

**FINANCIAL CATASTROPHE ASSOCIATED WITH OUT-OF-POCKET PAYMENTS
FOR MALARIA TREATMENT IN CHILDREN UNDER THE AGE OF FIVE YEARS
IN ZAMBIA.**

BY

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DECLARATION

I, Wanji Sichone, declare that this dissertation is my original work and has not been previously submitted for a Degree at this or any other University. However, I greatly benefited from studies done by other scholars, and due credit was given wherever such sources were used.

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APPROVAL

This dissertation of **Wanji Sichone** has been approved as a partial fulfilment of the requirements for the award of the degree of Master of Arts in Economics by the University of Zambia.

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ABSTRACT

Despite major achievements that have been made in controlling malaria, the disease remains a significant cause of morbidity and mortality in Zambia, with one in five under-five children infected with malaria. Most caregivers try to seek optimal health care services for their children in order to replenish their lost stock of health. Since most of them are liquidity constrained, the out-of-pocket payments associated with seeking malaria treatment forces them to resort to hardship methods of financing. For example the results show that, out of the 1120 caregivers of children who had malaria during the first visit; 11.9 percent of caregivers asked a friend/relative to pay, and about 4.9 percent; borrowed money to pay or paid too much (above 10 percent of their income) or sold assets to meet the out-of-pocket expenditures. This may have adverse health and welfare consequences and can potentially lead households into poverty. This study sought to determine the individual factors that influence the likelihood of seeking malaria treatment services and those that influence the risk of experiencing financial catastrophe when seeking malaria treatment services for children under the age of five years in Zambia.

This study used data from the 2014 Zambia Household Health Expenditure and Utilisation Survey (ZHHEUS) conducted by the Central Statistical Office (CSO). Binary logistic regression models were used to investigate both the former and the latter. The findings reveal that an increase in per capita monthly expenditure and having a household head that has a secondary school education level, relative to one whose head has no formal education; increases the likelihood of seeking care for a child under the age of five years *ceteris paribus*. The findings from the second logistic regression model reveal that; less per capita total household monthly expenditure, long distance to health facilities and visiting a private health provider increases the risk of financial catastrophe among caregivers who seek malaria treatment services for children under the age of five years.

From the findings, it is recommended that the government should continue with the construction of primary healthcare facilities in order to reduce the costs incurred in seeking professional malaria treatment services due to long distances to health facilities. Further, the government should also escalate malaria awareness campaigns to promote the seeking of malaria treatment services within 24 hours from the onset of symptoms.

DEDICATION

This dissertation is dedicated to my beloved family, particularly my parents, Mr. Wanji Kerr Sichone and Mrs. Astridah Sichone for their unwavering support towards my academic journey. They have been there for me and encouraged me throughout my academic life, and I wouldn't have managed to pursue this work without their support.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACT	-	Artemisinin-based Combination Therapy
CHE	-	Catastrophic Health Expenditure
CSO	-	Central Statistical Office
DHO	-	District Health Office
GDP	-	Gross Domestic Product
GRZ	-	Government of the Republic of Zambia
HSB	-	Health Seeking Behaviour
IPTP	-	Intermittent Preventive Treatment in Pregnancy
IRS	-	Indoor Residual Spraying
ITN	-	Insecticide Treated-Net
IVM	-	Integrated Vector Management
LLIN	-	Long Lasting Insecticide Treated Nets
MDGs	-	Millennium Development Goals
MIP	-	Malaria in Pregnancy
MoH	-	Ministry of Health
NMCP	-	National Malaria Control Programme
NMESP	-	National Malaria Elimination Strategic Plan
OOP	-	Out-of-Pocket
PHC	-	Primary Health Care
PPES	-	Probability Proportional to Estimated Size
RBM	-	Roll Back Malaria
SEA	-	Standard Enumeration Areas
SSA	-	Sub-Saharan African
WHO	-	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Malaria has remained a major health burden worldwide. According to World Health Organization (WHO) 2020, malaria is caused by plasmodium parasites which are spread to people bitten by infected anopheles' mosquitoes, also known as malaria vectors; and it is characterised by periodic attacks of chills and fever. The disease causes widespread premature death and suffering, imposes financial hardship on poor households, and holds back economic growth and improvements in living standards (WHO, 2019). Malaria flourishes in situations of social and environmental crisis, weak health systems and disadvantaged communities. In areas of high transmission, the most vulnerable groups are young children under the age of five years, who have not developed immunity to malaria yet, and pregnant women (ibid).

According to the world malaria report, released in December 2019, there were 228 million cases of malaria globally in 2018 and the estimated number of malaria deaths stood at 405,000 (WHO, 2019). The burden was heaviest in the WHO African region, where an estimated 94 percent of all malaria deaths occurred, and in children under the age of five years, who accounted for 67 percent (272,000) of all malaria deaths worldwide (ibid). Surveys in eighty-nine countries covering 89 percent of the world's population suggest that 150 million people globally suffer financial catastrophe annually because they pay for health services (WHO, 2017). At least half of the world's population cannot obtain essential health services. Currently, 800 million people spend at least 10 percent of their household budgets on health expenses for themselves, a sick child or other family members (ibid). For almost 100 million people, these expenses are high enough to push them into extreme poverty, forcing them to survive on just \$1.90 or less a day (WHO, 2017).

Malaria hampers children's schooling and social development. The economic burden of malaria to households can be extremely high. Even in the poor countries of Sub-Saharan Africa (SSA), households have been found to spend between \$2 and \$25 on malaria treatment, and between \$0.20 and \$15 on prevention each month (WHO, 2013). According to Dalaba et al. (2018), the

average cost to households in treating an under-five child with malaria in Ghana was US \$4.91, which was considerably high given the poverty levels in the country. High levels of financial expenses due to malaria can potentially lead households, especially very poor ones, to resort to hardship methods of financing like: borrowing money, selling assets, asking a friend or a relative to pay for their child's malaria treatment costs (Tahsina et al., 2018). High treatment costs discourage many caregivers from seeking professional care for their children and hence the high infant mortality rates in Africa (Dalaba et al., 2018).

According to Ministry of Health (MoH) 2017; as published in the National Malaria Elimination Strategic Plan (NMESP) 2017-2021, malaria remains a significant cause of morbidity and mortality in Zambia, with one in five children under the age of five years infected with malaria parasites. According to Inambao et al. (2017), 5.8 million malaria cases were reported by the MoH in 2014. These statistics have negative effects on economic growth. For example, according to WHO (2018), malaria in schoolchildren is a major cause of absenteeism and probably reduces the effectiveness of their education. It is also thought to drive away potential development opportunities by making certain zones unsuitable for habitation, deterring international trade and foreign investment, and jeopardizing the development of sectors such as tourism (ibid). Economic development may also be retarded by reduced access to international flows of knowledge and technology because companies may be reluctant to send representatives to malarious countries. Malaria may thus be a cause, and not just a consequence of underdevelopment (WHO, 2018).

Reducing the incidence of malaria in Zambia has been a national priority that requires a focused, comprehensive, and consistent approach in order to achieve the vision of “a malaria-free Zambia by 2021”, as stated by the MoH (2017), in the 2017-2021 NMESP. As part of Zambia's national malaria elimination strategy, several interventions have been implemented to reduce malaria. The interventions include: the universal insecticide treated-nets (ITNs) coverage and indoor residual spraying (IRS) in targeted areas and many more (Inambao et al., 2017).

Despite the efforts to try and reduce malaria incidence, the high levels of expenditures through out-of-pocket spending (OOPS) may prevent people from seeking and obtaining needed care, because they cannot afford to pay for; drugs/herbs, consultation, treatment and transport to and

from the facility (Kaonga et al., 2019). The associated high levels of financial expenses due to malaria can potentially lead households, especially very poor ones, to incur catastrophic costs in treating the disease (Xu et al., 2012). Some countries have experimented with a number of policies such as; community-based health financing schemes, user fee abolition, prepayment schemes, social health insurance, or a mix of these policies, in an attempt to guarantee greater healthcare access and financial protection, especially for the poorest who were worst hit by user charges (Kaonga et al., 2019). In 2012, the government of Zambia extended the policy of free public primary healthcare, which was initially implemented in rural primary health facilities in 2006, to all areas in the country. The goal of this policy was to eliminate financial barriers to access and increase utilization of primary healthcare (Masiye et al., 2010). However, studies have shown that even when user fees have been abolished, individuals and households still incur costs when they visit health facilities, and hence leading to low health care utilization. When patients turn up at a health facility to seek treatment, they often face uncertain OOP charges (Masiye and Kaonga, 2016).

In Zambia, households that utilize malaria healthcare services for children under the age of five years are at risk of experiencing financial catastrophe and impoverishment. Impoverishment is the extent to which people are made poor or poorer, by health spending and it occurs when expenditure on health exceeds the limit set in the capacity to pay (Berki, 1986). According to the MoH (2015), as stated in the Zambia Household Health Expenditure and Utilization Survey (ZHHEUS) 2014, total household health spending in Zambia neared K1.2 billion in 2014, of which urban households spent K790, 530,874 and K389, 550,433 was spent by rural households. Proportionately more households in urban areas experienced significantly lower rates of catastrophic health payments in 2014 than households in rural areas (ibid).

Furthermore, poor health care-seeking behaviour for fever among caretakers of under-five children is still a major concern in Africa (Hamooya et al., 2016). This has a huge bearing on the morbidity and mortality in under-five children (MoH, 2011). It has been shown that timeliness in seeking fever treatment is significantly enhanced by caretakers' knowledge of fever as a malaria symptom (Oyekale, 2015). In addition, studies have shown that health care seeking behaviour in under-five children is influenced by: educational attainment, knowledge of the causes of malaria,

age of the caretakers, availability of health facilities and daily activities of the caretakers (Shayo et al., 2015).

1.2. The Context of the Zambian Health System and Malaria Interventions

The ownership structure of the Zambian health system is such that 79 percent of health facilities are owned by government, 2 percent by faith-based organizations (mission facilities) and 19 percent are private for-profit (MoH, 2017). The majority of the population (86 percent) utilise public health facilities. The private sector and mission facilities account for about 3 percent and 6 percent of healthcare visits respectively. Traditional healthcare accounts for the remaining 5 percent (MoH, 2015). Zambia's per capita total health expenditure is estimated at about US \$60, where the government and donors account for almost an equal share (41 percent and 42 percent respectively) of the current health expenditure. OOP health expenditure contributes 12.8 percent to total health expenditure, while private medical schemes and insurance account for about 4.2 percent (MoH, 2016).

Zambia's public health system is structured in a four pyramidal referral set-up, with primary healthcare at the bottom; which consists of a network of health posts, health centres and district hospitals managed under the district health office (DHO) (MoH, 2013). Above the primary healthcare level are second level hospitals. Second level hospitals were designed to serve as the highest referral hospitals at provincial level and cater for a catchment area of between 200,000 and 800,000 people. They provide services in internal medicine, general surgery, pediatrics, obstetrics, gynecology, dental, psychiatry and intensive care services (ibid). The next level of care are the third level hospitals which provide tertiary level healthcare and in some cases medical training and research. Finally, at the apex of the health systems are specialised hospitals. They cater for a population of 800,000 and above and have specialist services in internal medicine, surgery, pediatrics, obstetrics, gynecology, intensive care, psychiatry, training and research (MoH, 2013).

In the two decades to the year 2000, few interventions in the fight against malaria focused on prevention. The existing policies were more concerned with the treatment of malaria rather than its prevention. These policies were largely unsuccessful; in 1976 there were 10.6 deaths per

1,000 malaria admissions, but by 1994 this had increased nearly to 51 deaths per 1,000 malaria admissions. The under-five children were particularly affected as malaria rates were five times higher amongst them than among those above the age of five years (Chenda et al., 2013). In order to reduce the malaria burden and meet key health targets such as the roll back malaria (RBM) and the health related millennium development goals (MDGs); the government placed malaria control as a key goal and included it in the national development plans and the national health strategic plans (ibid). Key interventions that Zambia has adopted in the fight against malaria have included an integrated vector management programme, prevention of malaria in pregnancy, and malaria diagnosis and case management (Chenda et al., 2013).

Integrated vector management (IVM) may be defined as “a rational decision-making process for the optimal use of resources for vector control. It is based on five key elements that include; evidence-based decision making, integrated approaches, and collaboration within the health sector and with other health sectors (Beier et al., 2008). It further includes advocacy, social mobilization, and legislation in addition to capacity building (ibid). The main interventions under this programme are the use of long lasting insecticide treated nets (LLIN) and the indoor residual spraying programme. Insecticide treated nets repel and provide a physical barrier against mosquitoes. They also have an insecticidal effect on mosquitoes. The use of LLINs provides one of the most cost effective means of malaria prevention (Beier et al., 2008). In Zambia, programmes to mass distribute ITNs began in 1998 and initially targeted the vulnerable groups of women and children, but have since been extended to all household members. The major means of distribution have included mass distribution campaigns and distribution to pregnant women in antenatal care clinics, through the malaria in pregnancy ITN scheme (MoH, 2012). The percentage of households owning at least one insecticide treated net has increased from 13.6 percent in 2001 to 35 percent in 2005 and 64 percent in 2010 (ibid). IRS involves the spraying of an effective dose of insecticide on indoor surfaces inside human dwellings, usually twice a year. IRS provides a cost effective means of malaria prevention in communities and was introduced in 2003 by the MoH (MoH, 2017).

The second intervention is prevention of malaria in pregnancy (MIP). Malaria infection during pregnancy poses a significant risk to the pregnant woman, her foetus and the new born child

(MoH, 2012). The pregnant woman is particularly at risk of severe malaria and maternal anaemia while the foetus and/or unborn child are at risk of spontaneous abortion, still birth, premature birth and low birth weight (ibid). As part of the antenatal care clinic, the malaria control programme has successfully been able to implement MIP policy. These policies include the “provision of free intermittent preventive treatment during pregnancy (IPTp) with at least three doses of sulfadoxine/pyrimethamine during pregnancy, free ITNs; and free prompt diagnosis and treatment of clinical treatment (MoH, 2012).”

The third and final intervention is malaria diagnosis and case management. In 2003 MoH adopted the use of artemisinin-based combination therapy (ACTs), using Coartem a frontline antimalarial medicine for all persons above 5kg except pregnant women in their first trimester (MoH, 2012). The treatment policy is that every confirmed case of malaria is treated with an ACT. Quinine is still used to treat severe malaria in both children and adults. The government has since 2008 sought to primarily use microscopy and rapid diagnostic tests to detect malaria cases, but a number of cases are still only clinically assessed while only a portion are laboratory diagnosed (Ibid).

1.3. Statement of the Research Problem

Despite major achievements that have been made in controlling malaria, the disease remains a significant cause of morbidity and mortality in Zambia, with one in five children under the age of five years infected with malaria (MoH, 2017). As an illustration, three out of four under-five children with malaria symptoms, do not seek professional care within the recommended 24 hours from the onset of symptoms. The low timely utilisation of appropriate health care services among persons suffering from malaria illness, not only reduces their chances of surviving the disease, but also increases the economic burden of malaria (ibid).

Most households face a number of constraints in making allocation decisions to replenish a child's lost stock of health, which predispose them to hardship methods of financing. The constraints come about as a result of; randomness of illness events which render rational decision making difficult, lack of insurance markets, lack of credit markets where people can borrow money in order to smoothen their consumption, lack of liquidity due to poverty and seasonality

of incomes in most rural parts of the country. Since most households are liquidity constrained, the OOP payments associated with seeking malaria treatment services for children under-five years e.g. on consultations, drugs/herbs, transport, medical investigations may lead to hardship financing. Resorting to hardship methods of financing like; borrowing money, selling assets, paying too much (above 10 percent of their income) and asking a friend or a relative to pay may have adverse health and welfare consequences, as it compromises health recovery and depletes household assets. This also reduces their productive capacity when they sell tools to finance health care for a sick child, deprives households of adequate essential needs such as food and education, and has the potential to lead households into poverty. The results for example show that, out of the 1120 caregivers of children who had malaria during the first visit; 11.9 percent asked a friend/relative, 2.9 percent paid above 10 percent of their income, 1.3 percent borrowed money and 0.3 percent sold their assets to seek treatment.

According to the MoH (2015), as stated in the ZHHEUS 2014, total household health spending in Zambia neared K1.2 billion in 2014, of which urban households spent K790, 530,874 and K389, 550,433 was spent by rural households. Proportionately more households in urban areas experienced significantly lower rates of catastrophic health payments in 2014 than households in rural areas. Further, mothers, who mostly supply household labour in rural Zambia, have to take time off production in order to take a child for treatment. The impacts of such productivity losses at the household level have been found to be significant.

Appreciation should be given to global health initiatives, as malaria treatment is free at the point of service in public facilities in Zambia. These global health investments are intended to scale up coverage of key health interventions in major public health facilities in SSA by facilitating delivery of health services, free to the patient at the point of service. However, households still struggle to cope with financial hardships associated with the costs of seeking malaria treatment. For example, studies show that households forgo treatment because they cannot afford to pay for treatment, while in other times, they may incur high catastrophic expenditures. Although prior studies have examined catastrophic health spending in Zambia, little is known about the financial risk to households, imposed by this type of diseases in Zambia. For example, Kaonga et al. (2019) did a study on hardship financing of OOP payment but focused on all individuals and not

just on malaria, but included other diseases. Few studies have shown how coping with malaria illness can cause financial hardships at household level. In particular, the level of hardships associated with malaria treatment for under-five children, is not well documented. This study seeks to contribute to fill this gap.

1.4. Study Objectives

1.4.1 General Objective

The general objective of this study was to determine the individual factors that influence the likelihood of seeking malaria treatment services and also experiencing the risk of financial catastrophe when seeking malaria treatment services for a child under the age of five years in Zambia.

1.4.2 Specific Objectives

The specific objectives of the study were to:

- ❖ Identify the individual characteristics that influence the likelihood of seeking malaria treatment services for a child under the age of five years in Zambia.
- ❖ Determine the factors that influence the likelihood of experiencing the risk of financial catastrophe when seeking malaria treatment services for a child under the age of five years in Zambia

1.5. Statement of Hypotheses

- ❖ Higher income of a caregiver, higher level of education of caregiver, short distance to health facility, being a salaried employee, being an urban dweller and being a young caregiver; increases the likelihood of seeking malaria treatment services for a child under-five years in Zambia.
- ❖ Being a poor caregiver, seeking treatment from private providers, long distance to health facilities, being a part-time or manual worker, residing in a rural area and being a female household head; increase the likelihood of experiencing the risk of financial catastrophe

when seeking malaria treatment services for a child under the age of five years in Zambia.

1.6. Significance of the Study

This study seeks to add to the body of knowledge by identifying the factors that influence the likelihood of experiencing the risk of financial catastrophe associated with OOP payments for malaria treatment in children under-five years in Zambia. Although prior studies have examined catastrophic health spending in Zambia, little is known about the financial risk to households, imposed by this type of disease in Zambia. Few studies have shown how coping with malaria illness can cause financial hardships at household level. In particular, the level of hardships associated with malaria treatment for under-five children, is not well documented. This study seeks to contribute to fill this gap.

In order to design policies that are effective at reaching the beneficiaries of malaria treatment, the study also seeks to advance little knowledge available on factors affecting health seeking behaviour among children under the age of five years in Zambia. The individual family situation has to be considered when formulating: prevention, treatment, rehabilitation and educational programmes, to ascertain why there are differences in health care utilisation. Also, the financial burden associated with malaria treatment at household level can be a hidden cost to policy makers. By identifying and measuring the magnitude, nature and determinants of the financial costs associated with malaria treatment; this study can feed into policy on ensuring elimination of all forms of financial barriers to health care seeking. Results from the study will help strengthen the social protection policies to make them more holistic and effective in protecting the most vulnerable caregivers from financial catastrophe and impoverishing effects of health payments due to malaria illness in Zambia.

1.7. Definition of Key Terms

Malaria: A human disease that is caused by sporozoan parasites (genus plasmodium) in the red blood cells, and it is transmitted by the bite of anopheles' mosquitoes, and is characterised by periodic attacks of chills and fever (WHO, 2020).

Caregiver: Any person above 18 years of age who at the time of the study was directly responsible for the care of a child under the age of five years (Muhumuza, 2015).

Health: “a condition of complete physical, social and mental wellbeing, and not merely the absence of disease or infirmity” (WHO, 2006).

Health seeking behaviour: it has been defined as, “any action or inaction undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding an appropriate remedy” (Latunji and Akinyemi, 2018).

Financial catastrophe: A household is considered to have experienced financial catastrophe if they reported financing healthcare OOPs using any of the following four mutually-exclusive options: (i) borrow money or sell assets in order to meet out-of-pocket payments, (ii) healthcare out-of-pocket payments substitute expenditure on other basic essential consumption, (iii) ask a relative or a friend to meet out-of-pocket payments, and (iv) avoid out-of-pocket payment costs by foregoing healthcare utilization (Lagarde and Palmer 2011).

Catastrophic health expenditure: it is defined as out-of-pocket spending for health care that exceeds a certain proportion of household’s income with the consequence that households suffer the burden of the disease (Ekman, 2007).

Out-of-Pocket Payments: The total costs incurred on consultations at the health facility; drugs/herbs at the health facility or elsewhere; medical investigations at the health facility or elsewhere; transportation costs to and from the facility or any other place where treatment was sought, and any other costs that were incurred in seeking malaria treatment (MoH, 2014)

Morbidity: this is the state of being symptomatic or unhealthy for a disease or condition (Hernandez and Kim, 2020).

Mortality: the number of deaths in a certain group of people in a certain period of time (Hernandez and Kim, 2020).

CHAPTER TWO

LITERATURE REVIEW

This chapter presents an assessment of the conceptual literature regarding health care utilization, the factors associated with the likelihood of experiencing financial catastrophe when seeking malaria treatment services for children under the age of five years and also the conceptual framework of the study. This chapter will firstly discuss the various studies that have been done on the factors that influence health seeking behavior for malaria treatment, and thereafter discuss the factors that influence the risk of financial catastrophe associated with seeking malaria treatment services for children under the age of five years; by different scholar's world over. Lastly the chapter will give the conceptual foundation of the study.

2.1. Studies Specific to Malaria Health Care Seeking Patterns for Under-Five Children

Malaria is the fifth leading cause of death worldwide, the second leading cause of death in Africa, and almost half of the world population is at risk (WHO, 2013). It kills a large number of African children each year; were every 30 seconds, a child dies from malaria in Africa (UNICEF, 2009). Globally, a number of empirical studies on health care seeking behaviour for malaria treatment have been conducted, with each adopting a different methodology. This section will look at studies that particularly considered factors that influence malaria health care seeking patterns for children under the age of five years.

Muhumuza (2015) conducted a cross-sectional household survey among caregivers of children under-five years of age in Rwimi Town Council, Kabarole District, in Uganda. A total of 368 household heads were sampled from 6 villages. Following a multivariable analysis, it was found that, socio-economic status was associated with seeking health services from the formal health sector. Most caretakers (67.1 percent) who had houses with burnt bricks and plaster had sought for health services from formal health sector than those who had grass thatched and mud houses. His findings were in line with those of Xu et al. (2012), who conducted a survey of 718 households among the Wa ethnic group in Myanmar, a country in Southeast Asia. Following a multivariate logistic regression analysis, it was found that income was significant. Families with an average annual income per person of more than \$200 were more likely to seek treatment

within 24 hours. Similarly, Dzator and Asafu-Adjaye (2004) considered the factors that influence malaria seeking behaviour in Ghana using a multinomial logistic regression on a sample of 231 malaria cases, and found that income was a significant factor, as caregivers with higher incomes were more likely to use public and private providers over self-medication.

Hogan and Adindu (2013) conducted a study in Calabar in Nigeria, which was limited to mothers of children under five years, who brought their sick children to outpatient departments of selected primary health care (PHC) facilities. They found that about 22.7 percent of mothers delayed taking their children to health facilities from the onset of malaria symptoms because they had no money. Similarly, Hamooya et al. (2016) conducted a study on treatment-seeking behaviour for childhood fever among caretakers of Chavuma and Magoye rural communities of Mazabuka in Zambia. Results from the longitudinal regression showed that poor social-economic status of consumers was a reason for delay to seek treatment care among mothers or caregivers of under-five children. However, Franckel and Lalou (2009) conducted a survey of 902 households in rural Senegal; with at least one child affected by fever. A backward stepwise binary logistic regression was used, and they found that the economic status of the household as measured by their goods and equipment did not seem to be a significant factor in determining HSB. It appears that this study departs from the findings by other author's; maybe due to difference in methods used, as this is the only study that used a backward stepwise binary logistic regression model.

Mbagaya et al. (2005) conducted a study on health seeking behaviour during child illness in a rural western Kenya community. They conducted an observational cross-sectional community survey using interview schedules, key informants, focus group discussions, and descriptive statistics in data analysis. It was found that mothers with more years of schooling tended to take action by either buying drugs or taking their children to the hospitals as compared to mothers with less years of schooling. Similarly, Muhumuza (2015) who conducted a cross-sectional household survey among caregivers of children under-five years in Uganda found that, the level of education of the caregiver was associated with seeking formal health treatment for under-five children. Caregivers who had attained secondary education were more likely to seek formal health care, compared to those who had other levels. Kante et al. (2015) conducted a study on childhood illness prevalence and health seeking behaviour patterns in rural Tanzania, and used a

multinomial regression model. It was found that children living with an educated caregiver were more likely to receive formal care at a facility than to receive no care or home care, compared to those who lived with uneducated caregivers. However, Franckel and Lalou (2009), who used a backward stepwise binary logistic regression, found that educational level of parents or caregivers was not a significant determinant of an early visit to a health facility in rural Senegal. It appears that the literature is mixed on the impact of educational attainment of a caregiver, on HSB in Africa. Differences in methods, data, definitions, etc., limit the generalizability of the results.

On distance to the health facility as a determinant of health seeking behaviour, Xu et al. (2012), who used a multivariate logistic regression analysis, found that distance was significant; as households located more than 3km from a health facility were less likely to seek early treatment. Similarly, Kante et al. (2015) found that children living more than 1 km from the health facility were less likely to receive formal health care, rather than to receive no care or home care for malaria treatment compared to those living less than 1 km from the facility. Hogan and Adindu (2013) found that, about 52.4 percent of mothers delayed taking children to health facilities after onset of malaria symptoms, because the hospital was too far from the residence. Similarly, Hamooya et al. (2016) who conducted a study in Mazabuka found that, lack of access to treatment/ health facilities due to long distance and poor road network was a reason for delay of caregivers to seek treatment. All the studies seem to agree with the fact that long distance to health facilities hinders caregivers from seeking formal health care for their children under the age of five years in Africa.

On sex of the household head as a determinant of health seeking behaviour, Xu et al. (2012) found that families where women made decisions were more likely to seek early treatment, compared to those headed by males. Their finding was in line with that of Adinan (2017), who studied the Individual and contextual factors associated with appropriate healthcare seeking behavior among febrile children in Tanzania. Following a mixed effects logistic regression, it was found that caretakers' sex was statistically significant. Febrile children from households headed by female caretakers had almost three times higher odds of being taken to the health facilities compared to households headed by men. The findings by Franckel and Lalou (2009)

contradicted those of the previous two authors'. They found that, visits to the health centre appeared more frequent in households where the father was the only decision maker. Hogan and Adindu (2013) found that, about 30 percent of mothers delayed taking children to health facilities after onset of malaria symptoms because the father was not home. However, Muhumuza (2015) found that the sex of the caretaker was not associated with seeking treatment from either formal or informal health sector despite the fact that more female caretakers (72.6 percent) had sought for health services from formal health sector than males. Similarly, Hamooya et al. (2016) who conducted a study in Mazabuka found that gender was not a significant predictor of early treatment. It appears that the literature is mixed on the impact of sex of household head on health seeking behavior in Africa.

On age of a caregiver as a determinant of health seeking behaviour, Muhumuza (2015) found that the age of a caregiver influenced HSB from a formal health facility. Caregivers below 30 years were more likely to seek treatment for children below five years from formal health facilities, than caregivers above 30 years. Mitiku (2017) conducted a study on caregivers' perception of malaria and treatment seeking behaviour for under-five children in Mandura District, West Ethiopia. Following a multiple logistic regression analyses, his findings were exactly similar to those of Muhumuza (2015). It was found that caregivers below 30 years were 3.40 times more likely to seek formal treatment as compared to those above the age of 30 years. Similarly, Wambui (2018) conducted a study on the determinants of health seeking behavior among Caregivers of Infants in Kenya. A multiple logistic regression analysis was performed, and it was established that young mothers were more likely to seek health- related help immediately following their infants' illness, due to lack of experience on the actions to take, thus seeking professional help. A considerable proportion, aged 31years and above did not seek immediate help for their sick children. However, Hamooya et al. (2016) who conducted a study in Mazabuka found that age was not a significant predictor of early treatment. It appears that all the studies apart from the one done in Zambia, are in agreement with the fact that, young caregivers are more likely to seek health- related help immediately, compared to older ones.

On region of residence of a caregiver as a determinant of health seeking behaviour, Wambui (2018) found that caregivers residing in urban settings sought immediate help for their sick child

compared to those from rural areas. This is attributed to increased awareness via easily available media for dissemination of health information, namely: television, radio, newspaper, and proximity to well informed neighborhood. Similarly, Cassy (2019) conducted a study on care-seeking behaviour and treatment practices for malaria in children under-five years in Mozambique. Complex sampling logistic regression model was used, and it was found that care-seeking behaviour for fever was also associated with place of residence. Caretakers from rural areas were less likely to seek care for febrile children than those from urban areas. Similarly, Hamooya et al. (2016) who conducted a study in Mazabuka found that Magoye had more episodes of fever being treated within 24 hours of recognition than Chavuma, because Magoye is along a major high way and accessibility to preventive measures is easier than Chavuma. However, Dzator and Asafu-Adjaye (2004), found that females in rural areas had a higher probability of seeking care at a public provider. Similarly, Mitiku (2017), found that, compared with urban residents, caregivers from rural area were more likely to seek treatment for under five children, adjusting for other variables. It appears that the literature is mixed on the impact of region of residence on HSB in Africa, due to different methods, data used and definitions adopted by different scholars.

2.2. Studies Specific to the Determinants of the Risk of Financial Catastrophe

The burden of health care payments pushes poor households deeper into poverty. Mahal et al. (2005) found that households will ordinarily have to pay for care and treatment costs even if the patient dies while undergoing treatment as found in India. The lost income reduces household's purchasing power for other goods and services and hence catalysing poverty (Abegunde et al., 2007). This section will look at the studies that particularly considered factors that influence the likelihood of experiencing financial catastrophe when seeking malaria treatment services for children under the age of five years.

Tahsina et al. (2018) conducted a cross sectional survey on the determinants of hardship financing in coping with OOP payments for care seeking of under-five children in selected rural areas of Bangladesh. 5 percent of households incurred illness costs of more than 10 percent of their household's monthly expenditure. Different financing mechanisms adopted to meet OOP

were: loan with interest (6 percent), loan without interest (9 percent) and financial help from relatives (6 percent). A multivariable ordered logistic regression showed that, poor caregivers whose children suffered from malaria had two times higher risks of suffering from hardship financing. They found that severity of hardship financing was around 45 percent lower for households with monthly income of more than BDT 7500. Orem et al. (2013) sought to assess the statistical relationship between out-of-pocket expenditure on malaria treatment and patterns of treatment seeking behaviour of children below the age of five years with malaria, using a sample from the 2009 Uganda Malaria Indicator Survey. Following a log-linear regression it was established that rich caregivers were able to meet OOP expenses compared to the poor ones, and are thus less likely to face financial hardship when they seek malaria treatment services for children under the age of five years.

Njagi et al. (2018) conducted a study on the determinants of catastrophic health expenditure (CHE) and impoverishment in SSA countries. Systematic review or meta-analysis protocol was applied to guide the screening and eligibility of the studies. 34 studies that met the inclusion criteria were fully assessed. It was found that households' income level is the most consistent determinant of CHE, with higher-income groups being less likely to incur CHE relative to middle-income and lower-income groups (Ilunga-Ilunga, 2015). Kaonga et al. (2019) conducted a study on the prevalence and determinants of hardship financing arising from out-of-pocket payments in Zambia, using data from a nationally-representative household health expenditure survey conducted in 2014. They employed a sequential logistic regression model to examine the factors associated with the risk of hardship financing, conditional on reporting an illness and an out-of-pocket expenditure. The results show that up to 11 percent of households who reported an illness had borrowed money, sold items or asked a friend for help, or displaced other household consumption in order to pay for health care. They concluded that the risk of hardship financing was higher among the poorest households. It appears that all the studies are in agreement with the fact that, income level is the most consistent determinant of financial catastrophe; with poor caregivers more likely to face the risk of financial catastrophe when seeking formal care for a child under the age of five years.

On provider type as a factor that influences hardship financing, Tahsina et al. (2018) ran a multivariable ordered logistic regression and found that the burden of hardship financing increases by 2.09 times when care is sought from a private trained provider, compared to seeking care from a public provider. Similarly, Njagi et al. (2018) found that, seeking care from a private health facility is associated with increased CHE relative to seeking care at a public facility. Orem et al. (2013) used data from the 2009 Uganda Malaria Indicator Survey and found that, for a child that goes to a private provider, the odds of incurring OOP expenditure are 13.4 times higher than the odds for a child that goes to a public facility. Hence visiting a private provider increases the risk of hardship financing. It appears that all the studies are in agreement with the fact that, the burden of hardship financing increases when care is sought from a private trained provider compared to seeking care from a public provider.

Binnendijk et al. (2012) conducted a study on the determinants of hardship financing of healthcare among rural poor in Orissa, India. They used survey data of 5,383 low-income households in Orissa and ran a logistic regression. Njagi et al. (2018) also conducted a study on the determinants of catastrophic health expenditure and impoverishment in SSA countries. In both studies it was found that, distance to the health facility is associated with an increased likelihood of catastrophic health expenditure; highlighting the significance of distance in increasing cost of access to health care. Similarly, Kaonga et al. (2019), who conducted a study on the prevalence and determinants of hardship financing arising from out-of-pocket payments in Zambia, found that the risk of hardship financing was higher among the households who resided further from health facilities. It appears that all the studies are in agreement with the fact that, long distance to the health facility is associated with an increased likelihood of incurring catastrophic health expenditures.

On education of a caregiver as a factor that influences hardship financing, Orem et al. (2013) established that, for a child whose mother is of higher school level education; the odds of incurring OOP expenditure are 4.3 times higher than the odds of a child whose mother has no education. Educated mothers are less prone to hardship financing compared to mothers with no education since they are more likely to meet OOP payments, without being pushed into poverty. Similarly, Tahsina et al. (2018) ran a multivariable ordered logistic regression and found that

mothers who had at least secondary education were less prone (one third) to be faced with hardship compared to mothers with no education. Njagi et al. (2018) also found that households with lower education of mothers were more likely to incur CHE. However, Binnendijk et al. (2012) found that, education of the household head did not influence the probability of hardship financing. It appears that the literature is mixed on the impact of education of mothers or household head on the likelihood of experiencing financial catastrophe, due to different factors.

On employment status of a caregiver as a factor that influences financial catastrophe, Binnendijk et al. (2012) found occupation to be significant. Households where the household head was self-employed in agriculture, self-employed in business, a daily wage labourer, or does not work due to any reason; have a significant higher likelihood of being at risk of hardship financing than households where the household head was a regular salaried employee. Similarly, Njagi et al. (2018) found that households with unemployed heads are more likely to incur CHE. Full-time employment is protective against CHE, especially amongst couples where the woman had a fulltime job. Also, employment status and occupation are associated with CHE, for instance, having a household head who is a manual labourer increases the likelihood of CHE. It appears that all the studies are in agreement with the fact that, being self-employed, a daily wage labourer, or being unemployed increases the risk of experiencing financial catastrophe.

On sex of a caregiver as a factor that influences hardship financing, Masiye and Kaonga (2019) found that, the risk of hardship financing was higher for female headed households. Similarly, Kinyanjui (2016) conducted a study on the determinants and distribution of catastrophic health expenditures and impoverishment in Kenya and found that female headed households experienced more catastrophic health expenditures (3.95 percent) compared to male headed households (3.67 percent). It appears that the studies are in agreement with the fact that, the risk of hardship financing is higher for female headed households.

Summary of the Literature

The literature above pinpoints that the logistic regression model is overwhelmingly used in analysing the determinants of the risk of financial catastrophe and factors that influence seeking of health care among caregivers of children under the age of five years.

Generally, the literature supports that: income or economic status of household head and distance to health facilities significantly influence treatment seeking behaviour among caregivers of under-five children suffering from malaria. A higher income of the household head increases the probability of seeking treatment. Long distance to health facility negatively influences the probability of seeking treatment by caregivers, since it increases the risk of incurring treatment costs. It appears that the literature is mixed on the impact of the level of education of a caregiver, age of a caregiver, sex of a caregiver and the region of residence of a caregiver on seeking malaria treatment services. The literature also supports that: income, provider type, distance, employment status and the gender of the household head, are consistent determinants of financial catastrophe. Being a poor caregiver, seeking treatment from private providers, long distance to health facilities, being a part-time or manual worker and having a female household head, increase the risk of hardship financing. It appears that the literature is mixed on the impact of education of mothers or household heads on the likelihood of incurring catastrophic health expenditures due to different methods, data used and definitions adopted by different scholars.

Our review of the literature highlights that, only a few studies have considered malaria health care seeking behaviour and the risk of financial catastrophe associated with malaria treatment seeking among children under the age of five years. Furthermore, the evidence on several variables including; education of caregiver, gender, age and region of residence is inconclusive. It is evident that there is a gap in our understanding of the factors that currently affect the demand for malaria treatment and the financial burden imposed by malaria sickness on households in Zambia.

2.3. Conceptual Framework of Demand for Malaria Treatment and Financial Catastrophe

The conceptual foundation of this study was constructed on Grossman's model of demand for health and health care services as outlined by Zweifel (2009). In the Grossman model, demand for health care is state dependent, that is, people's demand for health care is dependent upon their health state. When one is sick, demand for healthcare becomes imperative, they demand healthcare in order to restore their health capital. According to Jacobson (1988) each family member is the producer, not only of his own health, but also of the health of other family members. Applying this to our study, a caregiver is not only the producer of his/her own health,

but should also augment a child's health, by providing medical treatment services and investing in preventive efforts like buying a mosquito net for a child. Underlying the Grossman model is the assumption that the individual derives utility from consumption goods (X) and from good health (H). The individual's utility function may therefore be represented as:

$$U = U (X, H)$$

The model further assumes that the health stock can be augmented by the individual through medical treatment services (M) and by committing time to prevention efforts (t^1). The health stock investment function is shown as:

$$H = H (M, t^1)$$

An improved stock of health is valued as a capital good since it enables an individual to earn more income and thereby purchase more consumption goods, from which he/she derives utility. If a child is in a good health state, the productivity of a caregiver or mother also increases, as they spend less time seeking treatment for a child; either through self medication or professional care.

We consider an individual whose planning horizon is two time periods. During each of the time periods, the individual may experience an amount of time in which they suffer from malaria illness (t^s), which is lowered with a larger stock of health (H). We also assume that the individual derives utility from consumption goods (X) but derives disutility from time sick. From the assumptions, the utility function may be represented as:

$$U = U (t^s (H_0), X_0) + \beta U (t^s (H_1), X_1)$$

The Grossman model regards the individual as a producer of health and an essential equation of the model describes the movement of the health stock over time. We assume that the health stock depreciates at a rate δ over time due to malaria illness. The individual can make investments (I) in his health stock through the utilisation of malaria treatment services or committing time to preventive efforts (t^1). According to Jacobson (1988) a child derives utility from good health produced by the child's parents by using market goods and parental time. The health stock in the

next period (H_1) depends on the stock of health today adjusted for depreciation and investment made in the health stock in the current period. This is summarized in the following equation:

$$H_1 = H_0 (1 - \delta) + I (M_0, t^I)$$

The final fundamental equation is based on the assumption that out-of-pocket expenditures associated with seeking malaria treatment services (PM) and expenditures on consumption goods (CX) are financed by wage income (W) and some initial endowment of wealth (A_0). Jacobson (1988) further assumes that, not only the individual's own income and wealth, but also the earnings of other family members, can be used in the production of health. Applying this to our study, a caregiver not only uses his income to provide medical treatment services for a child but can also borrow money and ask a friend or a relative to pay, in order to invest in preventive efforts like buying a mosquito net for their child. When this happens, a household is considered to experience hardship financing. It is also assumed that wage income (W) diminishes proportionately with the period of time that the individual suffers from malaria illness or dedicates to malaria prevention efforts. We further assume that the investment in health is only made in period 1. The budget constraint facing the individual can therefore be represented as:

$$A_0 + W_0 (1 - t^s(H_0) - t^I) + \frac{W_1 (1 - t_1^s(H_1))}{R} \geq PM + CX_0 + \frac{CX_1}{R}$$

Where R represents a factor that discounts future period money values.

According to Jacobson (1988), the net effective marginal cost of child health is equal to the user cost of child health capital less the marginal investment benefit of child health; implying that, the family invests in health until the rate of marginal utilities of lifetime health to effective price of health for all family members is equal, and equal to the marginal utility of wealth. Poor families (where the wealth restriction is binding) value a marginal change in child health, higher than rich families, and families for whom the wealth constraint is not binding have a zero marginal utility of child health (ibid). Further, a child with unhealthy parents can be expected to have lower health compared to a child with healthy parents, because resources have to be spent on increasing the health of the unhealthy parents (Jacobson, 1988).

The individual faces a utility maximisation problem in which he or she seeks to maximise his or her lifetime utility subject to the health stock constraint and the budget constraint. This can be specified in log form as:

$$\ln M = \ln H + (1 - \alpha) \ln W - (1 - \alpha) \ln P - \beta E$$

Where M = malaria treatment services utilized, H = the individual's health stock, W = wage rate, P = price of health care services and E = education. Education (E) whereas α is a parameter which measures the elasticity of production of malaria treatment services. β is the marginal productivity of education.

Predictions of the Grossman Model

The model specifically predicts wages, age, price of treatment services and education to be important determinants of the demand for health care services. The model suggests a positive relationship between wages and the demand for health treatment. This may also entail that wealthier caregivers are more likely to seek treatment for a sick child, since they have the ability to pay. A higher price of health treatment services is, *ceteris paribus*, associated with a reduced demand for malaria treatment services, since it raises the marginal cost of seeking treatment. This may discourage caregivers from seeking professional treatment for a sick child to avoid OOP payments. It is expected that a more educated individual is likely to use fewer malaria treatment services, since increased levels of education makes the individual a more efficient producer of health. Education increases an individual's health prevention ability through; health knowledge, healthy lifestyle, processing health information, and so on. This may entail that a more educated caregiver may invest in preventive efforts like buying a mosquito net for a child and hence reducing the chances of a child falling sick, and therefore less likely to demand malaria treatment services for a child. Age is predicted to be positively associated with the demand for malaria treatment services. The literature shows the demand for healthcare is higher among children under the age of five years and among the elderly (Sauerborn, Nougara and Latimer, 1994).

Liquidity-Constrained Healthcare Consumption and Financial Catastrophe of Health Payments

According to the Grossman model, individuals seek to optimize health care consumption in order to have good health stock, by choosing optimal levels of health investments vis-à-vis other consumption goods. Households demand healthcare as a response to a real or perceived deterioration in health stock. The Grossman model shows that demand for healthcare is derived from the demand for health. A utility maximizing household will allocate its resources in order to maximize X and H .

$$U = U(X, H)$$

According to the Grossman model, individuals will spend up to a point where the marginal gain is equal to marginal cost.

The basic postulate of the Grossman model of demand for health and healthcare is that, individuals maximize a lifetime health-related utility function subject only to the lifetime budget constraint, without being constrained by imperfect capital markets. If this was true, then healthcare consumption and welfare should not be an issue in health policy. However, empirical data shows that this postulation is not accurate, especially in SSA.

The Grossman model assumes the existence of capital markets where households can borrow. However, households in developing countries face the following constraints in making their allocation decisions, such that, decisions to spend on health predispose them to financial catastrophe:

1. Randomness of illness events which render rational decision making difficult
2. Lack of insurance markets
3. Lack of liquidity due to poverty and seasonality of incomes in most rural parts of the country
4. Lack of credit markets where people can borrow money to smoothen consumption

The first feature is uncertainty of illness incidence which render rational decision making difficult. Individuals don't know when they will fall sick; neither do caregivers know when a child will fall sick. It is reasonable to presume that consumers respond to these uncertainties by adjusting their patterns of consumption and healthcare purchase and display some form of precautionary behaviour like saving, in order to respond to uncertainties (Nocetti and Smith, 2010). However, most caregivers do not plan for such uncertainties and hence, seeking treatment for a child when they suffer from malaria becomes burdensome to them as they fail to meet treatment costs. In the end some borrow money and some even go to the extent of selling their assets to finance treatment.

The second feature is lack of insurance markets. Because of the problem of uncertainty, consumers try to protect themselves against the financial risk of sickness by purchasing insurance. When one has an insurance policy they don't pay directly for the full costs of their health care; the insurance company pays for them either in full or partly, depending on the insurance arrangement (Zweifel, 2009). However, in Zambia most caregivers lack insurance cover which is likely to protect them from uncertainties and thus smoothen their consumption, as the insurance markets are not well developed in Zambia. Thus when a child suffers from malaria, the majority of caregivers fail to meet the treatment costs and resort to hardship methods of financing.

The third feature is lack of liquidity due to poverty and seasonality of incomes in most rural parts of the country. The majority of the individuals are liquidity constrained, to afford the medical treatment costs. According to Yildiz (2019), increasing health costs are a big concern for the wellbeing of liquidity constrained households. Most individuals in Zambia do not have enough money to seek proper healthcare for themselves nor for their children when they fall sick; while some do not even seek care at all because they cannot afford to pay. When a child falls sick, most caregivers resort to hardship methods of financing like asking a friend/relative to pay, borrowing money and selling household assets to finance medical treatments. Further the majority of Zambians, especially farmers in rural areas; make seasonal incomes and can only manage to meet some medical costs for a sick child when they harvest and sell their crops. When a child suffers from malaria off harvest season, it becomes challenging for them to pay for medical

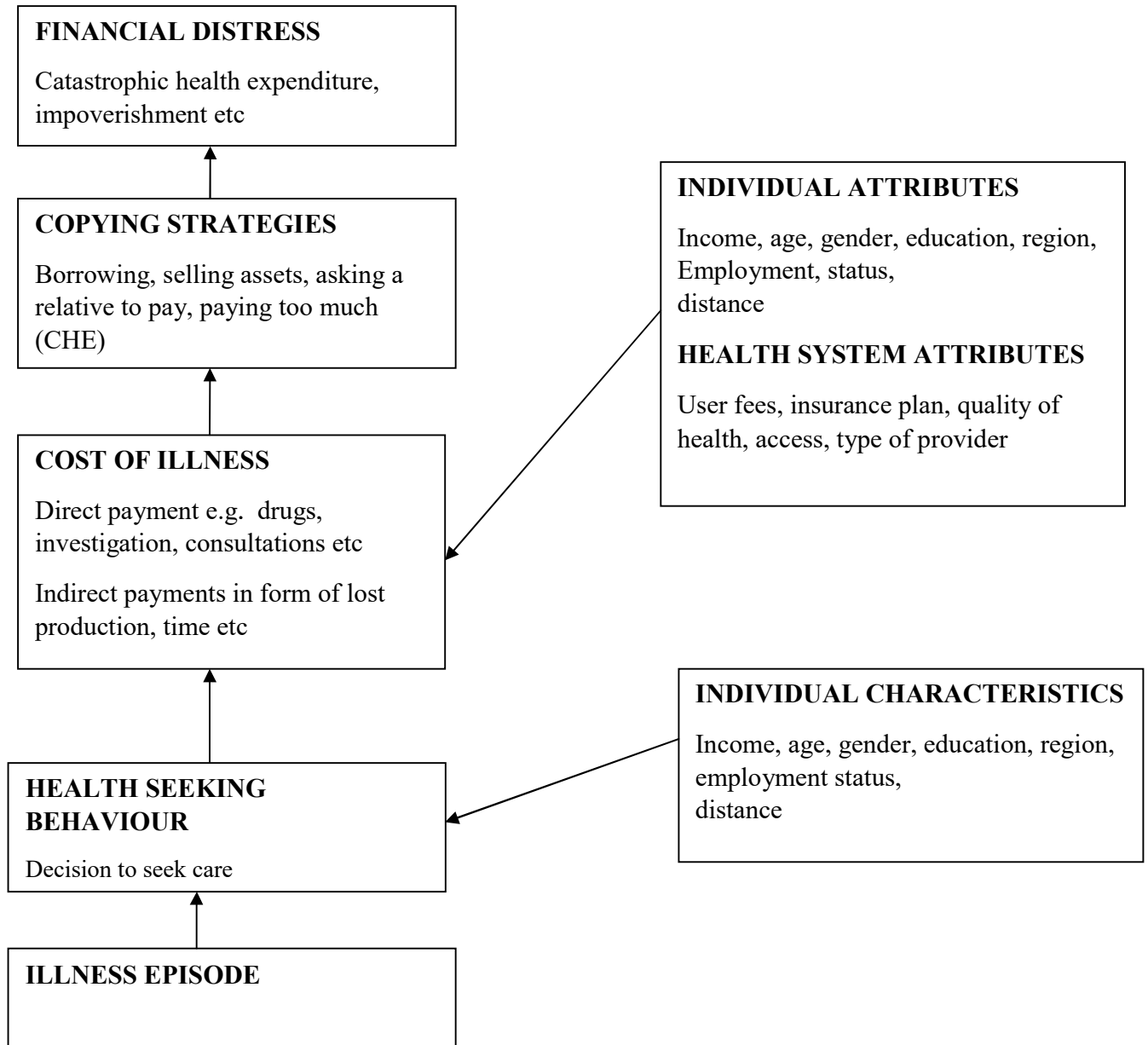
costs, and thus resort to hardship methods of financing like selling of assets, for example, farming tools.

The fourth and final feature is lack of credit markets where people can borrow to smooth their consumption. This further makes it difficult for liquidity constrained individual or caretakers who cannot afford to pay for medical costs to borrow. In the end some caregivers do not at all seek healthcare, while others resort to other means of financing health care like asking a relative to pay or selling of valuable assets.

All these four characteristics lead households into financial catastrophe. Demand for health care may not be optimal, as individuals underconsume or do not consume healthcare at all. Even from those who manage to pay for health care, the majority still face the risk of financial catastrophe because they earn less income and end up paying too much (above 10% of their income). Resorting to hardship methods of financing like; borrowing money, selling assets, paying too much and asking a friend or a relative to pay, may have adverse health and welfare consequences, as it compromises health recovery and depletes household assets. It also reduces their productive capacity when they sell tools to finance health care for a sick child, with individuals in rural areas being at high risk.

The conceptual framework for analysing financial catastrophe of illness and demand for malaria treatment services can be illustrated diagrammatically as shown in figure 1 below. When a child suffers from malaria, a caregiver can either seek care or do nothing at all. The decision is based on individual characteristics like; Income, age, gender, education, region, distance to the health facility and employment status of a caregiver. When a caregiver decide to seek health care for a child, they incur costs e.g. on drugs, medical investigation and consultations. The costs incurred depend on the health system and individual attributes. Due to high medical treatment costs, caregivers resort to coping strategies like; borrowing money, asking a friend or a relative to pay and selling of household assets in order to seek health care for a child. This financial catastrophe due to OOP payments has health and welfare consequences and can lead some individuals into poverty.

Figure 1: Determinants of health seeking behaviour and financial catastrophe



Source: Author (Adapted from the Grossman model)

CHAPTER THREE

METHODOLOGY

3.1. Type of Research Design

A cross-sectional research design was employed to determine the factors that influence the likelihood of a caregiver's choice following a malaria illness of a child who is under the age of five years, and also to determine who is at risk of financial catastrophe, by looking at the determinants of financial catastrophe associated with seeking malaria treatment services for under-five children, from the formal health care sector for outpatients. The study focused on under-five children, whose mothers faced financial hardship in seeking malaria treatment services, and was based on a cross-sectional dataset from the ZHHEUS conducted in 2014.

3.2. Data Sources and Sample

The statistical analysis in this study was based on a cross-sectional dataset from the ZHHEUS conducted in 2014 by the Central Statistical Office (CSO). The ZHHEUS sampled a cross-section of households in all 10 provinces of Zambia using a sampling design, which was aimed at achieving national representativeness. The CSO, with support from the MoH and the University of Zambia, conducted the survey, yielding a total of about 12, 000 households, including some 59, 500 individuals, in all 10 provinces of Zambia. From this number, about 8842 were children under the age of five years, and out of this number, a total of 2164 reported being ill during the first visit. A two stage stratified cluster sample design was used. In the first stage, Standard Enumeration Areas (SEAs) were selected within each stratum using the Probability Proportional to Estimated Size (PPES) procedure and during the second stage; twenty households were selected from each SEA using the systematic random sampling method. Individuals were asked if they had experienced an illness or injury in the 4 weeks preceding the survey, or if they had been admitted to a health facility in the 6 months preceding the survey. The survey included questions on self reported illness, healthcare utilisation and health expenditure. OOP health expenditure included expenditure at the facility, medical expenditure outside the facility and non-medical costs associated with seeking healthcare. This study focused on analyzing hardship financing related to outpatient visits and individual/household characteristics, rather than admissions. The data on out-of-pocket payments for admissions was very noisy. For

example, of those who were admitted, 92 percent reported zero expenditure. It is believed that this data suffered from recall biased.

3.3. Data Analysis

This study estimated two binary logistic models. The first one, modeled health care choice (seek care or do nothing) as a function of individual and household explanatory variables. The second binary logistic model, modeled financial catastrophe as a function of household explanatory variables. Data was analyzed using the STATA 14.2 software package.

3.4. Study Variables

3.4.1. The Dependent Variables

This study considered two binary logistic models, and therefore had a unique dependent variable for each model. The dependent variable in the health care seeking model was care options. The care options were described by the possible action that the caregiver could have taken at the onset of malaria symptoms for a child under the age of five years i.e. the option of seeking professional care, self-medication or doing nothing. The care option variable was binary and took on the value of (1), which was defined as seeking care; if the caregiver either self-medicated or sought professional care for malaria treatment for a child under the age of five years and the value (0) if they did nothing.

The dependent variable in the second binary model was financial catastrophe. A household is considered to have experienced financial catastrophe if they reported financing healthcare OOP payments using any of the following four mutually-exclusive options: (i) sold assets (ii) borrowed money, (iii) asked a relative or friend to pay, and (iv) experienced catastrophic levels of OOPs (paid above 10 percent of their income). It was assigned the value of (1) if the caregiver financed OOP payments to access malaria treatment for a child under the age of five, through; selling assets, borrowing money, asking a friend/relative to pay or paid too much (above 10 percent of their income). It was assigned a value of (0) if they financed OOP payments through other means. OOP expenditures were comprised of costs incurred on consultations at the health facility; drugs/herbs at the health facility or elsewhere; medical investigations at the health facility or elsewhere; transportation costs to and from the facility or any other

place where treatment was sought, and any other costs that were incurred in seeking malaria treatment for a child under the age of five years.

3.4.2. Independent Variables

Age of Caregiver

Age was measured as a continuous variable in years. The study sought to establish whether treatment seeking behaviour of a caregiver was associated with age.

Region of Residence

A dummy was used to capture the region of residence classified as (1) if the household was in a rural area and (2) if the household was in an urban area. It was expected that caregivers in rural areas may have a lower probability of seeking professional treatment and therefore incur lower expenditures due to difficulties in accessing professional care services.

Gender of Caregiver

A dummy was used to capture gender of an individual, coded as (1) if the individual (caregiver) was male and (2) if the individual was female.

Per Capita Household Consumption Expenditure

This was used as a proxy measure for income and it was computed by dividing the total amount of household monthly consumption expenditure by the number of household members. Per capita consumption expenditure was used because it is the best measure of welfare, as it is less understated in less-developed countries and comes closer to measuring permanent income, as opposed to using income, which is seriously understated.

Employment Status

A dummy was used to capture employment status of a caregiver, coded as (1) if the individual (caregiver) was a salaried employee and (0) if the individual was self-employed, unpaid household worker, intern, student or other.

Distance from Home to Facility

Distance was captured as a continuous variable, and it was measured in kilometers from home to the health facility. We expected distance to have a negative impact on health seeking behaviour and a positive one on financial catastrophe as evidenced by literature. This variable was based on self-reported distance.

Education of Household Head

Education of the household head was considered as a categorical variable coded as 1 if the head had no formal education, 2 if the head had primary education, 3 if the head had secondary education, and 4 if the head had tertiary education.

Provider Type

The type of health provider chosen was considered as a categorical variable coded as 1 if the household head sought care from public hospitals, 2 if they sought care from public health centers, 3 if they sought care from public health posts, 4 if they went to mission facilities, 5 if they visited private health facilities and 6 if they visited other facilities.

3.5. Empirical Model and Estimation

In this study we estimated two binary models. The first binary logistic model, modeled health care choice as a function of individual and household explanatory variables. The second binary logistic model, modeled financial catastrophe as a function of the same individual and household explanatory variables.

3.5.1 Model of Determinants of Health Care Demand

Based on the Grossman model of demand for healthcare and the empirical studies on healthcare utilisation and expenditure, we identify a number of key variables that influence health seeking behaviour for malaria treatment in children under the age of five years. Given that the outcome of interest in the health seeking behaviour model will be defined as two levels (seek treatment or do nothing), a binary logistic regression model will be used to determine the factors that

influence the likelihood of a caregiver's choice following a malaria illness of a child who is under the age of five years. The empirical model will be stated as:

$$Y_{ij} = \beta X_i + \varepsilon_{ij}$$

Where Y_{ij} indicates the choice by a caregiver "i" of treatment option "j". The treatment options are classified as 1 if the individual (caregiver) sought care and 0 if the caregiver did nothing. X_i represents a vector of covariates for a caregiver or individual "i". The vector of covariates is fully specified as:

$$X_i = \begin{cases} \text{region of residence} & X_1 \\ \text{age of caregiver} & X_2 \\ \text{gender of caregiver} & X_3 \\ \text{employment status of caregiver} & X_4 \\ \text{income of caregiver} & X_5 \\ \text{education level of caregiver} & X_6 \\ \text{per capita expenditure} & X_7 \end{cases}$$

ε_{ij} is the error term which will be assumed to have a logistic distribution. Analytically, the binary probability of option j conditional on X is given as:

$$\text{prob} (Y = j / X_i) = \frac{e^{\beta_j X_i}}{1 + e^{\beta_j X_i}} \text{ for } j = 0, 1 ; \beta = 0$$

Where $\text{Prob} (Y_i = j | X_i)$ indicates the probability of a caregiver or individual "i" choosing the treatment option "j"; j = 0 or 1 [j = 1 if the individual sought care and j = 0 if caregiver did not seek care]. X represents a vector of individual or household characteristics. The option of doing nothing will provide the base or reference category.

3.5.2 The Determinants of risk of Financial Catastrophe

In the second model, the study will seek to establish the determinants of financial catastrophe associated with seeking outpatient treatment for under-five children suffering from malaria illness. In line with the literature, a household is considered to have experienced financial catastrophe if they reported financing healthcare using any of the following four mutually exclusive options: sold assets, borrowed money, asked a relative or friend to pay, or paid too much (above the CHE level).

Dependent Variable

Financial Catastrophe can then be defined as a binary variable as follows:

$$Y_j = \begin{cases} 1 & \text{if a caregiver financed health care by:} \\ & \text{selling assets} \\ & \text{borrowing} \\ & \text{asking a relative to pay} \\ & \text{paid too much (CHE)and} \\ 0 & \text{Otherwise} \end{cases}$$

The response is binary and Y_j can take the values 1 or 0 with probability p and $1-p$ respectively. Analytically, the binomial probability of being at risk of financial catastrophe (option 1) conditional on X is given as:

$$\text{prob}(Y = j / X_i) = \frac{\exp Y'}{1 + \exp Y'} = \frac{e^{a + \beta_j X_i}}{1 + e^{a + \beta_j X_i}} \text{ for } j = 0, 1 ; \beta_0 = 0$$

Where X_i is a set of covariates included in the first model (X_i) plus some additional determinants like distance travelled in seeking care and type of provider visited.

3.6. Diagnostic Tests

Diagnostic tests were run on the data to ensure precise and meaningful estimation of our models. Specifically, we ensured that the models were correctly specified; there was no Multicollinearity, there was no Heteroscedacity and there were no influential data points (outliers).

3.6.1. Model specification

The Wald Test

Despite the theoretical basis of variable choices, we examined the model specification using the Wald Test. A Wald Test is a more simplistic test for independent variable significance. Income, education and age were tested, following theory. The null hypothesis that the variables are equal to zero was rejected and we concluded that; the model cannot be improved by dropping any of the variables

Table 1: Results of the Wald Test

Model	Wald Chi2	Prob > Chi2
Health Seeking Behaviour	29.41	0.0000
Financial Catastrophe	28.58	0.0000

The Link Test

The Link Test was used to detect specification error. The idea behind the link test is that if the model is properly specified, one should not be able to find any additional predictors that are statistically significant except by chance. In both models the variable \hat{y} which is the predicted value of the model was statistically significant, and \hat{y}^2 was insignificant. Hence this is an indication that the model was correctly specified (no relevant variables were omitted).

Table 2: Results of the Link Test

Model	\hat{y} $P > z $	\hat{y}^2 $P > Z $
Health Seeking Behaviour	0.004	0.136
Financial Catastrophe	0.000	0.689

3.6.2. Multicollinearity

In accordance with economic theory and the nature of cross-section data, there was no reason to suspect multicollinearity to be a serious problem. However, to completely rule out multicollinearity among independent variables, the VIF Test was conducted. The VIF mean in both models was less than 10, hence showing that multicollinearity was not a serious problem.

Table 3: Variance Inflating Factors

Model	VIF Mean
Health Seeking Behaviour	1.77
Financial Catastrophe	1.91

3.6.3. Heteroscedasticity

When regression disturbances have variances that are not constant across observations, they are said to be heteroskedastic, and this leads to inefficient estimators. The Breusch-Pagan Test was conducted to determine whether the variance of the error terms were not constant over time. In the financial catastrophe model, the probability was insignificant and so the null hypothesis of constant variance held. However in the health seeking model the null did not hold and study adopted the Huber-White standard errors to control for heteroscedasticity. The significant advantage of using these robust standards errors is that they are asymptotically valid in the presence of many forms of heteroscedasticity.

Table 4: Results of Heteroscedasticity

Model	Wald Chi2	Prob > Chi2
Health Seeking Behaviour	220.97	0.0000
Financial Catastrophe	0.85	0.3562

CHAPTER FOUR

RESULTS

4.1. Descriptive Statistics

The data indicates that 24.5 percent of children under the age of five years were reportedly ill in the four weeks prior to the nationally representative 2014 ZHHEUS and 51.8 percent of all ill children reported to have suffered malaria symptoms. It was observed that 6 percent of caregivers of children under the age of five years reporting to have suffered malaria symptoms did not seek care, either professional or self-medication. On the other hand 94 percent of caregivers either sought professional care or self medicated. About 54.6 percent of caregivers who sought professional care visited a public health centre and only 1.7 percent visited private facilities. Further, 41.9 percent of all caregivers sampled in the survey resided in urban areas and about 24.6 percent were female.

Further, the results show that 16.5 percent of households, who incurred health expenditure when seeking malaria treatment services for their children under the age of five years, faced one form of hardship financing or another. The major source of hardship financing was asking a friend/relative to pay (11.9 percent). About 4.9 percent either borrowed money to pay or paid too much (above 10 percent of their income) or sold assets to meet the OOP expenditure. It is also noteworthy that 6 percent of caregivers who reported that their children suffered from malaria did not seek care due to treatment costs, which indicates avoidance of financial hardships.

Table 5 below provides a summary of the descriptive statistics for the; regional, socioeconomic, treatment seeking behaviour, expenditures and sources of funds for caregivers in the sample:

Table 5: Descriptive Statistics

Variable Name	Variable Description	Statistic
Illness prevalence (%)	% of under 5 reported to suffer any illness in 4 weeks prior to survey	24.5
Prevalence of malaria among the ill (%)	% of under 5 with malaria illness	51.8
Gender of household head sampled (%)	Male = 1 Female = 2	75.4 24.6
Age in years	Age mean for household head	43.3
Region of residence for heads (%)	Rural = 1 Urban = 2	58.1 41.9
Employment status of head (%)	Other = 0 Salaried employee = 1	77.4 22.6
Per capita household monthly expenditure, in Kwacha	Total household monthly consumption expenditure divided by the number of household members.	214.7
Education of the head (%)	No formal education	10.6
	Primary education	43.1
	Secondary education	34.4
	Tertiary education	11.9
Distance travelled in kilometres	Mean	5.2
Provider type consulted by caregiver of child under 5 (%)	Public hospital	9.6
	Public health centre	54.6
	Public health post	18.5
	Mission health facility	6.2
	Private health facility	1.7
	Other facilities	9.6
Expenditure incurred in seeking treatment for other diseases, in ZMK	Mean or average	183.9
Care options among caregivers of under 5 with Malaria symptoms (%)	Sought care Did nothing	94 6
Source of funds among caregivers of under 5 (%)	Sold assets	0.3
	Borrowed	1.3
	Asked a friend/relative	11.9
	Paid above 10%	2.9
	Paid cash	81.7

4.2. Determinants of Demand for Malaria Treatment

The health care seeking behaviour model classified the health care options facing a caregiver whose child suffered from malaria as a binary option, to seek care (professional care or self-medication) or do nothing (reference category).

Table 6: Results of the Binary Logistic Regression for Health Care Seeking Behaviour

Variable Name	Coefficients	Standard errors
	Binary Logistic Regression	
Gender (Male = 1; Female = 2)	-0.0109	0.0117
Age in years	-0.0042	0.0045
Region (Rural =1; Urban = 2)	0.0110	0.0210
Employment (Salaried=1; Other=0)	0.0134	0.0286
Log (Per capita total household monthly expenditure)	0.0207***	0.0046
No formal education (Base Category)	-	-
Primary education	0.0263	0.0163
Secondary education	0.0362**	0.0159
Tertiary education	0.0126	0.0288
Number of observations	1120	
Wald Chi2	29.41	
Prob > Chi2	0.0000	
Chi2 (2) for Link test	37.88	
Prob for _hatsq	0.136	

Note: * represents significance at the 10 percent level, ** represents significance at the 5 percent level and *** represents significance at the one percent level. The base care option was doing nothing

We found that only two variables (per capita total household monthly expenditure and secondary education level of caregiver) were significant determinants of the demand for malaria treatment services for children under the age of five years as summarised in the table above.

Our study findings indicate that, for a Kwacha increase in per capita monthly expenditure, the log-likelihood of seeking care would be expected to increase by 0.02 *ceteris paribus*. This means that, an increase in per capita monthly expenditure raise the probability of a caregiver to either self-medicate or seek professional care for a child who suffers from malaria.

Our study findings indicate that, for a child from a household whose head has a secondary school education level, relative to one whose head has no formal education; the likelihood of seeking care would be expected to increase by 0.04 *ceteris paribus*. It is worthy to note that we do not find primary and tertiary education of the household to be a significant influence of the decision to seek care or not.

Our study findings indicate that, *ceteris paribus*, the gender of a caregiver i.e. whether male or female does not significantly influence the probability of a caregiver to seek care. For female caregivers relative to males, the likelihood of seeking care was expected to reduce *ceteris paribus*.

The findings indicate that, *ceteris paribus*, the age of a caregiver does not significantly influence the probability of a caregiver to seek care. For a one year increase in the age of a caregiver, the likelihood of seeking care was expected to reduce *ceteris paribus*.

The study findings indicate that, *ceteris paribus*, the region of residence i.e. whether rural or urban does not significantly influence the probability of a caregiver to seek care. For individuals in urban areas relative to individuals in rural areas, the likelihood of seeking care was expected to increase *ceteris paribus*.

The findings indicate that, *ceteris paribus*, employment status i.e. whether salaried or other forms do not significantly influence the probability of a caregiver to seek care. For a caregiver who is a salaried employee, relative to one who takes up other forms of employment; the likelihood of seeking care was expected to increase, *ceteris paribus*.

4.3. Determinants of the Risk of Financial Catastrophe Associated with Malaria Treatment

The second model classified financial catastrophe faced by caregivers of children under the age of five years as a binary option, to experience financial catastrophe or not (reference category).

Table 7: Results of the Binary Logistic Regression for the Financial Catastrophe Model

Variable Name	Coefficients	Standard errors
Gender (Male = 1; Female = 2)	0.0748	0.0809
Age in years	-0.0165	0.0310
Region (Rural =1; Urban = 2)	0.0208	0.1072
Employment (Salaried=1; Other=0)	0.0529	0.1042
Log (Per capita total household monthly expenditure)	-0.2979***	0.0563
No formal education (Base Category)	-	-
Primary education	-0.0368	0.1783
Secondary education	-0.0580	0.1807
Tertiary education	0.0396	0.2174
Distance travelled in kilometres	0.0063*	0.0033
Public hospital (Reference Category)	-	-
Public health centre	0.0986	0.1295
Public health post	-0.0493	0.1652
Mission health facility	-0.0406	0.2321
Private health facility	0.4321***	0.0541
Number of observations	1120	
Wald Chi2	28.58	
Prob > Chi2	0.0000	
Chi2 (2) for Link test	65.85	
Prob for _hatsq	0.689	

Note: * represents significance at the 10 percent level, ** represents significance at the 5 percent level and *** represents significance at the one percent level. The base was those who did not face financial catastrophe

We found that only three variables were significant determinants of a caregiver experiencing financial catastrophe in seeking malaria treatment services for children under the age of five years as summarised in the table above.

Our study findings indicate that, for a Kwacha increase in per capita monthly expenditure, the log-likelihood of experiencing financial catastrophe would be expected to reduce by 0.3 *ceteris paribus*. This implies that households with lower per capita monthly expenditure are at high risk of experiencing financial catastrophe, compared to households with higher per capita monthly expenditure when seeking malaria treatment services for a sick child.

Our findings show that the coefficient for distance to the health care provider is positive and highly significant at the 1 percent level. For a 1 km increase in distance from home to health facility, the likelihood experiencing financial catastrophe would be expected to increase by 0.006 *ceteris paribus*.

The findings indicate that, *ceteris paribus*, the type of provider chosen by a caregiver significantly influence the probability of a caregiver experiencing financial catastrophe. For a caregiver who goes to a private health facility compared to public hospitals, the likelihood of experiencing financial catastrophe would be expected to increase by 0.43 *ceteris paribus*.

Education of a caregiver whether primary, secondary or tertiary relative to having no formal education did not significantly impact on the likelihood of a caregiver experiencing financial catastrophe. We expected that an increase in education level of a caregiver would reduce the likelihood of experiencing financial catastrophe.

Our study findings indicate that, *ceteris paribus*, the gender of a caregiver i.e. whether male or female does not significantly influence the probability of a caregiver experiencing financial catastrophe. For female caregivers relative to males, the likelihood experiencing financial catastrophe was expected to increase *ceteris paribus*.

The study findings indicate that, *ceteris paribus*, the region of residence of a caregiver i.e. whether rural or urban does not significantly influence the probability of a caregiver experiencing financial catastrophe. For individuals in urban areas relative to individuals in rural

areas, the likelihood of experiencing financial catastrophe was expected to increase by *ceteris paribus*.

The findings indicate that, *ceteris paribus*, employment status i.e. whether salaried or other forms do not significantly influence the likelihood of a caregiver experiencing financial catastrophe.

The findings indicate that, *ceteris paribus*, the age of a caregiver does not significantly influence the probability of a caregiver experiencing financial catastrophe. For a one year increase in the age of a caregiver, the likelihood of experiencing financial catastrophe would be expected to reduce, *ceteris paribus*.

CHAPTER FIVE

DISCUSSION

The study examined the financial catastrophe associated with out-of-pocket payments for malaria treatment in children under the age of five years in Zambia. Financial catastrophe is the major issue in financing health services in Zambia and the rest of Africa due to: randomness of illness events which render rational decision making difficult, lack of insurance markets, lack of liquidity due to poverty and seasonality of incomes in most rural parts of the country, and lack of credit markets where people can borrow to smoothen consumption. Hardship financing was exemplified by; borrowing money, asking someone else to pay for them, or selling personal or household items, and CHE.

5.1. Individual Factors That Influence the Likelihood of a Caregiver to Seek Malaria Treatment Services for a Child under the Age of Five Years

Our study findings indicate that, for a Kwacha increase in per capita monthly expenditure, the log-likelihood of seeking care would be expected to increase by 0.02 *ceteris paribus*. This means that, an increase in per capita monthly expenditure raise the probability of a caregiver to either self-medicate or seek professional care for a child who suffers from malaria.

Our study findings also indicate that, for a child from a household whose head has a secondary school education level, relative to one whose head has no formal education; the likelihood of seeking care would be expected to increase by 0.04 *ceteris paribus*. It is worthy to note that we do not find primary and tertiary education of the household to be a significant influence of the decision to seek care or not.

Further, our findings show that: the gender of a caregiver, age of a caregiver, the region of residence and the employment status of a caregiver; do not have a significant influence on the probability of a caregiver seeking care for a child who suffers from malaria, *ceteris paribus*.

Our study findings suggest that income (proxied by household per capita expenditure) raise the probability of a caregiver to seek malaria treatment services for a child. The reason for this could be that, since healthcare is one of the inputs used to produce health, it is priced, and therefore higher income families may have better access to care as well as more opportunities to purchase

care; whereas a caregiver with lower income may be confronted with more stressful situations, which are detrimental to seeking healthcare. Our findings are in line with the predictions of the Grossman model which suggests a positive relationship between income (proxied by household per capita expenditure) and the demand for healthcare. This result is also widely supported by existing empirical literature. Our results affirm those of Xu et al. (2012) who conducted a study in Myanmar, and found that families with an average annual income per person of more than \$200 were more likely to seek treatment within 24 hours. Our findings were also in line with those of Dzator and Asafu-Adjaye (2004) and Muhumuza et al. (2015) who found that income was a significant factor, as caregivers with higher incomes were more likely to use public and private providers. Our findings were also in line with those of Hamooya et al. (2016) who conducted a study on treatment-seeking behaviour for childhood fever among caretakers of Chavuma and Magoye rural communities of Mazabuka in Zambia. Results from the longitudinal regression showed that poor social-economic status of consumers was a reason for delay to seek treatment care among mothers or caregivers of under-five children. However our findings contradict those of Franckel and Lalou (2009), who found that economic status of the households did not seem to be a significant factor in determining health seeking behaviour. It appears that this study departs from the findings by other author's, maybe due to difference in methods used; as this is the only study that used a backward stepwise binary logistic regression model.

Our results show that, for a child from a household whose head has a secondary school education level, relative to one whose head has no formal education, the likelihood of seeking care would be expected to increase by 0.04 *ceteris paribus*. It is worthy to note that we do not find primary and tertiary education of the household to be of significant influence on the decision to seek care or not. The reason could be that, people acquire more knowledge on the causes of various diseases and the best cure in junior secondary, as subjects like science are offered. At senior secondary level, subjects like biology offer vast knowledge on the causes and cures of various diseases. Mostly a caregiver who has attained secondary education level has knowledge on how malaria can be cured, and tends to demand more medical care for a sick child. Primary and tertiary education could have been insignificant because not much knowledge on diseases is gained in primary school and a large number of people who enroll at universities and colleges don't specialize in human Biology or pharmacy. According to the Grossman model, an increased

level of education makes the individual a more efficient producer of health, since education increases an individual's health prevention ability, through; health knowledge, healthy lifestyle, processing health information, and so on. It is therefore expected that a more educated individual or caregiver is more likely to use fewer malaria treatment services to attain a given state of health. Our results affirm those of Muhumuza (2015) who found that Caregivers who had attained secondary education were more likely to seek formal health care compared to those who had other levels. The findings were also in line with those of Mbagaya et al. (2005) and Kante et al. (2015) who found that, children living with an educated caregiver were more likely to receive formal care at a facility than to receive no care or home care, compared to those who lived with uneducated caregivers.

Our findings show that: the gender of a caregiver, age of a caregiver, the region of residence and the employment status of a caregiver; do not have a significant influence on the probability of a caregiver to seek care for a child who suffers from malaria, *ceteris paribus*. In the literature there are however mixed findings on how these variables influence health seeking behaviour due to differences in methods used, data, definitions adopted, etc., which limits the generalization of results.

5.2. Factors Associated with the Likelihood of Experiencing the Risk of Financial Catastrophe when Seeking Malaria Treatment Services for a Child

Our study findings indicate that, for a Kwacha increase in per capita monthly expenditure, the log-likelihood of experiencing financial catastrophe would be expected to reduce by 0.3 *ceteris paribus*. Studies have shown that households with severely limited incomes or resources are associated with increased likelihood of facing financial distress in meeting healthcare payments for under-five children.

Our findings show that the coefficient for distance to the health care provider is positive and highly significant at the 1 percent level. For a 1 km increase in distance from home to health facility, the likelihood experiencing financial catastrophe would be expected to increase by 0.006 *ceteris paribus*.

The findings indicate that, *ceteris paribus*, the type of provider chosen by a caregiver significantly influence the probability of a caregiver experiencing financial catastrophe. For a caregiver who goes to a private health facility compared to public hospitals, the likelihood of experiencing financial catastrophe would be expected to increase by 0.43 *ceteris paribus*.

It is worth noting that the age of a caregiver, the gender of a caregiver, region of residence, employment status and education level of a caregiver do not at all influence the likelihood of experiencing the risk of financial catastrophe due to differences in methods used, data, definitions, etc., which limits the generalization of results.

One possible explanation of the negative relationship between income (per capita monthly expenditure) and the likelihood of experiencing financial catastrophe is that, households with less income have a lower ability to pay for treatment services and may in some instances resort to other means of financing like borrowing, selling of household assets and asking someone else to pay. On the other hand caregivers who have more money are at low risk of experiencing financial catastrophe because, most of them have the ability to pay for medical services and don't resort to hardship methods financing. Our findings affirm those of Njagi et al. (2018), Ilunga-Ilunga (2015) and Masiye and Kaonga (2019), who found that income level was the most consistent determinant of financial catastrophe; with higher-income groups being less likely to incur CHE relative to lower-income groups.

One possible explanation of the positive relationship between distances travelled from home to the health facility is that, long distance to health facility raises transportation costs and related expenses, which constitute a significant portion of total healthcare OOPs, which may cause financing hardships. These hardships are generally higher in rural areas where distances are longer. The number of healthcare facilities in the country is still insufficient as distance continues to be a barrier to accessing malaria treatment for children under the age of five years. Our findings affirm those of Njagi et al. (2018), Binnendijk et al. (2012) and Masiye and Kaonga (2019), who found that distance to the health facility is associated with an increased likelihood of catastrophic health expenditure; highlighting the significance of distance in increasing cost of access to health care. The study also affirms the findings of Xu et al. (2012), Kante et al. (2015)

and Hogan and Adindu (2013) who found distance to be highly significant, as households located further from a health facility were less likely to seek early treatment.

The findings indicate that, for a caregiver who goes to a private health facility compared to public hospitals, the likelihood of experiencing financial catastrophe would be expected to increase by 0.43 *ceteris paribus*. One possible explanation for this could be that, even poor patients in urban areas do visit private facilities because of the perception that public healthcare is of poor quality especially in terms of; shortage of drugs, inadequate medical examination and overcrowding. This then raises the risk of financial catastrophe. Following the abolition of user fees in rural areas and exemption policies instituted in most public healthcare facilities, we expected caregivers to visit public providers and mission healthcare facilities for malaria treatment to reduce the risk of financial catastrophe compared to those seeking professional treatment from alternative health care providers. Our findings affirm those of Tahsina et al. (2018) and Njagi et al. (2018) who found that, seeking care from a private health facility is associated with increased risk of financial catastrophe relative to seeking care at a public facility.

5.3. Study Limitations

Finally, this study has a number of limitations. The first is that, household surveys are subject to recall bias in reporting out-of-pocket expenditure which could affect our calculation of CHE based hardship financing, since it might have been a challenge for the caregivers who responded to remember everything about their children under five years. People have been shown to underreport either illness experience or expenditure. The second limitation is that, the survey did not ask about the source of borrowing (i.e. whether these were commercial or interest free loans) or the amount borrowed. Local money lenders charge so high interest, that the amount to be repaid is much higher than the amount borrowed. Such information could be useful to analyse more fully, the level of financing hardship imposed by health payments. The third limitation is the lack of data on admission or hospitalization, which makes it difficult to establish the quality of care received by in-patients.

Fourthly, the national malaria policy seeks to ensure 85 percent of patients seek treatment within 24 hours of symptom onset. Therefore, it would also have been interesting to establish how quickly treatment was sought from the onset of symptoms, but the survey instrument did not

capture this information. Finally, the study could have adopted a multinomial logistic regression model to analyse HSB as the dependent variable “care option” had three categories; sought professional care, self-medicated and did nothing. However, two categories in the care option variable; sought professional care and self-medicated were combined to form a new category, sought care. This was due to the fact that, regressing the care option variable with three categories did not produce meaningful results as most of the variable that influenced HSB turned out to be insignificant. The result only become meaningful after combining the two categories to form a binary variable

These limitations notwithstanding, the findings from this study are consistent with similar studies on financial hardships associated with healthcare visits.

CHAPTER SIX

CONCLUSION AND STUDY RECOMMENDATIONS

6.1. Conclusion

The study had two objectives. The first objective was to determine the factors that influence the decision by a caregiver, whether to seek health care once a child under the age of five years suffers an episode of malaria illness or not. Additionally, the study sought to determine the factors associated with the likelihood of a caregiver experiencing financial catastrophe when seeking malaria treatment for children under the age of five years. The study utilised data from the ZHHEUS 2014. A binary logistic regression was used to analyse the demand for under-five malaria treatment and the determinants of financial catastrophe.

The data indicates that 24.47 percent of children under the age of five years were reportedly ill in the four weeks prior to the nationally representative 2014 Zambia Household Health Expenditure and Utilisation Survey and 51.76 percent of all ill children reported to have suffered malaria symptoms. It was observed that 6 percent of caregivers of children under the age of five reporting to have suffered malaria symptoms did not seek care, either professional or self-medication. Our study findings indicate that, an increase in per capita monthly expenditure increases the likelihood of seeking care *ceteris paribus*. Our study findings also indicate that, for a child from a household whose head had a secondary school education level, relative to one whose head had no formal education; the likelihood of seeking care would be expected to increase by 0.04 *ceteris paribus*. It is worthy to note that we do not find primary and tertiary education of the household to be a significant influence of the decision to seek care or not. Further, our findings show that: the gender of a caregiver, age of a caregiver, the region of residence and the employment status of a caregiver; do not have a significant influence on the probability of a caregiver, seeking care for a child who suffers from malaria, *ceteris paribus*.

Despite the removal of user fees on primary healthcare in the public sector, this study estimates that up to 16.53 percent of households who incurred health expenditure to seek malaria treatment services for their children under the age of five years, faced one form of hardship financing or another when coping with out-of-pocket healthcare payments. Furthermore, the disproportionate

share of the burden of hardship financing falls on caregivers with very low incomes, those that reside far away from the health facilities and those that visit private health providers, compared to those that take their children to a public health facility

6.2. Policy Recommendations

From the findings it is evident that for caregivers with lower incomes; their children have access to fewer or no malaria treatment services, especially if the health facilities are distant. Transportation costs reduce demand for professional care. Moreover, education, being a major determinant of accessing professional treatment services, implies that the less educated caregivers are disadvantaged and do not access appropriate treatment services for their children. Following the study findings on income and type of provider, we recommend the consideration of policy options which may enable children under the age of five years to have smooth access to health care services. Government should invest in building more health posts that have appropriate anti-malaria drugs and make malaria treatment free of charge. Building more health posts around the country will also reduce on high transport costs the caregiver would have to pay if they reside far away from the health facility. This will in turn reduce the risk of financial catastrophe especially among poor households.

It is also evident that caregivers with lower incomes are at risk of experiencing financial catastrophe and are thus less likely to seek professional care for their children under the age of five years. Financial catastrophe is positively correlated with out-of-pocket payments in total health spending. A reduction in the incidence of financial catastrophe requires the introduction or further development of prepayment mechanisms for health care like social health insurance, which is based on risk pooling. This would protect caregivers against financial insecurity and encourage them to seek healthcare for their children within the recommended 24 hours from the onset of symptoms.

Further, it is being recommended that the government escalate malaria awareness campaigns to promote the seeking of malaria treatment services within 24 hours from the onset of symptoms. A cost effective means of implementing such a campaign may be made through the educational system, especially at primary and secondary school levels. Another cost-effective option would be to collaborate with religious bodies on such awareness campaigns, since our analysis of the

statistics reveals that, nearly 98 percent of individuals in the entire sample belong to a religious grouping. Policy makers should therefore continue to promote the initiation and implementation of malaria prevention and treatment programmes.

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