility.

An indirect measure that Grossman theory addresses is the unmeasured cost incurred by the person accompanying the sick person to the hospital. It is clear there are costs on the man hours that this particular individual who accompanies the sick person to the facility.

(Heckman 2015) further expounded Grossman's theory in a different approach in that he argues that health can be evaluated as an economic good. He observes it in a two way whereby (1) as a production good, whereby he argues that when a person is in good health, then they are at a good place to be economically active and be useful in production of good and services.

Example, for one to be effective and productive in their day to day running of the activities, or for them to produce goods and services, then they need to be of good health and also good state of mind. This therefore cuts across physical and mental health (2) as a consumption good, because good health is consumed directly meaning everybody want to be healthier and to maintain good health. For example, an individual will do physical exercise such as attending the gym or running to keep fit and have direct benefit of keeping his body fit.

Or an individual will have regular medical checkups in order to rule out or treat any case of illness that could be unforeseen. for example, the regular cancer screening. All this is to enable them enjoy good health, and all the said activities are geared towards keeping healthy thus making health a good consumed directly.

Thus, according to Grossman, the responsibility of producing and consuming good health is the sole responsibility of the individual.

It is important to note that the production and consumption of the health can happen in different times or can happen concurrently. Example, an athlete who runs for money, is both producing and consuming at the same time. His running keeps his body fit while at the same time an economic activity.

Another dimension that Grossman's theory introduces is a general principle on the stock and depletion of health. This theory suggests that, when one is born, they inherit a given stock of health which is supposed to depreciate with time, however, how fast one depletes their stock depends entirely on how much they strive to maintain the good health status.

This is because good health prolongs life and increases an individual's output, therefore investing in it acts as a capital towards indirect production at both the household level (non-market) and work level (market). Generally, the two are interrelated in a way, and one is a function of the other in that; if an individual is not healthy, that means their ability to be productive is limited.

Therefore, the said individual has to rely on the others health to benefit from production of goods and services including food. This is further detrimental to the country as the dependency ratio increases, there is more burden to the those who can produce the goods and services, and this leads to more population being poor.

This introduces another concept where having good health should be viewed as a collective responsibility for prosperity of individuals which in turns prospers a nation in terms of reduced dependency burden and poverty.

Grossman's theory further argues that it is the responsibility of an individual to a proportionate time between leisure and work and use the outputs of both for his own benefit.

An individual will work to earn money/income, and as a result, their health is compromised and depleted meaning they would need to replenish it. One of the ways of replenishing gone stock is through relaxing exercising and sleeping.

Therefore, it is advisable for the individual to use the money generated from work to be spend on health, non-health resources and produce health capital to use in future. Income can be used to purchase healthy foods and fruits that assist in replenishing spend stock during work.

(Nocera & Zweifel 1998) argue that the level of health is not treated as exogenous but depends on the number of resources the individual allocates to the production of health.

A general application to our work on Grossman's theory is that, we are evaluating distance for outpatient care, on how much are the people willing to travel for the same. It is evident that outpatient care is not very serious condition and therefore, since an individual is both a producer and a consumer, they can solve some health conditions indirectly.

For example, a person who is obese and needs counselling services at a facility, or a woman who has recently given birth and needs family planning services at a facility. In such a scenario, the person can decide to walk some distance to the facility, and as he does so, then their body become fit to do other productive tasks.

Andersen and Newman's behavioral Theory

(Anderson 1995) proposed what was known as Andersen and Newman's behavioral model. It was to understand why and how people use healthcare services. This was to address the much problem of equity in access. It is evident from the formulation of the Anderson model, that the concern of how and when to access care is addressed.

(Anderson 1995) further argues that, it is possible to assess measure of access as well as understand the environment which has effect on healthcare utility. under this theory, policies inclined to equitable access to care should be put in place. This are not limited to improving the infrastructural access like roads, improve on the personnel in hospital by providing trainings and increasing the number of facilities depending on the population.

We argue that facilities which are close to the population but don't have the much-needed instruments to assure care, may be considered out of reach since they can't be utilized. Similarly, a facility that is close but cannot be accessed due to road issues doesn't solve the access issues.

In our own context of accessing outpatient care, then Anderson model addresses this issue directly as distance to access is influenced by several factors including gender, marital status, status of the health of the sick person, income e.t.c.

2.3 Empirical Literature

Type of facility opted by a patient in seeking care in relation to distance has been studied before. A study by (Muriithi 2013a) on determinants on health seeking behavior in Nairobi slum, found longer distances associated with patients choosing to visit formal health centers or informal (self-Medicare) . The study was conducted in Nairobi slum in Kenya and used a multinomial logit to analyze the data.

In the same study by (Muriithi 2013a) , he noted that people in better socio economic status were more likely to cover longer distances and spent more resources on travel so that they can seek care in private facilities. This shows disparities in access using wealth index are evident with the rich being at an advantage due to the availability of finances to access any service required. However, poor socio-economic status can force a person not to seek care at all (Njagi et al. 2020).

(Cernauskas et al 2018) conducted a study in India using a discrete choice method to determine factors influencing distance. In the study, they established that shorter distances were preferred by the people living in the urban areas. However, the patients were willing to travel for longer distance because they would get good proper care at the facilities, they were familiar with the doctors and good staff attitude.

A choice discrete model conducted (Albada & Triemstra 2009) among the elderly in a Dutch hospital found out that patients were willing to travel longer distances where there was short waiting time to see the doctor. In addition, higher education levels were associated with longer distances depicting the flexibility of the learned choosing facilities further apart due to quality of care. Also, the study reported longer distance among the lower age group than the older ones.

(Thaddeus & Maine 1994) evaluated the contribution of distance using a meta-analysis review and its contributions towards maternal mortality in Ghana, Nigeria and Sierra Leone. The study found out that pregnant women were more likely to travel longer to seek a service which was not close to their residence. This contributing to a decision of a delay in seeking emergency care resulting to high maternal mortality.

In addition, patients were willing to cover more distance to be attended to by staff they thought were very qualified. Further report by this study was longer distances because the facilities had ready medicine. Findings supported by (Honda et al. 2014) who conducted his study in South African using discrete choice experiment. They reported that patients were willing to travel for longer distance

because they were assured of medicine availability at the facility. The same study reported longer distances because the patients were more likely to spend enough time with the clinicians.

Evidence of longer distance for because of medicine availability and good staff attitude at the facilities was reported in a hospital in Amhara region, northern Ethiopia by (Berhane & Enquselassie 2015). This study was aimed at examining patients' preference for attributes related health care service. In their study, they used the random effect probit model for analysis. Further, patients were more likely to travel longer because of short waiting time to see the physician.

A mixed logit model was used by (Kruk et al 2011) to investigate the population preference for health care in relation to distance in Liberia. They found out that patients were willing to cover longer distance because they felt that the facilities, they visited offered them satisfaction and had medicine were available.

A study conducted by (Treacy et al 2018) using a qualitative approach on distance accessibility and cost in Sierra Leone found out that women were more likely to make more visits in facilities far away to access services which are not found close to them. The pregnant ones were more likely to make more visits for outpatient care than the average man.

In Zambia, patients traveled longer distance to facilities due to their cleanliness. This was through a study conducted by (Hanson et al. 2005) using a discrete choice experiment. An addition observation was the clinicians spend enough time with them in listening and diagnosing their illnesses.

In a study to access association of distance with mode of transport, longer distances were preferred by those who own private cars. This was through a qualitative meta-analysis study by (Syed et al. 2013) on transportation barriers to health access that compared several studies across countries..

In England, a binary logistic regression with a mixture of multinomial and nested logit models was used by (Robertson & Burge 2011). They found out that the rural traveled longer distance to access the facilities results supported by another study in Germany done by (Schang et al. 2017) who used qualitative and spatial analysis method. Further, great disparities between rural-urban were observed in the United States of America, with the rural having to travel further to access cancer treatment, because the facilities are far from their residence (Segel & Lenerich 2020). The study applied the multivariate linear regression model. In the same study, younger patients and those with high education levels preferred to cover longer distance because of satisfaction in the far facilities. In their work they documented how this has contributed to worse health outcomes for the rural patients.

An older population in Netherlands preferred to cover longer distance to the doctors who knew them if they were not near where they are. They felt the doctors who knew their history were more easy to deal with their cases and that their privacy was assured instead of having to start narrating their illness to a new doctor. They were opposed to the doctors delegating to a new physician because it would take time to build rapport like they already did. They also felt their information was safer with the doctors they are used to. This was through a study by (Nocera & Zweifel 1998).

(Berkelmans et al 2010) also found out that the staff courtesy at the facilities was a motivator in covering the distance to access. This was through a qualitative study in Netherlands. The patients also reported to be given special treatment when they visit the doctors who knew them because of the less time they would spent to see them.

Citizens of Denmark would prefer longer distance due to short waiting time at the facility. Using a logistic regression (Birk et al. 2011) further found out that less waiting time to see a physician was a motivator for patients to cover longer distances. The study was on the patients' experience in choosing outpatient care in the country.

A study in Ashanti region, Kumasi Metro area and Kwabre East District in Ghana found out that patients prefer traveling longer distance because medicine were available, doctors were available and they would spend less waiting time at the facilities to see the physicians. This was through a study conducted by (Boachie 2016) who used the multinomial logistic regression technique to ascertain the association with distance.

Poor people in Kenya were more likely to cover longer distance to access care in a modern facility, showing that the facilities were out of reach for the poor. In his work (Awiti 2014) observed a decrease in odds of access among the poor when injured or ill. He analyzed the Kenya Household Integrated Budget Survey (KIHBS) data using the multinomial probit model. The same was observed in western part of Kenya through a study by (Mwaliko et al. 2014), whose work was on "Not too far to walk": the influence of distance on place of delivery in a western Kenya. They applied the hot spot analysis in ArcGIS and the logistic regression method using data from health demographic surveillance system. From their works, they observed that western Kenyans were willing to cover longer distance to facilities if they were affordable.

Using multinomial nested logit models, (Kukla et al. 2017) observed that longer distances to facilities made Kenyans to prefer self-diagnose. This was through a study on the effects of cost on Kenyan

household's demand for medical care on why distance and time maters. The employed has better socio-economic status thus were willing to pay for longer distance to get care.

2.4 Overview of the Literature

It is evident that several factors would make patients travel further for different preference treatment. It is evidence that several factors could predict distance traveled to access healthcare services including medicine availability (4 studies), overall satisfaction of the services at the health centers (4 studies), familiar doctors/privacy (3 studies), good staff attitude (3 studies), short waiting at the facility to see a physician (3 studies), time spend with clinician (2 studies) and cleanliness of the facility (1). Others include wealth index (3 studies), place of residence (2 studies), education level (2 studies) and age (1 study).

While (Muriithi 2013a) argued that longer distances were associated with a choice of either visit to a formal or self-treatment, a gap exist on the choices among the formal. In the same study, while longer distances are termed expensive due to the cost, their study didn't factor in the new mode of transport like boda-boda that are relatively cheaper and are found in most places in the country. He also failed to realize that not all long distances require transport money, as people can opt to walk to access the hospitals. He further assert that people visit private hospitals are ready to spend, thus categorized as having better socio economic status, therefore can travel longer distance and while this narrative is true they portray a bigger picture of overall satisfaction at the expense of failing to bring out an important concept of travelling longer distance for either satisfaction, less waiting time to see a physician, time spent with clinician, staff courtesy at the facility, cleanliness of the facility, privacy at the facility and medicine availability. While his results could be generalized in urban slums in the country, there exist a gap on comparison of urban and rural people in terms of preference for longer distances. This notion motivated us to investigate the role that distance plays on Kenyans seeking outpatient care in 2018.

CHAPTER THREE:

METHODOLOGY

3.1 Introduction

This chapter entails a discussion of the methodology to be adopted. It includes a conceptual framework, model estimation and specification, definition, measurement and expected sign of the variables, data sources and concludes with data issues.

3.2 Conceptual Framework

The conceptual framework is based on conceptualization by the author where the dependent variable, the distance travelled to seek out patient care will be estimated based on several predictors. We base the frame work on the Anderson Behavioral model (Figure 1) by focusing on the Socio-Demographic factors, Hospital perspective and Other factors potentially affecting access for outpatient access care.

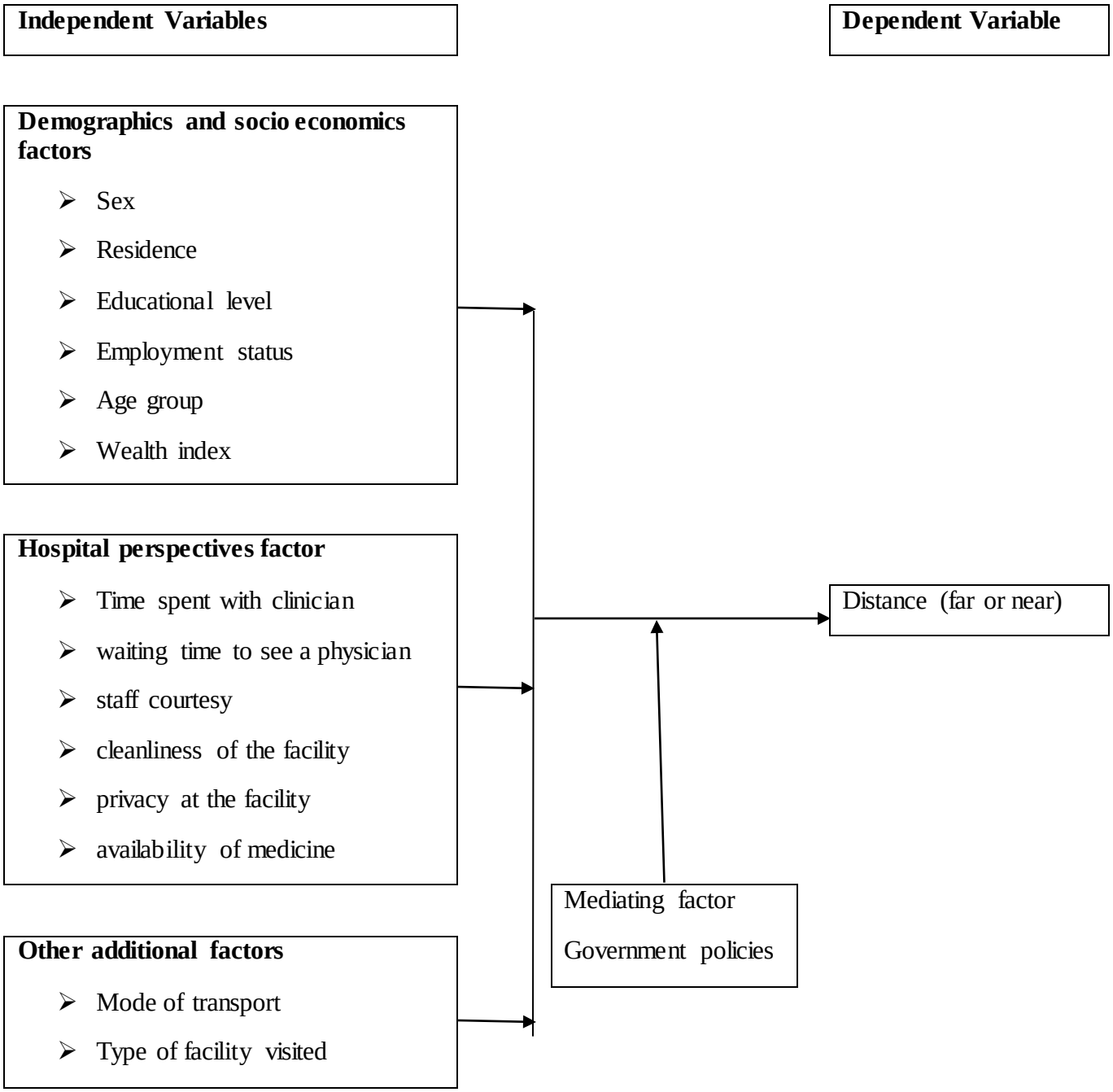

Figure 1: Conceptual framework **on Factors determining distance traveled to access outpatient care based on the Anderson behavioral model (*Source: Author*).**

3.3 Model Estimation and Specification

This work will estimate the relationship between the dependent (which is continuous but converted to a binary) and the predictors using a probit model. The choice of this approach is guided by the fact that the patients seeking outpatient services either covered long or short distances to the facilities.

Let Y_i be the status of distance covered by individual i who sought out-patient services in Kenya in 2018. This dependent variable is defined in such a way that $Y_i = 1$ if patient i traveled long distance and $zero$ otherwise.

Define a vector $\mathbf{x_i} = \mathrm{x_{i1}}, \mathrm{x_{i2}}, \ldots, \mathrm{x_{iq}}$ which contains q continuous independent random variables and vector $w_i = w_{i1}, w_{i2}, \ldots, w_{ip}$ which contains p categorical independent random variables whereby, the first component is the intercept.

The study assumes the outcome variable y_i is Bernoulli distributed as $y_i|\pi_i Bernoulli(\pi_i)$ with an unknown mean $E(y_i) = \pi_i$ being related to the independent variables as

$$h(\pi_i) = x_i'\beta + w_i'\phi$$

Such that $h(.)$ is a probit link functions, $\boldsymbol{\beta}$ is a q dimensional vector of regression coefficients for the continuous independent variables and p is a ϕ dimensional vector of regression for categorical independent variables.

The probit model uses the cumulative distribution function of the standard normal. The dependent in this study, distance to access health care facility for outpatient care, takes the value 1 if the distance is long and 0 for short distance. The interpretation of the dependent variable was likelihood of a patient traveling long distance to access outpatient care with presence of other covariates supported by other studies in the literature. The following model shows the association of the dependent and the covariates as

$$Y = x_i\beta + \epsilon$$

Where Y is the dependent, x_i is vector of covariates, β a vector of parameters to be estimated and ϵ is the error term.

Distance was presented as a function of the covariates; residence, wealth index, mode of transport, facility type, education level, employment status, sex, time with clinician, waiting time, staff courtesy, cleanliness of facility, privacy, medicine availability and age.

The probit model is shown as

$$Distance = f(\beta_1 Residence_i + \beta_2 wealth.Index_i + \beta_3 Mode.transport_i + \beta_4 Facility.Type_i + \beta_5 Education.level_i + \beta_6 Employment + \beta_7 Sex_i + \beta_8 Time.Clinician_i + \beta_9 Time.Waiting_i + \beta_{10} Staff.courtesy_i + \beta_{11} Facility.Clean_i + \beta_{12} Privacy_i + \beta_{13} Medicine.Available_i + \beta_{14} Age_i) + \epsilon$$

We use STATA version 14 for our analysis.

3.4 Variable description

Distance covered to access outpatient care was captured as continuous variable. Patients were asked how much distance they travelled to get the care from the facility where they sought care and it was recorded in Kilometers. This was later converted into binary to differentiate those who covered long distance versus those who covered short distance. Education level was recorded for the highest successful completed stage at each level with. This was captured in four levels, no education, primary, secondary and post-secondary education. Residence is where the patient lived during the survey period, in which was divided into urban and rural. Facility type was the type of hospital that the patient visited and this was captured as private, mission or public. Mode of transport was captured in 4 levels. There are those who walked to the facility, used public vehicles, used private cars and those that used the motorcycle. Those who had a source of income were classified as employed while those who didn't were unemployed. Five different wealth quintiles ranging from poorest to richest were created to differentiate patients in different socio-economic status. Age was a continuous variable ranging from 18 to 96 years old. Satisfaction of the overall service offered, time with clinician, staff courtesy, availability of medicine, cleanliness of facility and privacy were recorded as satisfied or not. Total amount paid at the facility was captured as monies paid to the facility after the outpatient care service and was captured in Kenya Shillings. Finally, household size was in three levels with small size comprising 1-3 members, medium size 4-6 members and large size 7 members and above.

The following **Table 3.1** summarizes the variables

Table 3.1 Table of Variables

Variables	Variable Definition	Measurement	Sign	Article
Dependent				
Distance	Distance travelled to seek out patient care	Dummy variable: 1 If distance is > 3KM, Long 0 if distance is < 3KM, short		
Independent				
Education	Level of education attained	Dummy variable 0 no education 1 Primary 2 secondary 3 post-secondary	+ +	Albada & Triemstra(2009) Segel & Lengerich (2020)
Sex	Whether male or female	0 if Male 1 if Female	-	Treacy et al (2018)
Employment status	Type of employment	Dummy Variable 0 if Not Employed 1 if Students	+ +	Mwaliko et al (2014) Kukla et al (2017)
Wealth Index	Levels from poor to rich	Dummy Variable 0 if Poorest 1 if Poor 2 if Middle 3 if Rich 4 if Very Rich	+ + + +	Muriithi (2013) Njagi et al (2020) Awiti (2014) Mwaliko et al (2014)
Time spend with clinician	Whether the patient was satisfied with time they spend with clinician	0 if not satisfied 1 if satisfied	+ + +	Honda et al (2014) Berkelmans et al (2010) Boachie et al (2016)
Waiting time to see a doctor	Whether the patient was satisfied with	0 if not satisfied	+	Albada & Triemstra (2009)

	time they waited to see a doctor	1 if satisfied	+	Berhane & Enquselassie (2015)
			+	Berkelmans et al (2010)
			+	Birk et al (2011)
Staff courtesy	Whether the patient was satisfied with courtesy of the staff at the facility	0 if not satisfied	+	Cernauskas et al (2018)
		1 if satisfied	+	Thaddeus and Maine (1994)
			+	Berkelmans et al (2010)
Cleanliness of the facility	Whether the patient was satisfied with cleanliness of the facility	0 if not satisfied	+	Hanson et al (2005)
		1 if satisfied		
Privacy	Whether the patient was satisfied with privacy at the facility	0 if not satisfied	+	Nocera & Zweifel (1998)
		1 if satisfied		
Medicine availability	Whether the patient was satisfied with medicine availability at the facility	0 if not satisfied	+	Thaddeus and Maine (1994)
		1 if satisfied	+	Honda et al (2014)
			+	Berhane & Enquselassie (2015)
			+	Kruk et al (2011)
			+	Boachie et al (2016)
Residence	Place of residence of the patient	Dummy variable:	+	Cernauskas et al (2018)
		0 if rural,	+	Robertson & Burge (2011)
		1 if urban	+	Schang et al (2017)
			+	Segel & Lengerich (2020)
Mode of transport	The mode of transport used by the patient	Dummy Variable	-	Syed et al (2013)
		0 if walking		
		1 if Private car/Taxi		
		2 if Bicycle/Motorcycle		

		3 if Public transport		
Age	Age of the patient seeking care	Variable captured in full years	+ - -	Albada & Triemstra (2009) Segel & Lengerich (2020) Nocera & Zweifel (1998)
Facility Type	Type of facility used by the outpatient to seek care	Dummy variable: 0 if Referral/County hospital 1 if Private Hospitals/clinics 2 if Government health centers 3 if NGO/FBO clinics	+	Muriithi (2013)

3.5 Data Sources

This work used the data from the Kenya Household Health Expenditure and Utilization survey 2018, which contains the dependent variable of interest and the predictors. This was a cross sectional survey data that covered all the 47 counties in Kenya. 34, 000 households were sampled for the survey. Our interest lies on the self-reported distance to access outpatient care were recorded from 6191 individuals, who visited different health facilities in Kenya in 2018. This was captured and recorded in kilometers as a continuous variable. Later, a binary response, short (less than 5km) or long (Greater than 5km) distance was created.

This is in recommendation to the World Health Organization of population living within 5km of access to a health facility (Carol Perks 2006) and those who live farther than this will be considered deprived and in high need of health facility resources.

Using the generalized linear model framework, we analyzed the binary response adjusting for several covariates including mode of transport, type of health facility, employment status, level of education, age-group and wealth index among others.

3.6 Data issues

Multi-collinearity: Is a data issue that comes about when any of the predictor in multiple regression model can be predicted from the others. Evaluation of the variances from the model will assist in

determining model best fit. We used the Variance Inflation Factor approach to verify how best our model does. We employed the VIF() function in the car package in R software developed by (Fox &) to detect multi-collinearity using the function vif (mode1), such that, our model will be updated by removing the predictor variables with high VIF value(>5).

Normality: Normality is violated in the data when it depicts skewness characteristic. This is usually observed in the continuous data. We employed the Anderson-Darling normality test for the continuous variables to test normality. If there is continuous violation of the normality, then the variables will be log transformed in the probit model then later exponentiated for result interpretation.

CHAPTER 4

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents results from the data analysis with interpretation and discussion on the predictors of distance to access outpatient care in Kenya. The inferential statistics are presented as the model while the descriptive are presented in tables. The P-values of the computed Z scores are presented and interpreted depending on their significance.

4.2 Descriptive Statistics

Table 4.1. A summary of the demographics and socio-economic factors, hospital perspective and other additional factors

Table 4.1 Descriptive characteristics

Variable	Obs	Mean	Std. Dev.	Min	Max
Distance	6,191	0.424971	0.494378	0	1
Mode of Transport	6,191	2.32208	0.922854	1	4
Facility type	6,191	1.45971	0.612431	1	3
Residence	6,191	1.38055	0.485561	1	2
Sex	6,191	1.64916	0.477269	1	2
School Category	6,191	2.229527	0.794452	1	4
Employment Category	6,191	0.605395	0.488805	0	1
Wealth Index	6,191	3.054595	1.345581	1	5
Age	6,191	43.47101	17.93085	18	96
Overall Satisfaction	6,191	1.11016	0.313114	1	2
Satisfied with Time spend with clinician	6,191	0.917622	0.274961	0	1
Satisfied with staff courtesy	6,191	0.924568	0.264109	0	1
Satisfied with Medicine Availability	6,191	0.80084	0.399401	0	1
Satisfied with facility cleanliness	6,191	0.946858	0.224334	0	1
Satisfied with facility privacy	6,191	0.953965	0.209577	0	1
Household size	6,191	1.066387	0.286395	1	3
Total paid for outpatient care	6,191	1649.905	3764.126	1	90000

A total of 6191 individuals aged between 18 and 96 years who visited the facilities were investigated. The mean age of the patients was 56 years old. There was twice the number of women (64.92%) than men, with majority of patients living in rural areas (61.94%) and slightly below two thirds visited public facilities (60.36%).

Four out of ten preferred motor cycle (43.32%) as a means of transport while two thirds had a source of employment (60.54%).

There was equal number of those who never went to school (18.8%) and the poorest quintile (17.17%). Majority of the patients, nine out of ten, reported overall satisfaction (88.98%), with decreasing individual satisfaction decreasing from privacy (95.40%), facility cleanliness (94.69%), staff courtesy (92.46%), time spent with clinician (91.76%) and least satisfaction reported on availability of medicine (80.08%).

Total paid for outpatient care was a minimum expenditure of KES 1, the maximum was KES 90000. The mean was 1650 with a median of 600 depicting skewness on the OOP expenditure.

4.3 Diagnostic pre-estimation tests

This research aimed at achieving valid, accurate and reliable estimates on the influence of several factors in relation to distance for outpatient care. The following test were carried out to find out how fit the data was for this type of application. Anderson Darling for Normality test, Variance inflation factor and correlation analysis.

4.3.1 Normality; Anderson-Darling test.

The A-D test is used to test the null hypothesis that the data follows a normal distribution. **Table 4.2** shows the Anderson normality test on the continuous variable out of pocket spending. Since the p value is below 0.05 significance level, then we reject the null and conclude there is sufficient evidence that our data does not follow normal distribution.

Table 4.2 Anderson Darling Normality test on Total paid for outpatient care

A-D test statistic	1,077.60
P value	0.001

Since total paid for outpatient care violates the normality, we log transform it in our probit regression model. Although age is continuous variable, we didn't subject it to the A-D test since we only considered age from 18 to 96, but for robustness of the model, we tested if the age squared had any effects on the general model performance.

4.3.2 Correlation and Multicollinearity testing

Table 4.3 presents the correlation matrix table among the independent variables. Among the covariates selected and analyzed, none depicted a perfect positive (+1) or negative (-1) correlation, but there were very weak values of correlation between the variables.

Table 4.3 Correlation Matrix on the covariates

Variable	Sex	Residence	Facility Type	Mode of Transport	Education status	Employment	Wealth Index	Age	Overall Satisfaction	Time with clinician	Staff courtesy	Medicine Availability	Cleanliness of facility	Privacy	Household size	Total paid at facility
Sex	1.000															
Residence	0.016	1.000														
Facility Type	-0.006	0.129	1.000													
Mode of transport	-0.028	0.033	0.007	1.000												
Education status	-0.093	0.208	0.055	-0.024	1.000											
Employment	-0.216	0.016	0.010	-0.023	0.123	1.000										
Wealth Index	0.006	0.479	0.174	-0.048	0.437	0.123	1.000									
Age	-0.071	-0.127	-0.046	-0.023	-0.372	0.129	-0.130	1.000								
Overall satisfaction	-0.001	0.010	-0.102	0.000	-0.041	-0.029	-0.035	-0.002	1.000							
Time with clinician	-0.016	-0.011	0.094	0.009	0.032	0.026	0.021	0.008	-0.531	1.000						
Staff courtesy	-0.018	-0.032	0.098	-0.015	0.024	0.030	0.010	0.003	-0.476	0.504	1.000					
Medicine Availability	-0.009	-0.013	0.160	0.004	0.029	0.000	0.014	-0.033	-0.482	0.391	0.415	1.000				
Cleanliness of facility	0.019	-0.025	0.085	-0.005	0.039	0.030	0.026	-0.015	-0.377	0.408	0.472	0.327	1.000			
Privacy	0.005	-0.022	0.079	0.007	0.049	0.029	0.035	-0.010	-0.378	0.472	0.530	0.313	0.556	1.000		
Household size	-0.032	-0.013	-0.009	0.015	0.048	-0.189	-0.016	-0.161	0.003	0.010	0.000	0.011	-0.003	0.011	1.000	
Total paid at facility	-0.030	0.032	0.052	-0.043	-0.006	-0.002	0.046	0.110	-0.009	0.021	0.006	0.016	-0.001	-0.004	0.011	1.000

The VIF quantifies how much variance is inflated with value of <4 showing no correlation among the variable with the others. Values showing a VIF greater than 4 should be removed from the model, but since all the VIF values as presented in **Table 4.4** are less, then we retain all the covariates to use in the probit regression model.

Table 4.4 Variance Inflation Factor

Variable	GVIF	Df	GVIF^(1/(2*Df))
Sex	1.08565	1	1.041945
Residence	1.345916	1	1.160136
Facility Type	1.142601	2	1.033888
Mode of Transport	1.279671	3	1.041957
Educational Level	1.633567	3	1.085233
Employment	1.183563	1	1.087917
Wealth Index	1.836273	4	1.078927
Log(Total paid for outpatient)	1.241877	1	1.114395
Age	1.332158	1	1.154192
Overall satisfaction	1.664438	1	1.290131
Time with Clinician	1.676816	1	1.294919
Staff Courtesy	1.750595	1	1.323101
Medicine Availability	1.437991	1	1.199162
Cleanliness of the Facility	1.570082	1	1.253029
Privacy	1.700877	1	1.304177
Household Size	1.112632	2	1.027041

Sex, facility type, mode of transport, employment, wealth index, age, privacy and household size had negligible correlation amongst themselves, a value between -0.3 and 0.3.

Wealth index with residence and Education status; Education status and age; Overall satisfaction with staff courtesy, medicine availability, cleanliness of facility and privacy; Time with clinician with medicine availability and cleanliness of the facility; Staff courtesy with medicine availability and cleanliness of facility; Medicine availability with cleanliness of the facility and privacy, depicted a low positive correlation (0.3 to 0 0.5) or low negative correlation (-0.3 to -0.5).

Moderate positive correlation (0.5 to 0.7) was observed in, Time with clinician with staff courtesy; staff courtesy with privacy; and cleanliness with privacy with a moderate negative correlation (-0.5 and -0.7) observed in overall satisfaction with overall time spent with clinician.

From the correlation matrix, there was no strong positive or negative correlation, however some correlation existed and therefore it was apparent to subject the covariates to further test to determine

if all the covariates could be used in the model, or we needed to drop some. We therefore adopted the variance inflation factor test for this.

Econometrics Results

Table 4.5 present the econometrics results from the Probit model, depicting estimated coefficients, standard error, z values and p values. Only the rural residence, private facilities walking, motorcycle and private as means of transport; secondary school education, wealth index and log (OOP) spending were statistically significant. Out of pocket spending decrease with distance, meaning affordable facilities are located far away.

Table 4.5 Probit estimates of the factors influencing distance when accessing outpatient care in Kenya

Variables	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Sex (ref: female)						
Male	-0.032	0.039	-0.81	0.415	-0.109	0.045
Residence (ref rural)						
Urban	-0.483***	0.044	-11.08	**0.000**	-0.568	-0.397
Facility Type (ref: Public facilities)						
Private	-0.330***	0.042	-7.88	**0.000**	-0.412	-0.248
Mission/FBO/NGO	-0.11	0.076	-1.45	0.148	-0.26	0.039
Mode of Transport (ref:public)						
Walking	-1.786***	0.061	-29.22	**0.000**	-1.905	-1.666
Motorcycles	-0.936***	0.046	-20.14	**0.000**	-1.027	-0.845
Taxi/personal cars	-0.446***	0.075	-5.93	**0.000**	-0.593	-0.298
School category(ref:Never went to school)						
Primary	-0.115**	0.054	-2.14	**0.032**	-0.221	-0.01
Secondary	-0.140**	0.062	-2.27	**0.023**	-0.261	-0.019
Post-Secondary	-0.214	0.11	-1.94	0.052	-0.43	0.002
Employment status (ref:Non employed)						
Employed	-0.073	0.04	-1.83	0.068	-0.152	0.005
Wealth Index(ref:Poorest)						
Poor	-0.045	0.059	-0.76	0.448	-0.16	0.071
Middle	-0.240***	0.059	-4.08	**0.000**	-0.355	-0.125
Rich	-0.325***	0.062	-5.23	**0.000**	-0.447	-0.203
Richest	-0.523***	0.078	-6.7	**0.000**	-0.676	-0.37

Age	0.001	0.001	0.81	0.416	-0.001	0.003
Overall satisfied?(ref:no) Yes	0.011	0.074	0.15	0.88	-0.134	0.156
Time with clinician (ref:not satisfied) Satisfied	-0.02	0.083	-0.25	0.805	-0.183	0.142
Staff courtesy (ref: not satisfied) Satisfied	-0.096	0.089	-1.08	0.28	-0.271	0.078
Availability of medicine(ref:Not satisfied) Satisfied	0.082	0.054	1.52	0.128	-0.024	0.189
Cleanliness of the facility (ref: not satisfied) Satisfied	-0.005	0.101	-0.04	0.965	-0.203	0.194
Privacy(ref:not satisfied) Satisfied	0.254**	0.113	2.25	**0.025**	0.032	0.475
Household size (ref: small[1-3])						
Middle[4-6]	-0.032	0.089	-0.36	0.722	-0.207	0.143
large[7+]	-0.151	0.183	-0.82	0.411	-0.51	0.209
Log(Total paid)	0.166***	0.014	12.08	**0.000**	0.139	0.192
Intercept	0.04	0.173	0.23	0.816	-0.298	0.379

The log likelihood of fitted model is -3181.38. ***, ** and *indicates significance level at 1, 5 and 10%, respectively;

Number of observations=6191
LRchi2(25)=2079.85
Prob>chi2=0.000
Pseudo R2=0.2464

Number observations are 6191, with p-value of the log likelihood chi square ratio is 0.00 and an R-squared value of 0.2464. This shows joint significance of predictors in explaining distance and 24.64% of the change in distance is explained by the change in these predictors.

The coefficient of urban is -0.483. This negative coefficient of the urban residence shows that those living in urban areas are less likely to cover long distance for outpatient care. The negative coefficient of 0.333 shows that private facilities are more reachable than the public facilities. Those who walked (-1.786), used motorcycles (-0.936) and taxi (-0.466) were less likely to cover long distance compared to the public. Those who attended primary school (-0.115) and secondary school (-0.140) are less likely to cover long distance compared to those who never went to school. The coefficients for middle (-0.240), rich (-0.325) and richest (-0.523) are all negative and show that they

are less likely to cover longer distance compared to the poorest. The positive coefficient value of 0.254 shows that people were more likely to travel longer distance for privacy. Longer distances were associated with more payments at the facilities with a positive coefficient of 0.166.

Table 4.6 Marginal Effects table

yvar	*dF/dx*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf. Interval]*	
Sex (ref: female)						
Male	-0.012	0.015	-0.81	0.416	-0.042	0.017
Residence (ref rural)						
Urban	-0.181***	0.016	-11.48	**0.000**	-0.212	-0.15
Facility Type (ref: Public facilities)						
Private	-0.125***	0.015	-8.06	**0.000**	-0.155	-0.095
Mission/FBO/NGO	-0.043	0.03	-1.46	0.144	-0.101	0.015
Mode of Transport (ref:public)						
Walking	-0.611***	0.016	-38.34	**0.000**	-0.642	-0.579
Motorcycles	-0.356***	0.016	-22.14	**0.000**	-0.388	-0.325
Taxi/personal cars	-0.163***	0.028	-5.72	**0.000**	-0.219	-0.107
School category(ref:Never went to school)						
Primary	-0.045**	0.021	-2.13	**0.033**	-0.086	-0.004
Secondary	-0.055**	0.024	-2.26	**0.024**	-0.102	-0.007
Post-Secondary	-0.082**	0.042	-1.98	**0.047**	-0.164	-0.001
Employment status (ref:Non employed)						
Employed	-0.028*	0.016	-1.83	0.068	-0.059	0.002
Wealth Index(ref:Poorest)						
Poor	-0.018	0.023	-0.76	0.448	-0.064	0.028
Middle	-0.094***	0.023	-4.09	**0.000**	-0.14	-0.049
Rich	-0.127***	0.024	-5.24	**0.000**	-0.174	-0.079
Richest	-0.198***	0.029	-6.91	**0.000**	-0.254	-0.142

Age	0	0	0.81	0.416	-0.001	0.001
Overall satisfied?(ref:no)						
Yes	0.004	0.029	0.15	0.88	-0.052	0.06
Time with clinician (ref:not satisfied)						
Satisfied	-0.008	0.032	-0.25	0.806	-0.071	0.055
Staff courtesy (ref: not satisfied)						
Satisfied	-0.038	0.035	-1.07	0.284	-0.106	0.031
Availability of medicine(ref:Not satisfied)						
Satisfied	0.032	0.021	1.53	0.125	-0.009	0.072
Cleanliness of the facility (ref: not satisfied)						
Satisfied	-0.002	0.039	-0.04	0.965	-0.078	0.075
Privacy(ref:not satisfied)						
Satisfied	0.094**	0.04	2.36	**0.018**	0.016	0.172
Household size (ref: small[1-3])						
Middle[4-6]	-0.012	0.034	-0.36	0.72	-0.079	0.055
large[7+]	-0.057	0.067	-0.84	0.399	-0.189	0.075
Log(Total paid)	0.064***	0.005	12.06	**0.000**	0.053	0.074

***, ** and *indicates significance level at 1, 5 and 10%, respectively;

Table 4.6 shows the marginal effect of the significant variables. The probability of covering long distance to access outpatient care depends on the marginal effects that are computed from the covariates similarly used in the probit regression model. This show change in probability of travelling for the care. Only the urban residence, private facilities walking, motorcycle and private as means of transport; secondary school education, satisfaction, wealth index and log (OOP) spending were statistically significant.

Based on the marginal effect of the model for the urban shows that the probability of a person living in urban area travelling long distance for outpatient care is 18.1% less than a person living in a rural area. While accessing a public facility for outpatient care compared to a private one, you are likely to cover longer distance by 12.5%. Public transport is the most preferred means for accessing health facilities that are far away compared to walking (61.1% less likely to cover long distance), motorcycle (35.6% less likely to cover long distance and private cars/taxis (16.3% less likely to cover long distance). Those who attended primary, secondary and post-secondary school were 4.5%, 5.5% and 8.2% likely to cover short distance compared to those who never went to school.

Being in middle, rich and richest wealth quintile reduced the probability of covering long distance by 9.4%, 12.7% and 19.8% compared to the poorest.

Those seeking privacy were 9.4% likely to cover long distances than those not concerned with privacy. Higher costs for care were associated with longer distances with high probability of 6.4% compared to short distances.

Discussions of results

This research project focused on analyzing the factors that predict distance travelled to access outpatient care in Kenya. Probit model is an important method of determining predictors of distance for outpatient care. In this study, using the KHHEUS data on outpatient care, taking advantage of the marginal effects in probit models to estimate the probabilities of distance for people aged between 18 and 96 years old.

Based on the analysis using the probit regression model, we found out that only the rural residence, private facilities walking, motorcycle and private as means of transport; secondary school education, wealth index and log (OOP) spending were statistically significant.

It is worth noting that outpatient care is the greatest contributor of catastrophic spending in Kenya, with expenditures totaling to Kshs 92.9 Billion spend in 2018 (GOK 2018), and thus a good area that need further research. Catastrophic spending has been identified as the most contributor hindrance towards achievement of the UHC. Also, outpatient care is the most demanded type, as it seeks to treat mild cases that are meant to strengthen health system by reducing progression of cases that may be difficult to treat. Outpatient care continues to be on high demand, with over 9.1 million visits in 2018 (GOK 2018) and is expected to increase in the coming decade.

Our work has identified five outstanding predictors for distance using the marginal effects in the probit model.

First, living in rural area increases the probability of covering long distance. This is in line with other studies (Cernauskas et al 2018, Robertson et al. 2019, Schang et al. 2017, Segel & Lengerich 2020), as they confirm living in a rural is a good predictor of long distance when accessing care.

Second, visiting a public facility compared to a private facility, is likely to increase probability of long distance by, showing that public facilities are still out of reach for Kenyans. This is in sharp contrast to the findings reported by (Chow et al. 2013) which found that private facilities are sparsely

distributed and only established in areas where there is sufficient demand. However, we can possibly argue that although the public facilities are in most places, private facilities have better quality care than public a finding similar to (Muriithi 2013b) who observed greater demand for private facilities in Nairobi. Additionally, the Kenya Master Health Facility List (KMHFL), public health dispensaries are among the most evenly distributed in the country (MoH 2021), but they lack personnel and medicine to attend day to day to people who are in need. This finding, indirectly complements a survey done by (GOK 2005), who reported that although government facilities were nearer, only 3 residents out of 10 visited them.

Third, the distance decreased across the wealth quintile from middle to the richest, compared to the poorest. This study has already established a preference for private facilities. This finding show that the private facilities which were closer, were mostly utilized by people with better socio economic status. This study is consistent with (Awiti 2014) who found out that the poor covered long distance for care.

Fourth we establish an association of education and distance in which the less educated travelled more. Better socio economic status are linked to education, whereby the most educated are more likely to have better sources of income. This further confirms our results in which we had established a distance decay in relationship to wealth index across the quintiles. A further notion asserted by (Albada &, Muriithi 2013b) who reported that the educated are more able to distinguish quality care, and further that provision of quality healthcare is more in private facilities.

Fifth, the work has established a preference of covering long distance using public transport, perhaps to access the public facilities by those sick. We have already noted that the preferred public facilities were located further and there is high probability that those needing care used them for access. This is in complete contrast to study by (Syed et al. 2013) who reported longer distance were more used by private cars/taxi. However, their study was based in a first world country and may not be generalized to our setting being a member of LMIC. In the Kenyan contest, we see that the private cars/taxis are mostly owned by the wealthy, are preferred for short distances and mostly used to access the private facilities.

Sixth, we established an association of longer distance with privacy, and supports the idea by (Nocera & Zweifel1998) who found out patients willing to travel for long distance to meet familiar doctors they could trust.

Finally, a positive association of amount spend for car has a positive sign with long distance, showing people tend to spend more when they access facilities far away. While it is the general notion that people would travel more for cheaper facilities, our results are opposite. This possibly could be explained by the fact that people would have travelled longer to seek services which were not available at the closest facilities but much cheaper in the public facility. These are services such as cancer screening and dialysis. As is expected, these services are generally cheaper in public facilities, but the location may be far as not all public facilities have this kind of services.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter covers the summarized results of the key findings and policy implication

5.2 Summary of the Study

In chapter one, we sought to identify the problem associated with distance when seeking for outpatient care in Kenya. We reviewed global, region and local materials to establish how far this problem has been studied and potentially identify gaps to be filled. After careful study, we did see that although distance was a common hindrance towards achieving good care at facilities, a gap regarding the factors that influence it existed. Most of the literature we came across was evaluating choice to a facility, trying to answer question "why did you choose the facility for care" and bypass of the facility, trying to address the question "why did you by pass the nearest health facility". Reviewing the literature, we identified that most of the answers were more perspective. Therefore, we sought to identify a better way to complement this questions and that was by the way of analyzing distance as the dependent, and other potential covariates as independent.

In chapter 2, we carefully reviewed theories that support this study, and among the theories were the Grossman theory and Anderson & Newman theory. We then reviewed the empirical literature that links factors to distance in accessing outpatient care. This were Sex, Residence, Facility Type, Mode of Transport, Educational Level, Employment, Wealth Index, Total paid for outpatient, Age, Overall satisfaction, Time with Clinician, Staff Courtesy, Medicine Availability, Cleanliness of the Facility, Privacy and Household Size

In chapter 3, we came up with the conceptual framework that linked the factors identified in the literature with our dependent. In the framework, we had 3 different categories of variables including demographic and socio-economics factors, hospital perspective factors and other potential factors that is associated with distance. We also highlighted government policies as potential mediating factors. We then went ahead to describe the model estimation methods together with all the assumptions, strength and limitations.

In chapter 4, we described the results from the models, both significant and non-significant ones. Our study findings indicate a relationship exists between the long distance and other covariates such as residence, facility type, education level, wealth index, privacy, user fees paid at the facility and mode of transport. The key finding of this study showed that the rural residence, less educated and the poorest travelled longer distances for outpatient care

5.3 Conclusions

In conclusion, this project has identified five predictors of distance when seeking for outpatient care. This include living in a rural residence, visiting a private facility, having a primary or a secondary education level, walking, motorcycle and private cars as means of transport and finally wealth index category middle, rich and very rich.

With lots of challenges existing on analyzing distance, which poses a challenge of non-normality and is mostly self-reported, the best mechanism was to analyze it as a binary, by recoding the continuous variable using method proposed by (Mwaliko et al. 2014), and recommendation by (Carol Perks 2006) in which we assumed those living within 5 km are within reach and the others are without reach. This work therefore provided proxy on how distance can be predicted from potential covariates.

The findings however show that there was no significant relationship of sex, employment, age, overall satisfaction, availability of medicine, cleanliness of the facility, and household size with distance.

With UHC becoming a topic of interest internationally, one of the ingredients of achieving it lies on access to the facility, because no matter how good policies we have, if the facilities are out of reach, then this remains just a dream.

5.4 Recommendations

Our results have clearly shown the role that education plays in terms of access. An indirect association has also been established in this work, in that the educated travel longer, but mostly visit private facilities. Our finding that shows people travel longer to access public facilities shows that policies targeting improving services at the public health facilities needs to be put in place to encourage access. Additionally, we have seen the rural residence probability of covering long distance increases by 18.1%. And most of those seeking the service prefer to use public means. This

clearly shows how out of reach the facilities are to the rural residence. Policies targeting more well equipped health facilities in rural areas need to be put in place. Policies targeting reduction of poverty and access to quality education need to be put in place in order to empower Kenyans on facility choice and ability to afford the services.

5.5 Areas of Further Research

Our study has only focused on outpatient care predictors as a way of complementing choice and by pass. Our work was limited by the fact that there were lots of missing data and our study only considered complete data. A further study that will factor in imputation of missing data would be very appropriate to support or critique findings of this study. This way, the government can have at disposal several policy documents to refer to when designing programs that will accelerate achievement of the UHC

References

1. Albada, A. & Triemstra, M. (2009), 'Patients' priorities for ambulatory hospital care centres. a survey and discrete choice experiment among elderly and chronically ill patients of a dutch hospital', *Health expectations : an international journal of public participation in health care and health policy* **12**(19250155), 92–105. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5060473/
2. Andersen, R. M. (1995), 'Revisiting the behavioral model and access to medical care: Does it matter?', *Journal of Health and Social Behavior* **36**(1), 1–10. http://www.jstor.org/stable/2137284
3. Awiti, J. O. (2014), 'Poverty and health care demand in kenya', *BMC Health Services Research* **14**(1), 560. https://doi.org/10.1186/s12913-014-0560-y
4. Azevedo, M. J. & Azevedo, M. J. (2017), The state of health system(s) in africa: Challenges and opportunities, *in* 'Historical Perspectives on the State of Health and Health Systems in Africa, Volume II: The Modern Era', Springer International Publishing, Cham, pp. 1–73. https://doi.org/10.1007/978-3-319-32564-4_1
5. Berhane, A. & Enquselassie, F. (2015), 'Patients' preferences for attributes related to health care services at hospitals in amhara region, northern ethiopia: a discrete choice experiment.', *Patient preference and adherence* **9**, 1293–301.
6. Berkelmans, P. G. J., Berendsen, A. J., Verhaak, P. F. M. & van der Meer, K. (2010), 'Characteristics of general practice care: what do senior citizens value? a qualitative study', *BMC geriatrics* **10**(21044316), 80–80. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2984451/

7. Bhatt, J. & Bathija, P. (2018), 'Ensuring access to quality health care in vulnerable communities', *Academic Medicine* **93**(9). https://journals.lww.com/academicmedicine/Fulltext/2018/09000/Ensuring_Access_to_Quality_Health_Care_in.13.aspx
8. Birk, H. O., Gut, R. & Henriksen, L. O. (2011), 'Patients' experience of choosing an outpatient clinic in one county in denmark: results of a patient survey', *BMC Health Services Research* **11**(1), 262. https://doi.org/10.1186/1472-6963-11-262
9. Blanford, J. I., Kumar, S., Luo, W. & MacEachren, A. M. (2012), 'It's a long, long walk: accessibility to hospitals, maternity and integrated health centers in niger', *International journal of health geographics* **11**(22737990), 24–24. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3515413/
10. Boachie, M. K. (2016), 'Preferred primary healthcare provider choice among insured persons in ashanti region, ghana', *IJHPM* **5**(3), 155–163. https://www.ijhpm.com/article_3119.html
11. Carol Perks, Michael Toole, K. P. (2006), 'District health programmes and health-sector reform: case study in the lao peopleâ€™s democratic republic', Policy and Practice.
12. Cernauskas, V., Angeli, F., Jaiswal, A. K. & Pavlova, M. (2018), 'Underlying determinants of health provider choice in urban slums: results from a discrete choice experiment in ahmedabad, india', *BMC Health Services Research* **18**(1), 473. https://doi.org/10.1186/s12913-018-3264-x
13. Chow, P.-S., Hu, D., Liu, Z.-W. & Hu, W. (2013), 'Congestion service facilities location problem with promise of response time', *Mathematical Problems in Engineering* **2013**, 716534. https://doi.org/10.1155/2013/716534

14. Dassah, E., Aldersey, H., McColl, M. A. & Davison, C. (2018), 'Factors affecting access to primary health care services for persons with disabilities in rural areas: a â€œbest-fitâ€• framework synthesis', *Global Health Research and Policy* **3**(1), 36. https://doi.org/10.1186/s41256-018-0091-x

15. Ehebrecht, D., Heinrichs, D. & Lenz, B. (2018), 'Motorcycle-taxis in sub-saharan africa: Current knowledge, implications for the debate on â€œinformalâ€• transport and research needs', *Journal of Transport Geography* **69**, 242–256. https://www.sciencedirect.com/science/article/pii/S0966692317303344

16. Escamilla, V., Calhoun, L., Winston, J. & Speizer, I. S. (2018), 'The role of distance and quality on facility selection for maternal and child health services in urban kenya', *Journal of Urban Health* **95**(1), 1–12. https://doi.org/10.1007/s11524-017-0212-8

17. Faria, J. (2020), Total estimated employment in kenya from 2015 to 2019, Technical report, statistica.

18. Fox, J. & Weisberg, S. (2019), *An R Companion to Applied Regression*, third edn, Sage, Thousand Oaks CA. https://socialsciences.mcmaster.ca/jfox/Books/Companion/

19. GOK (2005), Kibera social and economic mapping. household survey report., Technical report, GOK and UNHABITAT.

20. GOK (201), 2013 kenya household health expenditure and utilisation survey, Technical report, Ministry of Health.

21. GOK (2018), 2018 kenya household health expenditure and utilisation survey, Technical report, Ministry of Health.

22. Greer, S. L. & Mendez, C. A. (2015), 'Universal health coverage: A political struggle and governance challenge', *American journal of public health* **105 Suppl 5**(26180991), S637–S639. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4627521/

23. Group, O. B. (2020), New health care initiatives in kenya to increase access and quality, Technical report, Oxford Business Group.

24. Gulliford, M., Figueroa-Munoz, J., Morgan, M., Hughes, D., Gibson, B., Beech, R. & Hudson, M. (2002), 'What does 'access to health care' mean?', *Journal of Health Services Research & Policy* **7**(3), 186–188. PMID: 12171751. https://doi.org/10.1258/135581902760082517

25. Hanson, K., McPake, B., Nakamba, P. & Archard, L. (2005), 'Preferences for hospital quality in zambia: results from a discrete choice experiment', *Health Economics* **14**(7), 687–701. https://onlinelibrary.wiley.com/doi/abs/10.1002/hec.959

26. Heckman, J. J. (2015), 'Introduction to a Theory of the Allocation of Time by Gary Becker', *The Economic Journal* **125**(583), 403–409. https://doi.org/10.1111/ecoj.12228

27. Honda, A., Ryan, M., van Niekerk, R. & McIntyre, D. (2014), 'Improving the public health sector in South Africa: eliciting public preferences using a discrete choice experiment', *Health Policy and Planning* **30**(5), 600–611. https://doi.org/10.1093/heapol/czu038

28. Jordan, H., Roderick, P., Martin, D. & Barnett, S. (2004), 'Distance, rurality and the need for care: access to health services in south west england', *International Journal of Health Geographics* **3**(1), 21. https://doi.org/10.1186/1476-072X-3-21

29. Kelly, C., Hulme, C., Farragher, T. & Clarke, G. (2016), 'Are differences in travel time or distance to healthcare for adults in global north countries associated with an impact on

health outcomes? a systematic review', *BMJ open* **6**(27884848), e013059–e013059. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5178808/

30. KNBS (2020), Economic survey 2020, techreport, KNBS. https://www.knbs.or.ke/?wpdmpro=economic-survey-2020
31. Kruk, M. E., Rockers, P. C., Tornorlah Varpilah, S. & Macauley, R. (2011), 'Population preferences for health care in liberia: Insights for rebuilding a health system', *Health Services Research* **46**(6pt2), 2057–2078. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1475-6773.2011.01266.x
32. Kukla, M., McKay, N., Rheingans, R., Harman, J., Schumacher, J., Kotloff, K. L., Levine, M. M., Breiman, R., Farag, T., Walker, D., Nasrin, D., Omore, R., Oâ€™Reilly, C. & Mintz, E. (2017), 'The effect of costs on Kenyan householdsâ€™ demand for medical care: why time and distance matter', *Health Policy and Planning* **32**(10), 1397–1406. https://doi.org/10.1093/heapol/czx120
33. Mejia-Mantilla, U. P. . C. (2020), More than just growth: Accelerating poverty reduction in kenya, Technical report, World Bank.
34. MoH (2014), *Kenya Health Sector Referral Implementation Guidelines*, 1 edn, Ministry of Health, Division of Emergency and Disaster Risk Management, P.O. Box 30016, General Post Office Nairobi 00100, Kenya. http://www.health.go.ke
35. MoH (2021), 'Kenya master health facility list', Online.
36. Muriithi, M. K. (2013*a*), 'The determinants of health-seeking behavior in a nairobi slum, kenya', *European Scientific Journal* **9**(8).

37. Muriithi, M. K. (2013*b*), 'The determinants of health-seeking behavior in a nairobi slum, kenya', *European Scientific Journal, ESJ* **9**(8). https://eujournal.org/index.php/esj/article/view/884

38. Mwaliko, E., Downing, R., O Meara, W., Chelagat, D., Obala, A., Downing, T., Simiyu, C., Odhiambo, D., Ayuo, P., Menya, D. & Khwa-Otsyula, B. (2014), '"not too far to walk": the influence of distance on place of delivery in a western kenya health demographic surveillance system', *BMC Health Services Research* **14**(1), 212. https://doi.org/10.1186/1472-6963-14-212

39. Njagi, P., Arsenijevic, J. & Groot, W. (2020), 'Cost-related unmet need for healthcare services in kenya', *BMC Health Services Research* **20**(1), 322. https://doi.org/10.1186/s12913-020-05189-3

40. Nocera, S. & Zweifel, P. (1998), 'The demand for health: an empirical test of the grossman model using panel data.', *Developments in health economics and public policy* **6**, 35–49.

41. O'Donnell, O. (2007), 'Access to health care in developing countries: breaking down demand side barriers', *Cadernos de SaÃPÃ* **23**, 2820 – 2834. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2007001200003&nrm=iso

42. Quattrochi, J. P., Hill, K., Salomon, J. A. & Castro, M. C. (2020), 'The effects of changes in distance to nearest health facility on under-5 mortality and health care utilization in rural malawi, 1980-1998', *BMC Health Services Research* **20**(1), 899. https://doi.org/10.1186/s12913-020-05738-w

43. Robertson, L., Skelly, C. & Phillips, D. (2019), 'Making hard choices in local public health spending with a cost-benefit analysis approach', *Frontiers in Public Health* **7**, 147. https://www.frontiersin.org/article/10.3389/fpubh.2019.00147

44. Robertson, R. & Burge, P. (2011), 'The impact of patient choice of provider on equity: analysis of a patient survey.', *Journal of health services research & policy* **16 Suppl 1**, 22–8.

45. Rogers, A., Flowers, J. & Pencheon, D. (1999), 'Improving access needs a whole systems approach', *BMJ* **319**(7214), 866–867. https://www.bmj.com/content/319/7214/866

46. Salari, P., Di Giorgio, L., Ilinca, S. & Chuma, J. (2019), 'The catastrophic and impoverishing effects of out-of-pocket healthcare payments in kenya, 2018', *BMJ Global Health* **4**(6). https://gh.bmj.com/content/4/6/e001809

47. Schang, L., Kopetsch, T. & Sundmacher, L. (2017), '[travel times of patients to ambulatory care physicians in germany].', *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz* **60**, 1383–1392.

48. Segel, J. E. & Lengerich, E. J. (2020), 'Rural-urban differences in the association between individual, facility, and clinical characteristics and travel time for cancer treatment', *BMC public health* **20**(32028942), 196–196. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7006189/

49. Shiffman, J. (2006), 'Donor funding priorities for communicable disease control in the developing world', *Health Policy and Planning* **21**(6), 411–420. https://doi.org/10.1093/heapol/czl028

50. Syed, S. T., Gerber, B. S. & Sharp, L. K. (2013), 'Traveling towards disease: transportation barriers to health care access', *Journal of community health* **38**(23543372), 976–993. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265215/

51. Thaddeus, S. & Maine, D. (1994), 'Too far to walk: maternal mortality in context.', *Social science & medicine (1982)* **38**, 1091–110.

52. Treacy, L., Bolkan, H. A. & Sagbakken, M. (2018), 'Distance, accessibility and costs. decision-making during childbirth in rural sierra leone: A qualitative study', *PloS one* **13**(29462152), e0188280–e0188280. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5819763/

53. UN (2015), Transforming our world : the 2030 agenda for sustainable development, Technical report, UN. https://www.refworld.org/docid/57b6e3e44.html

54. WHO (2020), Disability adjusted life years, Technical report, WHO.

55. WHO (2021), Universal health coverage (uhc), Technical report, WHO.

56. Winpenny, E. M., Miani, C., Pitchforth, E., King, S. & Roland, M. (2017), 'Improving the effectiveness and efficiency of outpatient services: a scoping review of interventions at the primary-secondary care interface', *Journal of health services research & policy* **22**(27165979), 53–64. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5482389/