

**OUT-OF-POCKET PAYMENT FOR HEALTHCARE AND ITS EFFECTS
ON HOUSEHOLD WELFARE IN RURAL AND URBAN AREAS OF
KENYA**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University or for any other award.

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DEDICATION

To my family Stephen, Angelaida and Sean and my parents for their support, encouragement, prayers and patience.

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ABBREVIATION AND ACRONYMS

CI	Concentration Index
HIV	Human Immunodeficiency Virus
KIHBS	Kenya Integrated Household and Budget Survey
OOP	Out-of-Pocket Payment
SDGs	Sustainable Development Goals
TB	Tuberculosis
WMS	Welfare Monitoring Survey

OPERATIONAL DEFINITION OF TERMS

Catastrophic expenditure occurs when out-of-pocket health expenditure exceeds 40 percent of total non-food expenditure.

Engels curve explains the relationship between consumer expenditure on a particular good and total income.

Incidence is the percentage of households spending more than certain threshold of out-of-pocket payment to total non-food expenditure.

Inequity is the difference found in the measure of economic well-being among quintiles in the population.

Out-of-pocket payment refers to the payments made by households at the point of receiving healthcare services.

Poor households are those households that live below the poverty line

Post-payment is the household's consumption after the subtraction of the payments for health care.

Poverty gap is the amount by which the poor households fall short of reaching the poverty line.

Poverty line is a level of household's income below which one is classified as poor

Pre-payment is the household's consumption per capita.

ABSTRACT

Good health plays an important role in boosting economic growth, poverty reduction and the realization of social goals. However, the Survey of Health Care Utilisation and Expenditure of 2013 found that the high cost of health care was one of the major reason cited by households for not seeking health care. Moreover, out-of-pocket (OOP) payment for healthcare is the main source of health care financing in Kenya. OOP spending on outpatient care and inpatient services accounted for approximately 78 percent (KShs 48.4 billion) and 22 percent (KShs 13.7 billion) respectively of total household health expenditures. The consequences of OOP are regressive: they lead to catastrophic financial payment and impoverishment, especially among the poor and are a barrier to health care utilization. Regional differences in the incidence of poverty exist in Kenya, where 50.5 and 33.5 percent of rural and urban areas are poor. The objectives of this study were: to investigate the incidence of OOP payment for health care among different economic groupings; establish the level of inequity of OOP health expenditure among different economic groupings; examine the determinants of catastrophic OOP, establish the effect of catastrophic OOP payments for healthcare to households; find out the households coping mechanism to OOP payments for healthcare. Household Survey data of Health Care Utilisation and Expenditure of 2013 was utilized by the study. Logit regression was estimated to predict the probability of catastrophic health expenditure in respect to the selected background indicators. This included social, economic and demographic indicators. To measure impoverishment due to OOP, two methods were adopted: poverty headcount and poverty gap. Engel curves were estimated to analyze the coping mechanisms to catastrophic health care expenditure. The results of the study showed that the poorest households in the rural and urban areas had the highest number of households experiencing catastrophic health expenditures than urban households. However, the burden of OOP payment for healthcare fell more on the rich. The results also showed that household size, income, mission hospital, and age of household member below 5 years, accidents/injuries, sex of household head, age of above 50, chronic illness, malaria, disease of respiratory, type of hospital, insurance status, and income were the factors determining catastrophic health care expenditure. The effect of OOP payment for healthcare on poverty head count was higher in urban areas than in rural areas. In addition, the average amount by which people go below poverty line because of OOP payment for healthcare, increased more in the urban areas compared to rural areas. Lastly, the results of the study showed that households were not able to smoothen their non-medical consumption in an event of catastrophic health care expenditure. From the findings of the study, there is need for the governments at both national and county levels to design health financing system that will protect poor households from catastrophic health payment. One way is to provide health insurance for the poor households.

CHAPTER ONE

INTRODUCTION

1.1 Background

Countries without universal insurance coverage expose its citizens to catastrophic health expenditure. This is because households will be required to pay for the health care services received. The cost of health care will include both direct and indirect expenses, such as out-of-pocket (OOP) for health care. Some households will not earn income because they will not be able to work, also there is transport cost which households incur while seeking healthcare. The direct and indirect health expenditure normally constitutes a large proportion of a household's total expenditure and may push many into poverty (Krishna, 2006).

To cope with health expenditure people adopt various strategies depending on the amount of health expenditure incurred. For example, some may use their savings or sell assets, if the current income is not enough. Some may borrow from friends and family or some may borrow from financial institutions using collateral (Leive and Xu, 2007). Households may also reduce consumption in order to pay for their healthcare. This might affect households' welfare if the goods that are sacrificed were suppose to help households out of poverty (Gertler, Levine and Moretti, 2002)

The Sustainable Development Goals (SDGs) seeks to ensure that, there is eradication of extreme poverty for all people everywhere, and also that people have good health and well-being (UNDP, 2015). OOP for healthcare can prevent households from seeking healthcare and those who do so can be pushed into poverty. Reducing OOP for health care could contribute substantially to income poverty decline (Garg, 2005). Majority of the countries health financing in the world is OOP ((World Health Organization, 2005). Therefore, the primary goal when designing health care financing reform strategies should be that any health financial method should protect households against high levels of OOP. High levels of OOP for health care violate the vertical equity, which requires that payments should be progressive (World Health Organization, 2000). This will ensure that the rich shoulder the biggest proportion of health expenditure.

The major challenge that countries experience while coming up with health financing system is the designing of a system that will protect households from the risk of impoverishment resulting from OOP for health care, and ensure that its citizens can cheaply receives health services when they need. When households pay from their pockets at the point of receiving health services this can lead to individuals spending high proportion of their income on healthcare, therefore, reducing the amount to spent on other items. Sometimes individuals can be prevented from seeking health services when they cannot afford (Cavagnero *et*

al., 2006) If preventive and curative services delivered by health systems can make a difference in people's health, then with an improvement in people's health, rarely will households be falling ill and therefore poor households will get an opportunity to escape poverty because they will not incur any OOP for health care (Whitehead, Dahlgren and Evans, 2001; Kawabata, Xu and Carrin 2002).

The World Health Organization has emphasized the need to protect households from catastrophic medical expenses and impoverishment arising from seeking health care. This can be achieved by ensuring that there is universal health insurance cover. OOP for health care may cause unwanted effects like households ending up incurring catastrophic health expenditure (CHE), some of the households may be pushed into poverty and others may fail to seek the care needed (World Health, 2000). The WHO also calls for health financing systems to ensure that health care costs do not prevent people from receiving needed health services (World Health Organization, 2005). It estimated that about 150 million people in the world suffer catastrophic OOP for health care each year due to health care payments and about 100 million people who were not previously poor are driven into poverty because of OOP for healthcare (Xu *et al.*, 2007)

Catastrophic OOP for health care occur in both rich and poor countries, but over 90 percent of the people affected are from low-income countries (Xu *et al.*, 2003).

Catastrophic OOP for health care can occur regardless of the amount of money paid for health care services. The rich households might incur high OOP for health care without experiencing negative implications, while the poor can spend less on health care and this might have negative implications on their livelihoods (Xu *et al.*, 2003 and Chuma *et al.*, 2007).

In low-income countries Africa included health care is mostly funded through OOP. The OOP for health care does not offer any financial risk protection and therefore, many households are impoverished (Xu *et al.*, 2003). OOP for health care discourages some households from seeking care because they cannot afford to pay or may be forced to forgo seeking care (Preker *et al.*, 2002). Several coping mechanisms are normally adopted by households to meet the costs of seeking care. These strategies can be useful in the short-term, but might drive households into poverty or deepen poverty for those who are already poor (Xu *et al.*, 2003).

1.1.1 History and Sources of Health Care Financing in Kenya

Kenya's health system has been predominantly tax-funded since independence, but a series of health financing policy changes have been gradually introduced. Kenya was the first African country to introduce compulsory health insurance in 1966. This was compulsory for salaried workers, but later in 1972 the programme was expanded to include the self-employed. The schemes expansion progressed

well, but despite the progress in expansion it was established in 2007 that the scheme had covered only 25 percent of the population with 1.5 million members, and eight million dependents (Dahlgren, 1991).

The cost –sharing was introduced in 1989 (Dahlgren, 1991). Then in 1990 user fees were abolished for outpatient care. This was inspired by concerns about social justice. During that period when user fee had been abolished, government health centres reported an increase in attendance by 41 percent. This abolition also caused a movement of patients from the private sector to government health. In 1992, the fees were re-introduced due to governments budgetary constraints. In the cost-sharing period from 1992 attendance in public clinics dropped by about 50 percent (Mwabu *et al.*, 1995).

In 2004, health care at dispensary and health centre levels were to be free for all citizens, except for a minimal registration fee in government health facilities (Republic of Kenya, 2004). In the same year legislation for the National Social Health Insurance Fund (NSHIF) was submitted to Parliament. It was conceived as a compulsory insurance scheme with income-related contributions, and that aims to cover the entire population at an affordable cost for all. It was aimed at achieving coverage levels at 60 percent to 80 percent nine years after implementation with rapid inclusion of the poor (up to 100 percent) as a priority

over the transition period (Republic of Kenya, 2004). The new scheme was to take over the infrastructure of the existing insurance, by accrediting and remunerating private service providers. It was also to bring the public and private sectors under one financing umbrella. However, the social health insurance law was not ascended into law.

The sources of health financing in Kenya are: public taxes (33 percent); aid partners (15 percent); private out of pocket (41 percent); and private risk pooling (10 percent) (Republic of Kenya, 2010). The user fees were to be charged with exemptions of the poor, the unemployed, the elderly, the orphans, maternal and the children, HIV, Tuberculosis, immunisation and leprosy, but it has not been possible to implement these exemptions because of budgetary constraints.

1.1.3 Out-of-Pocket Payment and Household Welfare in Kenya

Good health is important in ensuring that an economy grows, poverty is reduced and that individuals are able to realize their social goals. With good health individuals are able to achieve their personal ambitions, and are able to exercise their political rights (Republic of Kenya, 2007). The consumptive benefit that one can derive from one's income depends on one's state of health. Poor health for instance, makes it impossible for the person affected to enjoy the nice things in

life. Only someone who is in good health can earn an income on the labour market (Zweifel, 2009).

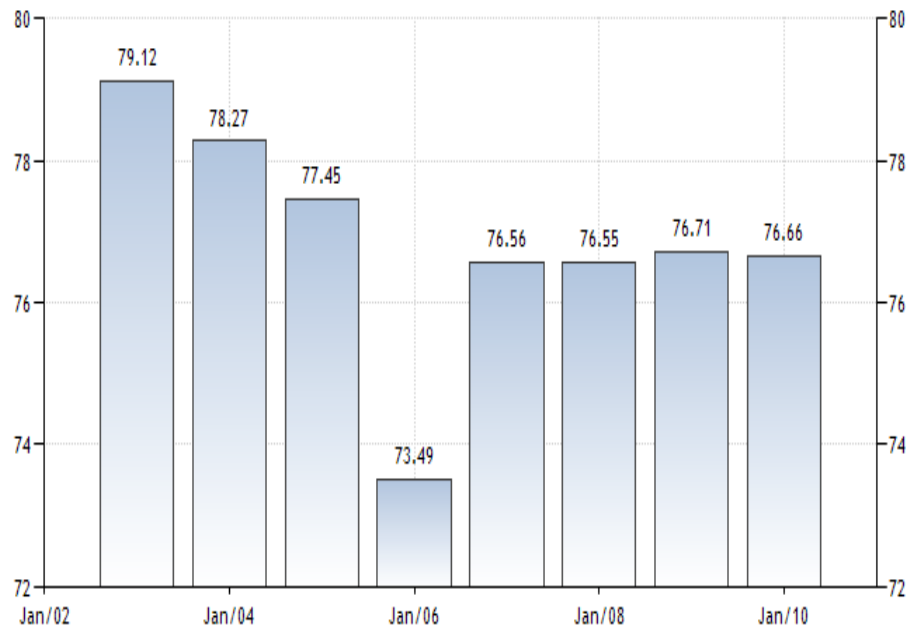
A population's material welfare is a crucial component of its communal well-being and a key factor in influencing prospects for economic growth and self-determined development. High rates of poverty burdens those directly affected and impede national development. It constrains national development by reducing overall domestic demand, hindering socio-political participation, and preventing the realization of human populations' full potential (Wiesmann *et al.*, 2014).

The Kenya government, multilateral and bilateral donors as well as non-governmental organizations (NGOs) have focused on helping Kenyan's poorest people to access the basic goods and services for survival. They have also fought to alleviate extreme poverty and deprivation. However, national poverty rates are still over 40 percent (KNBS, 2015). This means that nearly half of Kenya's populations are still poor.

Majority of Kenyans still do not have access to affordable healthcare. Preventable diseases like HIV/AIDS, malaria and tuberculosis as well as road carnage cases continue to exact a heavy toll on the population. In addition, poor health imposes a heavy burden on society and slows down economic growth. Illness in the family is one of the major causes of the reductions in incomes and assets of Kenyans,

increased dependency ratio, closure of businesses and sale of assets to take care of the sick, diversion of resources from investment to curative services, and in education, there is high dropout rate to take care of a sick family member or lack of school fees (Republic of Kenya, 2007)

The health sector in Kenya relies heavily on OOPs. OOPs are charged for health services sought from both the public and private sector. The Out-of-pocket payment for health (percentage of private expenditure on health) in Kenya was last reported at 76.66 percent in 2010 (World Bank, 2012) as shown in the Figure 1.1.



Source: World Bank (2012).

Figure 1.1: Out-of-Pocket Payment as a Percentage of Private Health Expenditure in Kenya

The OOP for health care spending (percentage of private expenditure on health) has been high ranging between 79.12 percent in 2002 and 76.6 percent in 2010. Out-of-pocket payments as percentage of total health expenditure accounted for 44.8 percent and 29.1 percent in 2001/2002 and 2005/2006, respectively (Republic of Kenya, 2003 and 2009). OOP spending per capita for outpatient and inpatient health expenditure is shown in Table 1.1.

Table 1.1 Trends in Out-of-pocket Payments

		2003	2007	2013
Outpatient	Overall spending (KShs billions)	50.4	25.1	48.4
	Per capita spending (KShs)	1570	676	1,254
Inpatient	Overall spending (KShs billions)	11.1	18.8	13.7
	Per capita spending (KShs)	343	505	355
Residence	Rural (Per capita spending (KShs))		236	1,259
	Urban (Per capita spending (KShs))		699	2,279
Total	Overall spending (KShs billions)	61.5	43.9	62.1
	Per capita spending (KShs)	1,913	1,181	1,609

Source: Republic of Kenya (2014) Household Health Expenditure and Utilisation Survey, 2013

Table 1.1 shows the total annual out-of-pocket payment on health. The OOP for health care increased in nominal terms, from KShs 61.5 billion in 2003 to KShs 43.9 billion in 2007, it then rose to KShs 62.1 billion in 2013, an increase of about 42 percent. In 2013, OOP payment on outpatient care accounted for approximately 78 percent (KShs 48.4 billion) of total household health expenditures, while spending on inpatient services accounted for close to 22 percent (KShs 13.7 billion). In addition, in urban areas annual per capita OOP payments for healthcare was KShs 2,279, while in rural areas it was KShs 1,259.

Given the cost of hospitalization, households and/ or individuals financed their inpatient health care from different source in Kenya as shown in Table 1.2

Table 1.2 Sources of Households' Health Care Financing

Source	Percent
Had cash available	67.3
Was given money by friends, relatives & family members	18.8
Borrowed money	7.4
Sold household assets	6.9
NHIF	5.6
"Harambee" contributions	3.5
Was given opportunity to pay later	2.8
Private health insurance	1.9
Waived/exempted	1.5
Community health insurance scheme	0.3
Reimbursed by employer	0.3

Source: Republic of Kenya (2014). Household Health Expenditure and Utilisation Survey, 2007

For about two thirds (67 percent) of the admissions, cash was available to pay for the hospitalized individuals. However, availability of cash to pay for the hospitalization varied by wealth quintile (75 percent amongst the richest households compared with 55 percent amongst the poorest households). Monetary support from friends and family members paid for 19 percent of admissions. For seven percent, households had to borrow money. Another seven percent had to sell household assets which included land, domestic animals and other assets to finance health expenditure which had important implications on equity and poverty. This was because this hampered the household's present and future earning potential and the household was exposed to the risks of experiencing

poverty and other deprivation. For 17 percent of admissions amongst the poorest households, assets had to be sold. In contrast, asset selling had to be done in less than one percent of admissions amongst the richest households (Republic of Kenya, 2009). This reduced welfare of the individuals concerned.

Substantial regional differences in the incidence of poverty exist in Kenya. About half of the rural population and between 29 and 50 per cent of the rural population were poor in the 1990s and 2000s (Gakuru and Mathenge, 2011). Table 1.3 shows the poverty estimates in Kenya;

Table 1.3: Poverty Estimates in Kenya

Summary of poverty estimates in Kenya				
Year	Data source	Poverty indices		
		National (%)	Rural (%)	Urban (%)
1994	1994 WMS11	40	46.8	29
1997	1997 WMS 111	52.3	52.9	49.2
1999	Small Area Estimation	52.6	52.8	49.5
2005	KIHBS	45.9	49.1	33.7
2009	KNBS	45.2	50.5	33.5

Source: Wambugu and Munga (2009)

Table 1.3 shows that the poverty rates in Kenya are very high. About half of the population in Kenya cannot meet the minimum level of basic needs and thus live in poverty. OOP for health care does not offer any financial risk protection and therefore with OOP healthcare payments, households might incur catastrophic health expenditure while others might be impoverished due to health care costs (Xu *et al.*, 2003).

1.2 Statement of the problem

Welfare of households can be reduced by Out-of-pocket (OOP) payments for health care. OOP for health care have a potential to interrupt households' material living standards because the money they spend on healthcare might otherwise have been spent on items such as food, clothing and shelter (O'Donnell *et al.*, 2008). OOP for health care consequences are regressive. They lead to catastrophic financial payment and impoverishment, especially among the poor and are a major barrier to health care. Despite these consequences, OOP for health care is still the main source of health care financing in Kenya (Republic of Kenya, 2014). Waiving mechanisms introduced to protect the poor from paying user charges have not been effective (Republic of Kenya, 2014; Mwabu, 1995; Mwabu *et al.*, 1995; Gilson and Mills, 1995). Furthermore, efforts that have been made to reduce user fees at the primary care level have not improved the situation.

Despite the effort made by the government, the OOP health payment is still high. In 2013, OOP spent on outpatient care accounted for approximately 78 percent (KShs 48.4 billion) of total household health expenditures, while spending on inpatient services accounted for close to 22 percent (KShs 13.7 billion) (Republic of Kenya, 2014). Given that the OOP for health care has been increasing, it is likely to worsen the welfare of households. Kenya's national poverty rate currently stands at 45.2 percent. The poverty rates in the rural and urban areas are

50.5 percent and 33.5 percent respectively (KNSB, 2009). This suggests that the living conditions of rural residents are worse than the prevailing conditions in the urban areas. In the Kenya Vision 2030, the government seeks to ensure that it provides equitable and affordable healthcare, which will reduce out-of-pocket health expenditure to 25 percent (Republic of Kenya, 2007). In addition, the vision also aims at establishing a socially just and equitable society without extreme poverty.

Studies have been conducted in Kenya on the level of OOP for health care (Leive and Xu; 2007, Chuma and Maina, 2012; and Kimalu, 2013). These studies focused on the effects of OOP payments for healthcare for the entire country. Moreover, these studies did not examine OOP for health care among different economic groupings in both rural and urban areas and yet this information is key for planning. They did not also focus on the effect of OOP for health care on household welfare and the coping mechanisms and yet the findings on the two could have enhanced their recommendations.

The government involvement in the provision of affordable health care services (Republic of Kenya, 2007; Republic of Kenya, 2014) enforces the idea of studying the extent of catastrophic OOP for health care among different economic groupings in Kenya. This knowledge is so important to the government, non-

governmental organizations (NGO's) and other stakeholders, in designing appropriate health care financing mechanisms that would promote access and equity among different socio-economic groupings. The purpose of this study was therefore to analyze the out-of-pocket payment for health care and its effects on household's welfare in rural and urban areas in Kenya.

1.3 Research Questions

This study sought to answer the following questions:

- i) What is the incidence of OOP for health care among different economic groupings in rural and urban areas?
- ii) What is the level of inequity of OOP for health care among different economic groupings in rural and urban areas?
- iii) What are the determinants of catastrophic OOP for health care in Kenya?
- iv) What is the effect of catastrophic OOP health care financing to households welfare in rural and urban areas?
- v) What are the households coping mechanism to OOP for health care in Kenya?

1.4 Objectives of the Study

The general objective of this study was to analyze the out-of-pocket payment for health care and its effects on household welfare in Kenya. The specific objectives were to:

- i) Investigate the incidence of OOP for health care among different economic groupings in rural and urban areas.
- ii) Establish the level of inequity of OOP for health care among different economic groupings in rural and urban areas.
- iii) Examine the determinants of catastrophic OOP for health care.
- iv) Establish the effect of catastrophic OOP for health care to households' welfare in rural and urban areas.
- v) Find out the households coping mechanism to OOP health care in Kenya.

1.5 Significance of the study

Findings of this study are important to the government, non-governmental organizations and other stakeholders in formulation of relevant policies that seek to reduce OOP health care. First, the government is enlightened on the areas that require policy changes and/or formulations geared towards the provision of the universal health insurance that aims at improving access to health care by all Kenyans and reducing the OOP for health care of different economic groupings. Secondly, the study provides more information as to the catastrophic nature of

having to pay directly out of pocket in order to access health care and advice on the effect of cost on access to health care and poverty. Thirdly, the study provides some very useful information on the impact of OOP for health care on household welfare and lastly the study enlightens the health stakeholders on the coping strategies employed by households in trying to cope with catastrophic health expenditure.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature on out of pocket payment on health is reviewed. Different studies are reviewed so as to shed some light on the factors that trigger OOP and the effect of OOP for healthcare on household's welfare in Kenya. The chapter starts with theoretical literature, followed by empirical literature, and finally overview of literature in which the knowledge gap is identified.

2.2 Theoretical literature

2.2.1 Growth of Gross National Product (GNP) as a Criterion of Welfare

Adam Smith implicitly accepted the growth of the wealth of a society. That is, the growth of the gross national product, as a welfare criterion. Adam Smith believed that economic growth resulted in the increase of social welfare because growth increased employment and the goods available for consumption to the community. To Adam Smith, economic growth meant bringing total welfare in a country (W) closer to optimal welfare W^* .

The growth criterion implies acceptance of the status quo of income distribution as ethical or just. However, growth may lead to a reduction in social welfare, depending on who avails most from it. However, the growth criterion highlights the importance of efficiency in social welfare. Given that social welfare depends on the amount of goods and services, efficiency is a necessary prerequisite for the maximization of the level of welfare (Kuotsoyiannis, 1991).

If income earned as the economy grows is used in paying for healthcare, then the welfare of individuals will not improve even if the economy is growing. The present study sought to analyze how OOP payment health care affects household's welfare.

2.2.2 Bentham's Criterion

Jeremy Bentham argued that welfare is improved when the greatest good is secured for the greatest number. Implicit in this dictum is the assumption that the total welfare is the sum of utilities of the individuals of the society. To illustrate Bentham's criterion, assume that the society consists of three individuals A, B, and C, so that

$$W=U_A+U_B+U_C.....2.1$$

Where W- total welfare of the society

U_A- total utility of individual A

U_B - total utility of individual B

U_C - total utility of individual C

According to Bentham $\Delta W > 0$ if $(\Delta U_A + \Delta U_B + \Delta U_C) > 0$.

If the utility levels of all individuals improve at the same time then the total welfare of the society will improve (Kuotsoyiannis, 1991). If individuals pay for their healthcare then their utility levels will decline, since they will not be able to or will reduce the consumption of non-medical goods. The study sought to establish how household's welfare will be affected after incurring catastrophic health expenditure.

2.2.3 A Cardinalist' Criterion

The law of diminishing marginal utility can be used as a criterion of welfare. It can be illustrated by the following example. Assume that the society consists of three individuals; A has an income of £1000, while B and C have an income of £500 each. Consumer A can buy double quantities of goods as compared to B and C. However, given the law of diminishing marginal utility, A's total utility is less than double the total utility of either B or C, because A's marginal utility of money is less than that of B or C, thus $W < W^*$. To increase social welfare, income should be redistributed among the three individuals. In fact cardinal welfare

theorists maintain that social welfare would be maximized if income was equally distributed to all members of the society (Kuotsoyiannis, 1991).

Out-of-pocket payments for healthcare can cause households to incur catastrophic expenditures, which in turn push them into poverty. Poor households are more affected compared to rich households. If income is equally distributed to all members in the society, the impact of OOP will affect all persons equally. The study sought to examine the effect of OOP on household's welfare.

2.2.4 The Pareto Optimality Criterion

This criterion refers to economic efficiency which can be objectively measured. According to this criterion, any change that makes at least one individual better-off and no one worse-off is an improvement in social welfare. Conversely, a change that makes no one better-off and at least one worse-off is a decrease in social welfare. A situation in which it is impossible to make anyone better-off without making someone worse-off is said to be pareto-optimal or pareto-efficient.

For the attainment of a pareto-efficient situation in an economy three marginal conditions must be satisfied: efficiency of distribution of commodities among consumers; efficiency of the allocation of factors among firms, and finally

efficiency in the allocation of factors among commodities. Applying the pareto optimality criterion to efficient distribution of commodities among consumes to the case of distribution of commodities Y and X, then a distribution of the given commodities X and Y between the two consumers is efficient if it is impossible by a redistribution of these goods to increase the utility of one individual without reducing the utility of the other (Arrow, 1963).

If households pay for their medical expenditure they will be made worse off and healthcare providers better off. Therefore, health policies should be devised in such a way that it will ensure households are cushioned from catastrophic effects of OOP for health care. It is therefore important to study the factors that trigger OOP for health care which the present study sought to explore.

2.2.5 Grossman Model

Individuals maximize their expected future lifetime utility, which depends on consumption and health. Future health and survival probability are influenced by utilization of health care.

$$U=U(C, H) \tag{2.1}$$

Where U is expected life time utility, C is the consumption of non medical goods, while H is an individuals' health status.

According to the seminar paper by Grossman (1972), health depends on "investment" in health which is a function of medical care characteristics and other individual characteristics (like risky behaviour) that might influence the efficiency of medical services.

$$H = f(H_0, M) \tag{2.2}$$

Where H is health stock, H_0 is the initial health stock before investment in health and M are medical goods consumed by an individual.

Expenditure on consumption of non-medical goods and on medical services is limited by income and wealth.

$$P_M M + P_C C = Y \tag{2.3}$$

Where;

P_M - Net (out-of-pocket) price of medical care

P_C - Price of other non-medical goods

Y - Exogenous income

Maximizing (2.1) with respect to (2.3) yields the following lagrangian of the problem

$$\ell = U(C, f(H_0, M)) + \lambda(Y - P_M M - P_C C) \tag{2.4}$$

Solving the problem yields the following household's reduced-form demands for medical care (M) and consumption of non medical goods (C)

$$M = M (P_M, P_C, Y, H_0) \quad (2.5)$$

$$C = C (P_M, P_C, Y, H_0) \quad (2.6)$$

An individual consumption of non-medical goods (C) influences an individual's health status which in turn determines the quantity of medical care to demand. The amount of medical goods to demand determines the price to be paid. The present study therefore, sought to examine the effect of this price especially the OOP for healthcare on household's welfare.

2.3 Empirical Literature

Cavanero *et al.* (2006) investigated health care expenditure and utilization in Argentina. The study explored institutional changes in the health sector and its impact on health service utilization and catastrophic out-of-payment. The multinomial logit regression was run for people with self reported illness during previous 30 days to explore the determinants of health care utilization in the different health financing schemes, given the need for outpatient treatment. It was found that richer individuals were less likely to use public health facilities compared poorer quintiles.

Results were different in the case of access to private and social health insurance. In both cases, richer individuals were more likely to use health services. Private health care utilization increased across quintiles. Other individual characteristics that affected access to health were considered and they were age group, gender and health conditions of the individual taking care were taken into account, as well as education level of household head. Children under five and females had greater access to health care. Those with chronic health conditions were more likely to use health services in all insurance schemes. And finally social health insurance members or people with private coverage were less likely to use public facilities compared to those without any coverage.

Logistic regression was applied to all households in order to explore the determinants of catastrophic expenditure. The binary independent variable was defined as one when a household's health expenditure was equal to or above 40 percent of its capacity to pay or 0 otherwise. The results showed that a wide range of variables were associated with catastrophic expenditure. Households that had at least one senior member aged 65 or more were more likely to face catastrophic payments than younger people.

Female-headed households were more likely to encounter financial catastrophe than households headed by males. All expenditure groups were more likely to

face catastrophic expenditure compare to the first quintile. Households headed by private health insurance members were less likely to face catastrophic payments than those without any health insurance. However, unexpectedly, households covered by social health insurance did not show a statistically significant coefficient. Finally it was found that households that had used outpatient or inpatient care services were more likely to face catastrophic payments. The use of inpatient services was the most important risk factor for financial catastrophe.

The study was carried out in Argentina and it focused on health service utilization and determinants of catastrophic expenditure, the present study focused on the effect of OOP payment for health care on household's welfare in Kenya, logistic regression was adopted to explore the determinants of catastrophic OOP for health care.

Rivero *et al.* (2006) studied the catastrophic expenditure in health and income elasticities by item of expenditure in health services in Mexico. The objective of that study was to put into economic perspective the expenditure in health within the pattern of family expenditure of the Mexican households. Probit model was used to model the probability of incurring catastrophic expenditure. The results revealed that the poorest households in Mexico did not rely on their structure of expenditure to support out of pocket expenses in health, and that was the reason

why an unexpected event of disease placed the families at risk of impoverishment, sale of assets or indebtedness. The study was conducted in Mexico to determine the probability of incurring catastrophic expenditure using Probit model. The present study used Logit model to estimate the probability of incurring catastrophic expenditure. The study also investigated the coping mechanisms to OOP for health care.

Leive and Xu (2007) carried out a study on coping with out-of-pocket health payment, by applying Engels curve and two-part models(2PMs) in six African countries; Burkina Faso, Chad, Kenya, Senegal, Zambia, and Zimbabwe using data from the 2003 World Health Survey. The engels curve analysis indicated relative changes in expenditure shares for a particular good, but not absolute increases or decreases. While households protected food when OOP comprises high shares of non-subsistence spending by allocating large proportions of their budget. The 2PMs suggested that the absolute level of food still decreased. Small changes in budget shares for education and housing occurred despite OOP shares. They found that in nearly each country under study households with higher OOP shares of non-subsistence spending reduced expenditure on goods that were essential to development and poverty alleviation. While households begin to cope at different levels in different countries, households spending more than 40

percent of non-subsistence expenditure on OOP demonstrated strong signs of adjustment in consumption.

The estimates for the coefficients in the Engels curve analysis and the average partial effects in the 2PMs for this group showed a similar pattern in all countries; food share increases while shares for education and housing decreases. The results indicated that it was at the level of non-subsistence spending on health care that households demonstrated the strongest coping behaviour. This study utilized data from the 2003 World Health Survey. The coping mechanism considered were reduction in food, housing and education expenditure.

The current study considered other coping mechanisms like reduction in savings, sale of assets borrowing and also reduction in education and housing expenditure using the 2013 Household Survey of Health care Utilization and Expenditure. 2PMs and Engels curves were adopted in analyzing the coping mechanisms to OOP health expenditure in Kenya.

Garg and Karan (2008) examined how out-of-pocket expenditure could be reduced to minimize income poverty. The study aimed at assessing the differential impact of OOP expenditure and its components, such as expenditure on inpatient care, outpatient care and on drugs, across different income quintiles, between

developed and less developed regions in India. They also measured poverty at disaggregated rural-urban and state levels.

The results indicated that the average OOP share to total consumption expenditures in India was 5 percent and it was higher in rural areas compared to urban areas. In rural areas the OOP payments was highly concentrated among the rich while in urban areas it was fairly evenly distributed across all consumption quintiles. It was also noted that of the 5 percent of OOP share about 75-80 percent was on drugs and only 25-20 percent was on inpatient and outpatient care. While average expenditures share on inpatient and outpatient care were lower in rural areas, expenditures on medicines were higher.

The share of expenditure on drugs was higher for higher income quintiles in rural areas but for the urban poor the share on drugs was as much as their richer counterparts. Also in richer states the high OOP was largely contributed by the higher shares of OOP on inpatient care while in poorer states the OOP payment was lower and the higher share went to expenditure on drugs. This study was conducted in India to examine ways in which the OOP expenditure could be reduced to minimize the poverty levels. The study was disaggregated into rural and urban areas. The current study sought to analyze the components that trigger

OOP payment, its effects on household's welfare and the coping mechanisms to OOP payment.

Tewarit and Lagrada (2008) conducted a study on payments for health care and its effect on catastrophe and impoverishment in Thailand during the transition period from before universal coverage to introduction of universal coverage. The results indicated that the proportion of out-of-pocket payments for health care as a share of household living standards among Thai households showed a decreasing pattern during the observed period. The incidence and poverty of catastrophic payments for health care declined from the pre-universal coverage to post-universal coverage health care period.

The distribution of incidence and the intensity of catastrophic payments of health care across quintiles also indicated that the lower quintile group incurred lower catastrophic health care payments compared to the higher quintile group. The universal policy was effective in preventing impoverishment due to out-of-pocket payments for healthcare since both the poverty headcount and poverty gap declined from the pre-universal coverage to post-universal coverage. The study was conducted in Thailand by comparing out-of-pocket pre-universal coverage and post-universal coverage and impoverishment. The results showed that poverty levels declined in the post-universal coverage. The current study sought to

analyze the effect of OOP payment on household welfare and thereafter came up with policy implications on how OOP for health care could be reduced to minimize poverty levels in Kenya.

Vaishnavi and Dash (2009) conducted a study on catastrophic payments for health care among households in urban Tamil Nadu, India. The aim was to study out-of-pocket expenditure and the extent of catastrophic payments for healthcare among households in a highly urbanized state of Tamil Nadu. They found that care was sought for 84 percent of illness episodes in urban areas, and the majority used private sector providers (67 percent for inpatients and 78 percent for outpatients). Mean OOP expenditure for inpatients and outpatients was higher for households with higher income.

The average cost burden per visit was higher among those who sought care from private providers for inpatient services (29 percent of household consumption expenditure) and outpatient services (20 percent of household consumption expenditure) compared with the burden associated with public health service use (3-4 percent of consumption expenditure). About 60 percent of households which used private health services faced catastrophic health payments at the 10 percent threshold level.

They also investigated the sources of financing health care expenditure, where they found that 57 percent of households were able to use either income or savings in order to pay the cost of inpatient care, while 20 percent of households had to borrow funds. However, there was a significant variation across the quintiles. Better off households were more likely to be able to use income or savings (70 percent) and only 19 percent had to borrow and only 55 percent were able to use their savings. In the case of inpatients accessing private health sources, around 55 percent of households covered their expenditure from their income or savings.

The average amount spent from other sources which includes sale of asset and ornaments was larger in magnitude across all quintiles. This study was carried out in urban Tamil Nadu, India to examine OOP health expenditure and the extent of catastrophic payments for health care among households. The present study sought to analyze the coping mechanisms to OOP for health care in the entire country. This study adopted some of the variables used in the study which include use of savings, borrowing and sale of assets as sources of healthcare expenditure.

Mondal *et al.* (2010) carried out a study on the major determining factors of catastrophic payments in health care, and the impact of such expenditure on household economic status, in West Bengal, India. Data from 3500 households

was analyzed using multivariate logistic regression models to identify factors associated with catastrophic health expenditures. The factors associated with catastrophic medical expenditures were multiple spells of illnesses in the households, prevalence of chronic morbidity among the household members, inpatient care, and childbirth.

Other household characteristics, such as household size and rural/urban location were also important determinants of catastrophic spending. The analysis showed a common pattern of expenditure due to the treatment of minor illness on increasing the burden of catastrophe on the households. The cumulative amount incurred for minor ailments affected household's food consumption, children's education, and medical treatment of the other members. This study was carried out to establish the major determining factors of catastrophic payments in health care, and the impact of such expenditure on household economic status in West Bengal, India. The present study sought to determine the components that trigger OOP for health care, effect of OOP for health care on household welfare and the coping mechanisms.

Ghost (2010) conducted a study on catastrophic payments and impoverishment due to OOP health spending and the effects of health sector reforms in India. Catastrophic payments for health care was measured by analyzing the incidence

of catastrophic payments, that is the percentage of households that spend more on health care than the threshold, which was measured by the headcount. Concentration index was calculated to determine whether poor households incur more catastrophic payments than rich households.

Headcount and poverty gap were used to measure impoverishment due to health care expenditure. The study provided considerable evidence on trends governing the magnitude, distribution and economic consequences of OOP payments for health care in India during the reform period. The evidence suggests that the new policies had a major impact in increasing the incidence of catastrophic expenditure and impoverishment. The analysis showed that the OOP for medical care increased over the study period. The results also showed that lower and middle income households bore the brunt of the healthcare reforms, the evidence pointed towards a higher incidence of impoverishment among these populations. The present study used poverty headcount to analyze the incidence of catastrophic payment, while the concentration index was used to determine who among the poor households and rich households incur more catastrophic health payments

Packard and Tomini (2011) investigated the extent to which out-of-pocket health spending impoverished households in Albania. They used the 2002, 2005 and 2008 data from Albania Living Standard Measurement Survey. It was found that

out-of-pocket and informal payments had increased in real value throughout the years. Even though their catastrophic effect had gone down, the results showed that the effect for the poorest expenditure quintiles remained high. Out-of-pocket payments deepened poverty headcount and also enlarged the poverty gap and the effect was larger for the poorest quintiles. This study carried out in Albania found that OOP payments made the poor to be poorer. The present study sought to establish the effect of OOP for health care on all income quintiles to establish whether the similar findings will hold in Kenya.

Arsenijevic *et al.* (2012) examined the catastrophic and impoverishing effects of health care spending in Serbia using different approaches. They used household data from the Serbia Living Standard Measurement Study. The data was collected in 2007 and consisted of 17,375 participants living in 5557 households. They found out that irrespective of the approach applied, out-of-pocket patient payment had a catastrophic effect on poor households in Serbia. They also found out those households that were above the absolute, relative and subjective lines respectively, after the subtraction of out-of-pocket payments fell below those poverty lines. The probability of catastrophic out of pocket patient payments were higher in the rural areas, in larger households, and among chronically sick household members. The present study sought to determine whether OOP

payment had a catastrophic effect on households in Kenya, and also whether households felt below the poverty line after making the OOP for health care.

Sanjay and Akansha (2012) carried out a study on out-of-pocket expenditure on institutional delivery in India. The objective of that study was to establish the regional pattern and social economic differentials in out-of-pocket expenditure on institutional delivery by source of provider in India. Descriptive statistics, principle component analysis and a two part model were used in analysis. They found that during 2004-2008, the mean OOP expenditure for a delivery in a public health centre in India was US\$39 compared with US\$ 139 in a private health centre. They also found that expenditure for a caesarean delivery was six times higher than for a normal delivery. With the increase in the economic status and educational attainment of mothers, the propensity and rate of OOP expenditure increases linking higher OOP expenditure to quality of care.

The OOP expenditure in public centres, adjusting for inflation, had declined over time and that was attributed to increase in spending under the National Rural Health Mission. The study was conducted in Serbia and it was found that economic status, educational attainment of mothers and quality increased OOP expenditure. Also those who delivered in Public hospitals spend less compared to those in private hospitals. The present study focused on OOP health care expenditure for

all households in Kenya, the components that trigger and its effect on households' welfare.

Muhammad and Shah (2012) estimated determinants of OOP payments in Pakistan. They developed a multiple regression model for the determinants of OOP payments using methods of ordinary least square. They found that median household OOP healthcare in the year 2004-2005 was Pakistani Rupees (PKR) 2500 (US\$41.99). Household non-food expenditure was the single highest significant predictor of household OOP health expenditure. Household features like literate head and spouse, at least one obstetric delivery in last three years, unsafe water, and unhygienic toilet were significant positive predictors of OOP payments. Household with male head, bricks used in housing construction, household with at least one child and no elderly, and head of household in white collar profession were negative predictors of OOP payments. In the present study components that trigger OOP expenditure were analyzed using the Logit model that determined the possibility of individual incurring catastrophic health expenditure.

Correa-Burrows (2012) carried out a study on out of pocket health care spending by the chronically ill in Chile. Focusing on chronic conditions associated with lifestyle, marginal impact of epidemiological characteristics of households on out-

of-pocket health spending was estimated. To do so, national-urban representative survey and multivariate analysis was used. It was found out that the number of chronic conditions; health care use, household income and insurance type were associated with OOP spending. Likewise, lower middle income individuals with chronic diseases and their families were particularly exposed to these payments. The study was conducted in Chile to investigate the OOP health care spending by the chronically. The present study sought to establish the components that trigger OOP, effects on household's welfare and the coping mechanisms to OOP in Kenya.

Van Minh *et al.* (2012) investigated financial burden of household out-of-pocket health expenditure in Vietnam. The aim of that study was to examine catastrophic and poverty impacts of household out-of-pocket health expenditure in Vietnam over time and identify social economic indicators associated with them. Logistic regressions were used to identify the socio-economic correlates of the catastrophic and poverty impacts of household out-of-pocket health expenditure. The findings revealed that there were problems in health care financing in Vietnam, many households encountered catastrophic health expenditure and were pushed into poverty due to health care payments.

Catastrophic expenditure and impoverishment problems were more common among the households who had more elderly people and those in rural areas. The current study also uses logistic regression to identify the socio-economic correlates of the catastrophic household out-of-pocket health expenditure. Headcount and poverty gap were used to establish the impact of OOP for health care on household welfare.

Nguyen *et al.* (2012) carried out a study on the effect of health expenses on household capabilities and resource allocation in rural commune of Vietnam. Multiple regression analysis was conducted to establish how each type of consumption was varied by health care expenditure. They compared consumption patterns between households with and without inpatient treatment, and between households with different levels of outpatient treatment, as well as among different income quintiles. They found out that compared to households without inpatient treatment and lower levels of outpatient treatment, household with inpatient treatment and higher levels of outpatient treatment reduced investments in basic capabilities. This was evidenced by decreased consumption of food, education and production. The lowest income quartiles showed the most significant decrease. No quintile with inpatient or high-level outpatient treatment was immune to reductions. The present study sought to establish the effects of

OOP for health care to different income quintile groups, the components that trigger and the coping mechanisms to OOP for health care.

Kimalu (2013) examined household health expenditure, health financing inequities and health outcomes in Kenya. To analyze the determinants of household health expenditure, the study used a two-part model. To analyze the determinants of catastrophic health expenditure, the study used bivariate probit with sample selection. The extent of household financing inequities was analyzed using Kakwani and concentration indices. To analyze the determinants of health outcome, the study constructed a pseudo-panel data model which was estimated using General Methods of Moments. The study used household data from Welfare monitoring survey (WMS) of 1992, 1994, and in 1997 and the Kenya integrated Household Budgetary Survey data sets of 2005/2006.

The study established that higher household income, higher budget allocation to the counties and visiting public health providers, determined household health expenditure. On catastrophic health expenditure, the study found that households visiting private and mission hospitals were more likely to incur catastrophic health expenditure. While rich households had a lower probability of incurring catastrophic health expenditure. The study also found that the health financing system in Kenya was progressive. The present study sought to establish the effect

of OOP for health care on household welfare in both rural and urban areas of Kenya. The study utilized the Kenya Household Health Expenditure and Utilisation Survey of 2014.

2.4 Overview of literature

The literature reviewed revealed that out-of-pocket payment for health care had a catastrophic effect on poor households (Arsenijevic *et al.*, 2012; Ghost, 2010). Logit specification was used to estimate the probability of catastrophic health expenditure in respect to background indicators, which include social, economic and demographic characteristics. Logit model was adopted by the study, by comparing the catastrophic effect of OOP for health care to rural and urban households.

Factors such as, age, rural/urban, education status of the household head, household size, type of illness, and private or health care facility were found to trigger OOP health care expenditure among households (Halliday and Park, 2009; Vaishnavi and Dash, 2009). The same factors were utilized in this study but with emphasis on the locality, to establish whether the same factors triggered OOP in rural and urban areas.

In measuring impoverishment due to OOP for health care, two measures were adopted by various studies: poverty headcount and poverty gap. The findings from these studies revealed that many households that encountered catastrophic health expenditure and were pushed to poverty due to health care payment (Van Minh *et al.*, 2012; Garg and Karan, 2008). These studies were carried out to establish the effect of OOP on household welfare in the entire country. The present study focused on the effect of OOP for health care on household's welfare in the rural areas and households in the urban areas, to establish whether the effects were different.

Engels curve and two-part models (2PMs) were adopted to analyze the coping mechanisms to OOP for health care. The findings revealed that households with higher OOP for health care shares of non-subsistence reduced expenditure on goods that were essential to development and poverty alleviation (Leive and Xu, 2007). To analyze the coping mechanisms to OOP for health care the study used the Engels curve, where a number of simultaneous equations were formulated to establish the coping mechanisms to health care payment in Kenya.

Most of the studies were conducted in developed countries and few studies in the developing countries. The present study analyzed the effects of OOP for health care on household welfare in Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research design, theoretical framework, model specification, variable definitions and measurement, data type and source, coding, cleansing, inputting, diagnostic tests and data analysis.

3.2 Research Design

The study used quantitative techniques. The study is a cross-sectional study. The data utilized was from the Household Survey of Health Care Utilisation and Expenditure of 2014.

3.3 Theoretical Framework

Let a risk-neutral payer maximize the difference between benefit from treatment B measured in monetary units and the payment to providers P.

In the basic model, the patient population to be treated is predetermined. Welfare W is given by;

$$W=B-P \dots\dots\dots 3.1$$

In the basic model, providers are assumed to be risk neutral, their preferences being described by the following utility function:

$$U(p,e)=p-c(e)-v(e) \text{ with } e>0, v(0)=0, v'(e)>0 \dots\dots\dots 3.2$$

e measures the effort exerted by the provider to control costs while $c(e)$ corresponds to the monetary cost of treatment, such as the costs of diagnostic tests and auxiliary services. The payer is assumed to observe $c(e)$. This rules out the provider manipulating cost data. The function $v(e)$ captures the corresponding loss of utility as well as providers' opportunity cost of time and is assumed to be convex in e . Providers who do not accept the contract offered by the payer obtain reservation utility, u . Costs C , are uncertain which implies that cost-reducing effort e cannot be inferred from observation. But their expected value, $EC(e)$, depends on effort, e , in the following way;

$$EC(e) \equiv E(C(e)) \text{ with } EC'(e) < 0, EC''(e) \geq 0 \dots \dots \dots 3.3$$

An increase in effort, therefore lowers expected costs $EC(e)$ at a non-increasing rate. The objective of the payer is to design a payment system which maximizes welfare. To reduce complexity, a linear payment systems is considered, which serves to limit the problem to the optimization of parameters. Specifically, a linear payment system takes the form:

$$P = F + nq + \gamma C \dots \dots \dots 3.3$$

Total payment, P , consists of a flat component F , a capitation payment, q , for each of the, n , patients treated, and a payment, γC , proportional to observed costs. The parameter, γ , is the share of actual costs borne by the payer. Correspondingly,

$1 - \gamma$, can be interpreted as the degree of supply-side cost sharing. Providers bear full cost responsibility if $\gamma = 0$. In this case, the payment system is fully prospective because the payer does not pay anything. If $\gamma = 1$, the payer reimburses costs as evidenced. This amounts to a fully retrospective payment system because the payer pays for the entire medical expenditure. A mixed system is characterized by $0 < \gamma < 1$, where there is cost sharing between the payer and the provider.

3.4 Model Specification

3.4.1 Catastrophic Payment for Health Care

To establish the level of OOP for health care among different economic groupings in rural and urban areas of Kenya, the methodology discussed by Wagstaff and Van Doorslaer (2003) was applied. An OOP payment is considered catastrophic when the payment exceeds some threshold (Z_{cat}) defined as a fraction of total household consumption or non-food consumption. If T represents OOP payments for health care, X represents total household expenditure and $f(X)$ stands for food expenditure, then a household is said to have incurred catastrophic payments when T/X or $T/[X - f(X)]$ exceeds a specific threshold, Z_{cat}

One of the approaches used to measure catastrophic payments for health care involves analyzing the incidence of catastrophic payments, which is the percentage of households that spend more on health care than the threshold, which can be measured by the headcount, H_{cat} . H_{cat} is the fraction of the sample whose health expenditures as a proportion of total expenditure exceed the threshold Z_{cat} .

Health expenditure is considered catastrophic when out-of-pocket health spending exceeds a certain proportion of total household consumption, 10 percent of total expenditure and 40 percent of non-food expenditure thresholds are the most commonly used. The threshold could be changed according to countries specific situation (Xu 2005). The present study considered three threshold levels (10, 20 and 40 percent of non-food expenditure).

3.4.2 Inequity of OOP Health Care Financing

In order to measure inequity caused by OOP for health care financing, the share of OOP as a proportion of both total expenditure and capacity to pay and concentration index were used. The concentration index is defined as twice the area between the concentration curve and the line of equality (the 45-degree line). Therefore, in the case in which there is no socioeconomic-related inequality, the concentration index is zero. The convention is that the index takes a negative

value when the curve lies above the line of equality, indicating disproportionate concentration of the health variable among the poor, and a positive value when it lies below the line of equality.

If the health variable is OOP for health care, a negative value of the concentration index means OOP for health care is higher among the poor. Formally, the concentration index is defined as;

$$C = 1 - 2 \int_0^1 L_h(p) dp$$

Where L_h rank of living standards and p is the OOP for health care. The index is bounded between -1 and 1 .

The variables used to meet the first and second objectives were measured as follows:

Out-of-pocket payment (T) is the expenditure on medical care reported by households in the last 4 visits. It was measured in Kenya shillings.

Total household expenditure (X) is the expenditure on food, education, house among others. It was defined without OOP in order to isolate its effects on

expenditure share adjustments for different commodities. It was measured in Kenya shillings.

Catastrophic threshold (Z_{cat}) is the level beyond which spending on health is disastrous to household welfare. It was measured by how much health expenditure exceeds the non-food expenditure, if more than 10 percent, 20 percent and 40 percent then was considered catastrophic.

Food expenditure [f(x)] is the amount spent on all foodstuffs by the household. However, it excluded alcoholic beverages and food consumption outside the home. It was measured in Kenya shillings.

3.4.2 Determinants of Catastrophic OOP Expenditure

The method suggested by Xu (2005) was adopted and modified to explore the characteristics of households related to catastrophic health expenditure. In order to do this, logit regression was used to analyze the components that trigger OOP.

The basic function form is:

$$y = \alpha + \sum \beta_i x_i + \epsilon \dots \dots \dots 3.6$$

$$Y = \ln \left(\frac{p}{1-p} \right) \dots \dots \dots 3.7$$

Where y is the dependent variable, in this case, α is the constant, x_i are independent variables, β_i are the coefficients of independent variables, p is the probability of household facing catastrophic expenditure.

The dependent variable is a dummy variable on catastrophic expenditure (1, with catastrophic expenditure and 0, otherwise). Independent variables are socio-economic indicators that include; income which was represented by quintiles (Q1, Q2, Q3, Q4 and Q5), household size (HS), type of facility (TF), education level of household head (E), sex of household head (S), age of household head (A), type of illness, presence of chronic illness, insurance, household size and age of the patient. The logistic regression results gave the impact of these independent variables on catastrophic health expenditure, and therefore the factors that triggered catastrophic health expenditure were determined. They were measured as follows:

Income was captured by income quintile groups, q_1 , q_2 , q_3 , q_4 and q_5 for the poorest, 2nd poorest, middle fourth and the richest groups respectively. Dummy=1 if poorest, 0 otherwise; D=1 if poor, 0 otherwise; D=1 if middle, 0 otherwise; D=1 if rich, 0 otherwise, D=1 if richest and 0 otherwise.

Household size (HS) was the number of members in a household. It was measured by the total number of members in a household.

Type of the facility (TF) is private, public or mission hospital; it was measured by dummy=1 for private and 0 otherwise, if a household member visited a private hospital. D=1 for public and 0 otherwise, if a household member visited a public hospital and finally D=1 for mission and 0 otherwise, if a household member visited a mission hospital.

Education of the household head (E) it was categorized as primary, secondary and post-secondary. Dummy D=1 for primary, 0 otherwise, if the household head level of education was primary. D=1 for secondary, 0 otherwise, if the level of education of the household head was secondary and D=1 for post-secondary and 0 otherwise, if the level of education for the household head was either university or college.

Sex of the household head (S) this was whether the household head was male or female. It was measured by dummy D=1 if male and D=0 if female.

Age of the household head (A) was the number of years of the household head. It was measured in years.

Age of household members: was the number of years from birth of the household members. Dummy =1 if aged between 0-5, 0 otherwise; D=1 if aged between 6-50, 0 otherwise; D=1 if aged above 50 and 0 otherwise.

Chronic illness: the chronic illnesses considered by the study were ulcers, diabetes, hypertension, arthritis, HIV/AIDs, gouts, cardiac disorders, and cancer. Dummy =1 with chronic illness and 0 otherwise.

Type of illness: the study considered four types of illnesses, diabetes, accidents and injuries, malaria and disease of respiratory. Dummy =1 if diabetes, 0 otherwise; D=1 if malaria, 0 otherwise; D=1 if accidents, 0 otherwise; D=1 if disease of respiratory and 0 otherwise.

Insurance: this referred to whether an household has a medical insurance cover or not. Dummy =1 if yes and 0 otherwise.

3.4.3 Measuring Impoverishment Due to Out-of-Pocket Payments for Health Care

In measuring impoverishment due to out-of-pocket payment for health care, two measures of poverty were used: poverty headcount and the poverty gap (Wagstaff and Van Doorslaer, 2003). The poverty headcount measured the number of households living below the poverty line as a percentage of total households, while the poverty gap captured the depth of poverty, or the amount by which the poor households fall short of reaching the poverty line.

Let X_i be households I 's consumption per capita which also refers to pre-payment, Z_{pov}^{pre} is the poverty line and p_i^{pre} the individual I 's prepayment income, then

define $p_i^{pre} = 1$ if $X_i < Z_{pov}^{pre}$, and zero otherwise. The pre-payment headcount is then expressed as

$$H_{pov}^{pre} = (1/n) \sum_{i=1}^n P_i^{pre} \dots\dots\dots 3.8$$

Where n is the sample size.

The average poverty gap is defined as

$$G_{pov}^{pre} = (1/n) \sum_{i=1}^n g_i^{pre} \dots\dots\dots 3.9$$

Where n is the sample size and

$$g_i^{pre} = x_i - Z_{pov}^{pre} \dots\dots\dots 3.10$$

In addition, a normalized pre-payment poverty gap, defined as

$$NG_{pov}^{pre} = G_{pov}^{pre} / Z_{pov}^{pre} \dots\dots\dots 3.11$$

The equation allows comparative analysis as it eliminates differences in currency or the choice of the poverty line. Post-payment was defined as X_i after the subtraction of the payments for health care. Replacing all superscripts ‘pre’ with ‘post’ gives the analogous post-payment measures. The effects of OOP payments on poverty, termed ‘poverty impact’ (PI), is the difference between the relevant pre-payment and post-payment measures, such as:

$$PI^H = H_{pov}^{post} - H_{pov}^{pre} \dots\dots\dots 3.12$$

$$PI^G = G_{pov}^{post} - G_{pov}^{pre} \dots\dots\dots 3.13$$

$$PI^{NG} = NG_{pov}^{post} - NG_{pov}^{pre} \dots\dots\dots 3.14$$

3.4.4 Coping Mechanisms to Catastrophic Health Care Expenditure

Engels curve method used by Leive and Xu (2007) was adopted. A system of Engels curves were estimated in the form of budget shares. This analysis estimated Engel curve in the general form as:

$$W_{ih} = \alpha_{ih} + \beta_{ih} \log_h X \dots\dots\dots 3.15$$

Where w_{ih} is the expenditure share of good i for household h . x is total expenditure, and β_i and α_i are parameters to be estimated.

Engels curve that uses a system of four equations corresponding to the expenditure shares (excluding OOP) of food, education, house and other. is specified as follows:

$$S_{ih} = \alpha_{ih} + \beta_1 \log(\text{TEXP}_h) + \beta_2 \text{CATA}_h + \beta_3 X_h + \beta_4 C_h + \mu_{ih} \dots\dots\dots 3.16$$

Where S_{ih} is the expenditure share of good i for household h , $TEXP_h$ is the total expenditure for household h , C is the set of coping strategy dummy variables (current income, borrow, sell, other coping strategies), x is the set of socioeconomic and demographic variables, and μ is the error term.

The equations were estimated simultaneously in order to account for possible correlation between the error terms. The system as defined in 3.16 was estimated using three-stage least squares (3SLS).

The variables used to meet this objective were measured as follows;

Education expenditure (education) it consisted of school fees and money spent on other school materials. It was measured in Kenya shillings.

Housing expenditure (house) it is the cost of rent or payment for housing and costs for gas, electricity, water, telephone, and heating fuel. This was measured in Kenya shillings.

Current income (income) was the amount of money a household used to pay for the hospital bills in cash. It was measured in Kenya shillings.

Sale of assets (sale) was the price paid for the asset in order to meet the medical expenditure. This was measured in Kenya shillings.

Money borrowed (borrow) is the funds borrowed in Kenya shillings from either financial institutions or individuals to pay for the medical bill.

3.5 Data Type and Source

Published data was utilized in this study. The data was retrieved from the Household Survey of Health Care Utilisation and Expenditure of 2013 conducted by the Ministry of Health in Kenya. By using a sample design that grouped households into clusters, the survey was able to collect precise data at both the national and county levels. A total of 1,347 clusters were selected and divided into 814 (60 percent) rural and 533 (40 percent) urban clusters.

3.6 Data Coding, Editing, Cleaning and Inputting

Collected data were assigned codes, and edited to check for errors and omissions. Finally, data was cleaned by proof reading to identify and correct errors and inconsistency. Inputting was done ready for analysis.

3.7 Diagnostic Tests

To ensure that estimates obtained were unbiased and consistent, diagnostic tests were undertaken. To take care of heteroskedasticity, robust standard error was used. In confirming whether the model fits the data well, Hosmer-lemeshow (H-L) test and Estat-classification tables were used on the models. In addition, Variance Inflation Factor and correlation matrix were generated to check for the presence of multicollinearity among variables.

3.8 Data Analysis

In establishing the incidence of OOP among different economic groupings, health spending was considered catastrophic when out-of-pocket health spending exceeded 10 percent of total expenditure and 40 percent of non-food expenditure thresholds. Logit regression model was estimated to predict the probability of catastrophic health expenditure in respect to the selected background indicators. The indicators included social, economic and demographic characteristics. In measuring impoverishment of the households due to OOP for health care, two measures were adopted: poverty headcount and poverty gap. In measuring inequity caused by OOP for health care, the share of OOP as a proportion of both total expenditure and capacity to pay and concentration index was adopted. And finally, Engel curves were estimated in the form of budget shares to analyze the coping mechanisms to catastrophic health care expenditure.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

The chapter presents the descriptive statistics, results of the analysis on the incidence and level of inequity of out-of-pocket (OOP) for health care among different economic groupings in rural and urban areas of Kenya, the findings on determinants of catastrophic OOP for health care financing, results of the estimation of effect of OOP for health care on household's welfare and, lastly, the households coping mechanism to catastrophic health expenditure in Kenya.

4.2 Descriptive Statistics

Table 4.1 presents descriptive statistics for the households from the rural and urban areas of Kenya. These are the characteristics of the sample households used in the study.

Table 4.1: Descriptive Statistics

Variable	Rural (n=20,350)			Urban (n=13,325)		
	Mean	Min	Max	Mean	Min	Max
Monthly food expenditure (Kenya shillings)	1,962	0	30,000	2,817	200	40,000
Monthly non-food expenditure (Kenya shillings)	4,876	0	65,320	6750	150	1,650,000
Housing expenditure (Kenya shillings)	670	0	60,000	1,873	0	100,000
Education expenditure (Kenya shillings)	2,089	0	83,000	3,029	0	660,000
Household size	4.7	1	22	4	1	12
Age of household head	47	16	99	41	15	98
Other household expenditure (Kenya shillings)	4,430	100	360,000	7,386	425	1,200,000
Total health expenditure (Kenya shillings)	2068	15	2,000,000	5,028	10	2,800,000
Out of pocket payment (Kenya shillings)	1259	15	2,000,000	2,279	10	2,800,000

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

Table 4.1 shows that the average monthly food expenditure for rural households was KSh 1,962, while the average monthly food expenditure for urban households was KSh 2,817. Food expenditure in the urban areas was higher than in the rural areas. This can be explained by the fact that, rural households can easily access food items either from purchasing cheaply from other farmers or from their own farms. Majority of rural households also engage themselves in some form of

subsistence farming. This explains the reason why the minimum food expenditure for rural households was zero unlike urban areas where households purchase almost all the food items. When households spend more on health care other expenses including food can be reduced and this might affect the welfare of households.

The non-food average expenditures were KSh 4,876 and KSh 6,750 in rural and urban areas respectively. If households spend more on OOP for health care, then households might be forced to sacrifice food or non-food items and this can be detrimental to their well being.

The average housing expenditure was KSh 670 in the rural areas, and KSh 1,873 in the urban areas. Majority of rural households live in their own houses. This explains the reason why the average housing expenditure in rural areas was lower than urban areas. The minimum housing expenditure in both rural and urban areas was zero. This can be explained by the fact that majority of rural households live in their own houses, while in the urban areas some households have either bought or built their own houses. Additionally, in the rural areas other housing expenses like water and cooking materials were readily and freely available or if sold they were affordable.

The average education expenditures were KSh 2,089 and KSh 3,029 in the urban and rural areas respectively. When households pay fees and other education expenditure for their members who are still in school, they are left with little or no cushion at all for the unexpected expenses, such as medical bills. When these unexpected expenses arise, families might be forced to delay payment of school fees, make extreme sacrifices, or even withdraw the child from school. This will make it difficult to break the intergenerational poverty circle and inequality.

The average OOP were KSh 1,259 and KSh 2,279 in rural and urban areas respectively. While the average health expenditure were KSh 2,068 and KSh 5,028 for households in the rural and urban areas respectively. The health seeking behavior for rural households is low, and this might be the reason why the average health expenditure in the rural areas was lower compared to urban areas. The share of OOP as a proportion of non-food expenditure was 13 percent in the rural areas and 10.2 percent in the urban areas. This percentage was above the 10 percent threshold for catastrophic health expenditure. The unexpected health care payments affect the present welfare and future wellbeing of household members through reduced consumption, reduced investment in education and even nutrition (Sharma 2009). In addition, relatively high OOP for health care can push households into poverty, therefore influencing their welfare (Cavagnero *et al.*, 2006). If the National government and county governments cannot put timely

financial protective measures in place, then the households will continue suffering from catastrophic health expenditure.

The average age of household head in the rural areas was 47 years old, while in urban areas, the average age of the household head was 41 years old. The age of household head, is likely to determine whether a household will incur catastrophic health expenditure or not. The older the household head, the less the probability of incurring catastrophic expenditure because it is likely that he has less responsibilities of providing for the family because the children might be old enough to take care of their expenses. From the descriptive statistics, majority of household heads from rural and urban areas in their middle age and therefore, they are likely to incur catastrophic health expenditure.

The average size for rural households was five members. While in the urban area the average household size was four members. Findings have shown that larger households are less likely to incur catastrophic health expenditure. This is because larger households are likely to pool resources to assist the sick household member (Kimalu, 2013 and Kagarura, 2012). Therefore, with large household size the welfare of household members is likely to be protected in an event of an ailment.

Table 4.2 presents the frequency distribution of the sample households from the rural and urban areas of Kenya used in the study.

Table 4.2: Frequency Distribution

		Urban (n=13,325)	Rural (n=20,350)
Variable	Description	Percentage	Percentage
Sex of household head	Male	74.4	68.1
	Female	25.6	31.9
Households with members	Below 5 years	14	13
	Above 50 years	11	8
chronic illness	Present	20	18.8
	Not present	80	81.2
Insurance status	Insured	26.6	12.1
	Not insured	73.4	87.9
Education level of household head			
Proportion of households with household head who had completed primary education (% of sample)		56.8	59
Proportion of households with household head who had completed secondary education (% of sample)		20.7	16
Proportion of households with household head who had completed college and university (% of sample)		13.3	4
Type of health care provider			
Proportion of households who visited a public facility (% of sample)		54	54.8
Proportion of households who visited private facility (% of sample)		21	14.2
Proportion of households who visited Mission hospital (% of sample)		10	19.4
Disease prevalence (percentage)			
Malaria		33.3	43
Disease of respiratory including pneumonia		16	12
Diabetes		3.2	1.5
Accidents and injuries		2.5	2.6
Coping mechanisms (percentage)			
a) Use of current income (as a % of the sample)		26.6	30.2
b) Sell of assets (as a % of the sample)		1.89	4.7
c) Borrowing (as a % of the sample)		3.3	5.1

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

The percentage of households with children below 5 years and adults above 50 years of age were 13 percent and 8 percent, respectively in the rural areas. In the urban areas, households with members below five years and above 50 years of age were 14 and 11 percent respectively. Since an individual's health stock depreciation rate is likely to increase with age, this implies that the health of older people is likely to deteriorate than the health of young people. This shows that with aging population, there is high demand for health care compared to the younger population. Studies have found that households with children below five years and the elderly are more vulnerable to catastrophic OOP payments (Cavagnero, 2005). This is because of relatively high probability of the elderly and young members getting sick in a household. This greatly increases the probability of incurring catastrophic and impoverishing health spending.

Households that were headed by male and female in the rural areas were 68.1 percent, while 31.9 percent respectively. In the urban areas most households are headed by male at 74.4 percent, while 25.6 per cent were headed by female. There was a higher percent of households that were headed by male in the urban areas than rural areas. This may have effect on the OOP health payments for those in the rural and urban areas. Furthermore, studies have reported contradictory results on the effect of male headed households on catastrophic OOP for health care. Syed and Malik (2012) found that male headed households predicted negative

influence on catastrophic OOP compared to female headed households in Pakistan. However, Kagarura (2012) found that catastrophic health expenditure increased with male headed household, this was because male headed households controlled resources and were able to spend more on health care.

Furthermore, female headed households are more vulnerable to economic shocks like OOP for health care, owing to the obstacles women face in accessing the economic resources. Women also participate less than men in the labour market and when they do participate, their earnings are usually lower than men's. Therefore, female headed households are less likely to be protected from catastrophic health expenditure.

OOP for health care depend on the type of illness. Table 4.2 shows that malaria had highest prevalence (43 percent) followed by disease of respiratory including pneumonia (12 percent), accidents and injuries (2.6 percent), and diabetes (1.5 percent) for rural households. For the urban households, the most common illnesses reported were malaria (33.3 percent) and respiratory disease including pneumonia (16 percent), accidents and injuries (4.2 percent), and diabetes (2.5 percent). Amendah *et al.* (2015) found that a severe ailment or injury that required inpatient care was found to increase the likelihood of catastrophic spending. Households with a member suffering from chronic illness were 18.8 and 20

percent in rural and urban areas respectively. Chronic illnesses included hypertension, diabetes, cardiac disorders, arthritis, HIV/AIDS, ulcers, gout and cancer. A household with a member suffering from chronic illness is likely to incur catastrophic health expenditure. Mondal *et al.* (2010) found that chronic illness was a major factor associated with catastrophic health expenditure in Western Bengal India.

Healthcare financing in many developing countries is predominantly based on OOP and has low levels of prepayment insurance mechanisms. In the absence of adequate medical insurance coverage, illness both reduces the well-being of individuals and increases the risk of impoverishment due to high healthcare costs (Republic of Kenya 2014). In Kenya health insurance coverage is very low, in the rural and urban areas (12.1 percent and 26.6 percent) respectively of households had a medical insurance cover. And yet households with a medical insurance cover have a lower probability of incurring catastrophic health expenditure. Moreover, studies have found that households headed by insured members are less likely to face catastrophic payments than those without any health insurance (Cavagnero 2006, Bromball 2011, and Amendah *et al.*, 2015)

Majority (59.8 percent) of household heads had attained primary level of education, while 16 percent of rural household heads had attained secondary level

of education. A relatively small percent of household heads had attained post-secondary education level, where four percent of rural household heads had attained either college or university level of education. Also in the urban areas majority of household heads had attained primary level of education at 56.8 percent, while 20.7 percent of urban household heads had attained secondary level of education and 13.3 percent of urban households' heads had attained postsecondary education. Educated households are less likely to incur catastrophic expenditure, because educated people are likely to be cautious about their health by doing exercise and eating nutritious food (Grossman, 1972). Therefore, uneducated households are less likely to be protected from catastrophic health expenditure which will negatively affect their welfare.

The cost of medical care in public hospitals is affordable and this may explain the reason why most rural households visited public hospitals at 54.8 percent, while 14.2 percent and 19.4 percent visited private and mission hospitals, respectively. 11.6 percent of households visited other healthcare providers like NGO clinics, traditional herbalists or faith healers, and purchasing drugs from the pharmacy. In the urban areas, a majority of households' members also visited public hospitals (54 percent), while 21 percent of those seeking medical care visited private hospitals, and those seeking medical care from mission hospitals were 10 percent. According to Kagarura (2012) households who utilize public health facilities are

less likely to incur catastrophic health expenditure compared to households visiting private and mission hospitals. This is because public health services protect households by imposing lower burden to them, since the services are subsidized (Dash and Vaishnavi, 2009). When households visit private health facilities, their welfare is likely to be affected adversely because they end up paying more OOP for their healthcare.

Households that face financial constraints may de-save or sell assets in order to cope with OOP for health care. Some may borrow from friends and family or take out a loan using collateral (Leive and Xu, 2007). Table 4.2 shows that 30.2 percent of households from rural areas used current income as coping strategy, while 4.7 percent sold their assets and 5.1 percent households borrowed to finance their healthcare. While in urban areas 26 percent of households used current income, 1.8 percent sold their assets and 3.3 percent borrowed to finance their healthcare. When households use current assets to finance their health expenses, consumption may be changed and this may be detrimental to households if the goods that are reduced are necessary for poverty reduction (Gertler, Levine and Moretti, 2002).

When households borrow to pay for their health expenses, their well-being might be affected because they will be required to repay the borrowed money with an interest in the future, this will prevent households from undertaking any future

investment. If a household will cope with OOP for health care by selling an asset, then household future income will be affected if the asset was a source of income to the family. It is clear that with OOP for health care, many households' welfare may be negatively affected and they might be driven into poverty if timely mitigating policies are not put in place to protect households from catastrophic healthcare payments.

4.3 Incidence of OOP Health Payments in Kenya

To establish the incidence level of OOP for health care among different economic groupings in rural and urban areas of Kenya, the methodology discussed by Wagstaff and Van Doorslaer (2003) was applied. An OOP for health care was considered catastrophic in this study when the payment exceeded some threshold (Z_{cat}) defined as a fraction of total household consumption or non-food consumption. If T represents OOP for health care, X represents total household expenditure and $f(X)$ stands for food expenditure, then a household was said to have incurred catastrophic payments when $\frac{T}{X}$ or $\frac{T}{[X - f(X)]}$ exceeds a specific threshold, Z_{cat} .

Health spending is considered catastrophic when out-of-pocket health spending exceeds a certain proportion of total household consumption (10 percent of total

expenditure or 40 percent of non-food expenditure thresholds are the most commonly used). The incidence of catastrophic health spending is therefore the proportion of households that exceed either of these two thresholds (Kawabata *et al.*, 2002, Xu, 2005). The study considered three threshold levels (10 percent 20 and 40 percent of non-food expenditure).

Figure 4.1 shows the incidence of catastrophic health payments across household expenditure quintiles in the rural areas of Kenya (in percentage), at the three threshold levels (10, 20 and 40 per cent)

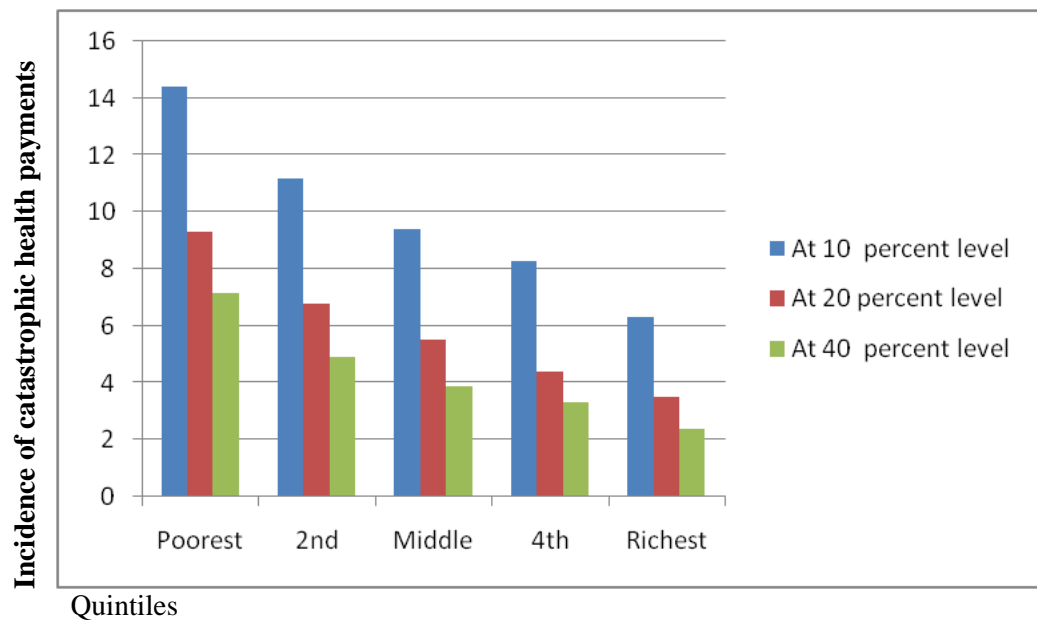


Figure 4.1: Incidence of catastrophic health payments in rural areas of Kenya

Figure 4.2 shows the incidence of catastrophic health payments across household expenditure quintiles in the urban areas of Kenya (in percentage), at the three threshold levels (10, 20 and 40 percent)

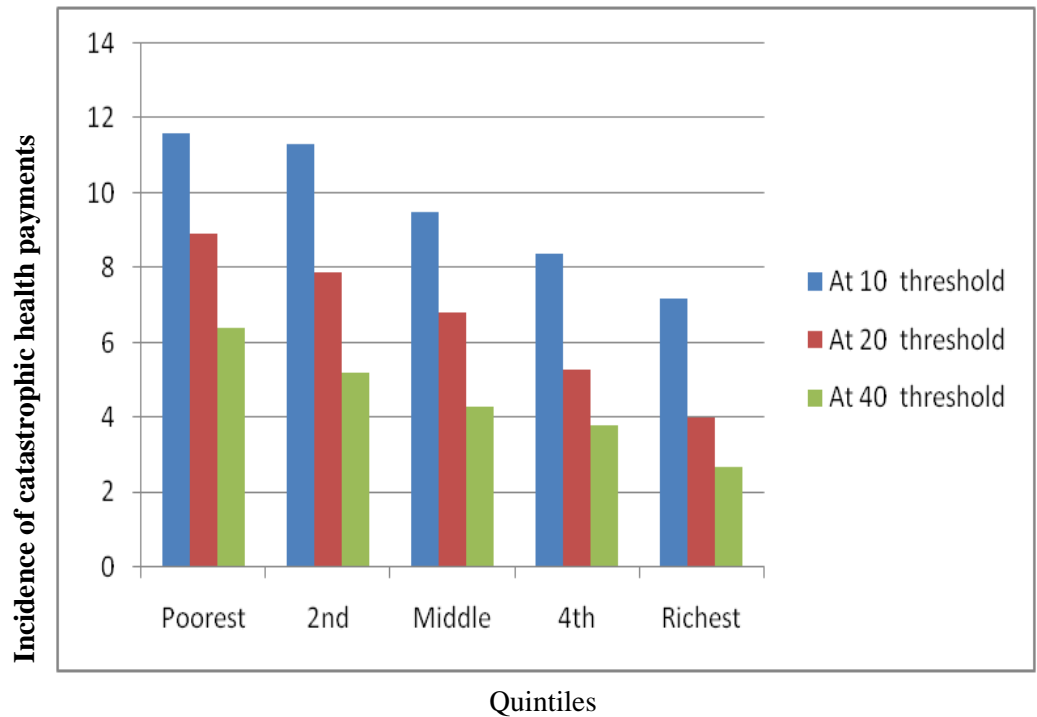


Figure 4.2: Incidence of catastrophic health payments in urban areas of Kenya

Figure 4.1 shows that 14.4 percent, 9.3 percent and 7.2 percent of households in the poorest wealth quintile from the rural areas who utilized healthcare services had experienced catastrophic expenditure at the thresholds of 10 percent, 20 percent and 40 percent, respectively. However, in Figure 4.2, the percentage of those who experienced catastrophic health expenditure at the same wealth quintile

was lower than in the rural areas. As shown in Figure 4.2, there were 11.6 percent, 8.9 percent and 6.4 percent of the households with catastrophic health expenditure at the 10 percent, 20 percent and 40 percent thresholds, respectively.

The poorest households in the rural areas had the highest number of households (14.4 percent, 9.3 percent and 7.2 percent at the three threshold levels) experiencing catastrophic health expenditures than urban households, while the richest quintile had the lowest incidence of catastrophic expenditures in both urban and rural areas. This affects the welfare of the poor households especially if the amount they spend on health care was to be spent on other items like investment, food and education. Similar results were reported by (Makinen *et al.*, 2001, Tomini and Packard, 2011 and Brombal *et al.*, 2011) who found that the majority of poor households compared to other quintiles faced high incidence of catastrophic payments. This was mainly due to the limited ability of these households to pay for non-subsistence spending, thus more easily incurring catastrophic payment. Contrary results were reported by Lagrada and Somkotra, (2008) who established that the richest households incurred more catastrophic health care payments and it was lowest among the poorest quintile. This was because the richest households demanded high quality health services that were perceived to be provided by the private sector.

The probability is also so high that the poor did not have medical insurance cover (Hsiao *et al.*, 2003). Moreover the medical insurance coverage of the poorest quintile remains low at 2.9 percent in Kenya (Republic of Kenya 2014). The results also show that the Kenyan rural households are more likely to incur catastrophic health care expenditures compared to households from urban areas as shown in figure 4.1. This can be attributed to the fact that majority of rural households have limited income (Republic of Kenya, 2014).

4.4 The Level of Inequity of OOP Health Payments

In measuring inequity caused by OOP for health care financing, the share of OOP as a proportion of both total expenditure and capacity to pay and concentration index was adopted. Concentration indices for headcount highlight the extent to which OOP for health care as share of total expenditure and capacity to pay (CTP) burdens either poor households or rich households in both rural and urban areas. The index takes a negative value when poor households are more likely to spend on health care from their resources than rich households, and a positive value indicates a greater tendency for the better-off to exceed the payment threshold. In the case in which there is no socioeconomic-related inequality, the concentration index is zero (O'Donnell *et al.*, 2008).

The burden of health payment in rural areas is shown in Figure 4.3

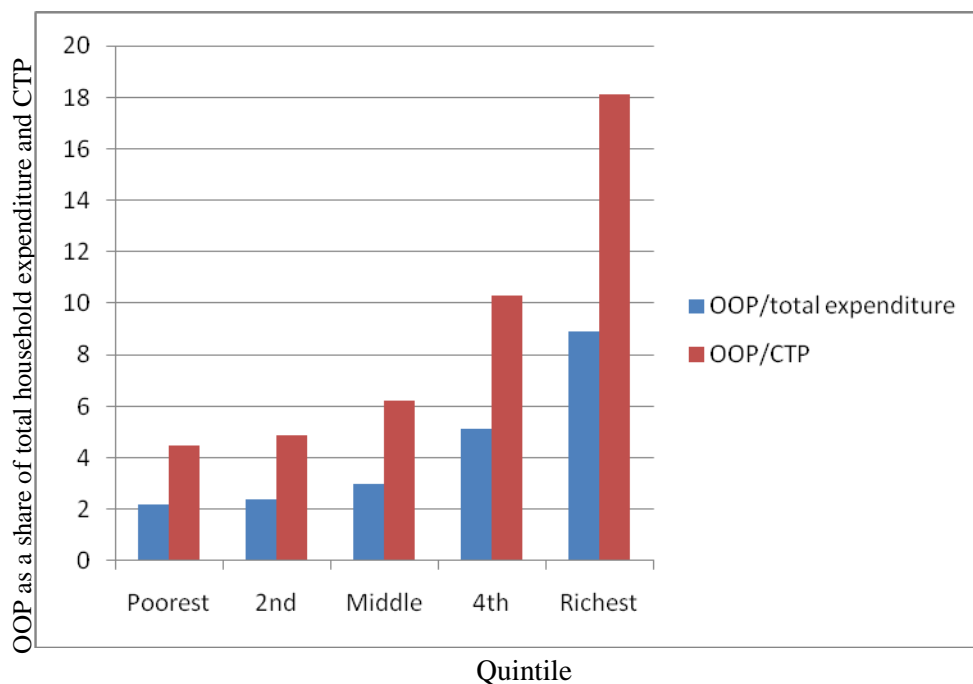


Figure 4.3: OOP as a share of total household expenditure and CTP

The results of the study show that the burden of health payment falls more on the rich households in rural areas compared to other quintiles as shown in Figure 4.3. The richest households in rural areas have the largest share of OOP as proportion of CTP and total expenditure at 18.1 per cent and 8.9 percent respectively. This implies that the rich households used more of their resources on health care compared to other expenditures. In rural areas, the rich households would spend a large proportion of their incomes to seek the best quality of health care services. Similar results were reported by Garg and Karan (2005) who found that the rich in the rural areas of India spent a large share of OOP to total expenditure and non-

food expenditure. Since rural areas were not equipped with higher quality and quantity of health care services, rich rural households spent a larger share in order to avail the same quantity and quality of health services, which were mainly available in urban areas.

Furthermore, the concentration index is positive, indicating that the rich households contribute more than proportionately to health care payments. The concentration index is 0.695 as shown in Table A3 in the appendix, this shows that the burden falls more on the rich. Garg and Karan (2005) found similar results that OOP in rural India was highly concentrated among the rich. Contrary results were reported by Kongsin *et al.* (2011) who established that there was a greater tendency of both the rich and the poor to pay more for health care.

Figure 4.4 shows OOP health payment as a share of total expenditure and capacity to pay in the urban areas.

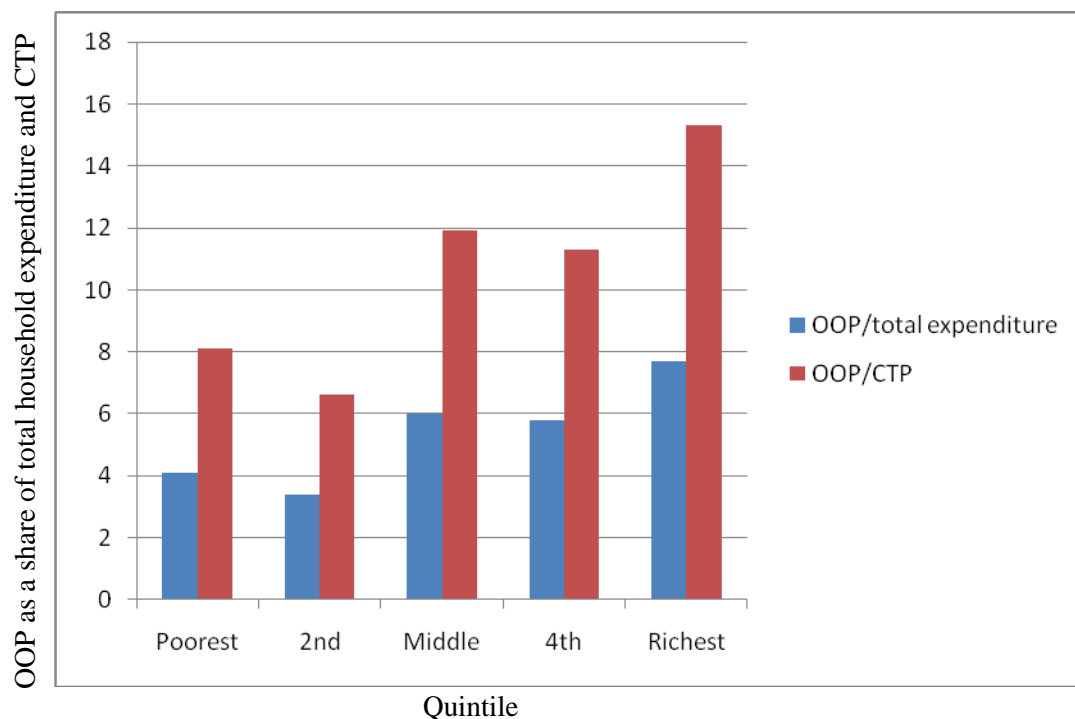


Figure 4.4: OOP as a share of total household expenditure and capacity to pay.

Figure 4.4 shows that the burden of health payment falls more on the richest households in the urban areas. OOP as share of capacity to pay and total expenditure is 15.3 and 7.7 respectively. Compared to the poor households in the rural areas, those in the urban areas have a higher share of OOP to total expenditure and capacity to pay at 4.1 per cent and 8.1 percent respectively.

In urban areas, rich households spend more in order to purchase higher quality as well as quantity of health services with increase in their income leading to increased share of OOP to total expenditure and capacity to pay for richest quintiles. Similar results were reported by Garg and Karan (2005) who found that

the rich households spent more on health care leading to increased share of OOP to total household income. This was because the rich households had better health seeking behavior and they tend to visit private hospitals on account of greater higher quality.

The value for concentration index is positive as shown in table A4 in the Appendix. This means that the rich are likely to spend on health care from their personal resources. Similar results were reported by Garg and Karan (2005) and Kongsin *et al.* (2011) who found that in the urban areas, OOP was distributed across all consumption groups. The results of the study therefore, show that healthcare financing in rural and urban areas of Kenya is concentrated among the rich and thus, the healthcare financing system is progressive.

4.5 Determinants of Catastrophic OOP for Health Care

The method suggested by Xu (2005) was adopted and modified to explore the characteristics of households related to catastrophic health expenditure. In order to do this, Logit regression was used to analyze the components that trigger OOP in rural and urban areas. The analysis was done for rural and urban areas as reported below.

To measure the fit of the logit regression model Hosmer-Lemeshow test and estat classification table were utilized and the results as shown in Table A6 and Table A7 in the Appendix indicate that the logistic regression model fitted the data well. Estat classification table shows that the model succeeded to produce accurately 78 percent of the true outcomes. Table A7 in the appendix also shows that the model is adequate since Hosmer-lemeshow value of 8.04 for 8 degrees of freedom is not large ($p=0.15$) hence the model fitted the data well.

Tables 4.3 and 4.4 report the Logit regression results of the determinants of catastrophic health expenditures in rural and urban areas of Kenya.

Table 4.3: Determinants of Catastrophic Health Expenditure in Rural Areas

Dependent variable=1 if household incurred catastrophic health expenditure and zero otherwise				
Independent variables	Coefficient	Robust Std. Error.	P value	dy/dx
Household size	-0.039***	0.012	0.001	-0.008
Sex of household head (Male=1, Female 0)	-0.101*	0.054	0.064	-0.021
Age of the patient				
Below 5 years	0.499***	0.122	0.000	0.103
Above 50 years	0.321***	0.091	0.000	0.067
Age between 5-50 is the default variable				
Age of household head	0.004*	0.002	0.070	0.0007
Education level				
Primary	0.023	0.084	0.787	0.005
Secondary	-0.108	0.176	0.536	-0.012
University and college	-0.109	0.093	0.239	-0.022
No education is the default variable				
Chronic illness (Yes=1, No=0)	0.399***	0.076	0.000	0.083
Type of illness				
Disease of respiratory	-0.122	0.081	0.132	-0.026
Diabetes	0.596***	0.160	0.000	0.121
Accidents and injuries	0.752***	0.274	0.006	0.150
Malaria	-0.458***	0.062	0.000	-0.096
Other types of illness is the default variable				
Type of health provider				
Private hospital	1.698***	0.098	0.000	0.351
Mission hospital	1.333***	0.110	0.000	0.278
Public hospital	-0.578***	0.083	0.000	-0.117
Other types of providers is the default variable				
Insurance cover (Yes=1, No=0)	-0.049	0.087	0.573	-0.010
Income Quintile				
Quintile 2	0.541***	0.087	0.000	0.108
Quintile 3	0.924***	0.089	0.000	0.191
Quintile 4	1.289***	0.091	0.000	0.271
Quintile 5	2.029***	0.099	0.000	0.420
Quintile 1 is the default variable				
Constant	-1.810	0.181	0.000	
Number of observations	20,350			
Prob>chi2	0.000			
Pseudo R2	0.232			
Wald chi2 (21)	1032			

***significant at 1%, **significant at 5%, *significant at 10%,

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

Hosmer-Lemeshow test and estat classification table were used to measure the fit of the logit regression model for urban areas and the results as shown in Table A5 and Table A8. The results indicate that the logit regression model fitted the data well. Estat classification table shows the model succeeds to produce accurately 74 percent of the true outcomes.

Table A6 show that the model is adequate since Hosmer-lemeshow value of 15.69 on eight degrees of freedom is not large: $p=0.471$ so the model fits the data well. Table 4.4 shows the Logit regression results of the determinants of catastrophic health expenditure in urban areas of Kenya.

Table 4.4: Determinants of Catastrophic Health Expenditure in Urban Areas

Dependent variable =1 if household incurred catastrophic health expenditure and zero otherwise				
Independent variables	Coefficient	Robust Error.	Std. P value	dy/dx
Sex of household head (Male=0, Female=1)	-0.357***	0.06	0.000	0.079
Household size	-0.003	0.014	0.805	-0.001
Age of the patient				
Above 50 years	0.235**	0.119	0.048	0.053
Below 5 years	-0.137	0.128	0.285	-0.03
Age between 5-50 is the default variable				
Age of household head	0.007***	0.003	0.004	0.002
Education level				
Primary	0.094	0.126	0.455	0.021
Secondary	0.175	0.141	0.216	0.039
University and college	-0.024	0.165	0.885	-0.005
No education is the default variable				
Chronic illness (Yes =1, No=0)	0.201**	0.085	0.018	0.045
Type of illness				
Disease of respiratory	-0.828***	0.067	0.000	-0.189
Diabetes	-0.599***	0.093	0.000	-0.138
Accidents and injuries	0.123	0.293	0.674	0.028
Malaria	-0.468	0.476	0.326	-0.108
Type of health provider				
Public hospital	-0.667***	0.08	0.000	-0.15
Mission hospital	-0.224***	0.078	0.004	-0.05
Private hospital	0.301***	0.11	0.006	0.068
Other types of providers is the default variable				
Insurance cover (Yes=1, No=0)	-0.201***	0.074	0.007	-0.045
Quintile				
Quintile 2	0.097	0.094	0.299	0.022
Quintile 3	-0.556***	0.093	0.000	-0.126
Quintile 4	-0.849***	0.102	0.000	-0.192
Quintile 5	-1.202***	0.109	0.000	-0.268
Quintile 1 is the default variable				
Constant	0.515	0.181	0.004	
Number of observations	13,325			
Wald chi2	58.97			
Prob>chi2	0.000			
Pseudo R ²	0.157			

*** Significant at 1%, **Significant at 5%

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

The Logit regression results show that the coefficients of household size, income, government hospital, private hospital, mission hospital, and age of household member below 5 years and above 50 years, presence of chronic illness, diabetes, accidents / injuries, and malaria in the rural areas were statistically significant at 1 percent level. Sex and age of household head were statistically significant at 10 percent level. All these factors determine catastrophic health care expenditure by rural households. Table 4.3 also shows that, the coefficients of insurance cover, education levels, and disease of respiratory were statistically insignificant.

The Logit regression results in Table 4.4 shows that the of sex of household head, age of above 50, age of household head, chronic illness, malaria, disease of respiratory, public hospitals, private hospitals, mission hospital, insurance status, and rich are the factors determining catastrophic health care expenditure by households in urban areas, while the household size, age of below 5 years, diabetes, accidents and injuries, poor and primary, secondary and college and university education level are not factors determining catastrophic health expenditure in the urban areas.

The coefficient for household size in the rural areas was negative and statistically significant at one percent level. This shows that other factors held constant, household size reduces the probability of observing a rural household incur

catastrophic health expenditure. The marginal effect for the household size was - 0.08. This implies that when household size increases by one member, the probability of a rural household incurring catastrophic health care expenditure reduces by 0.8 percent, holding other factors constant. In the urban areas the coefficient for household size is negative and insignificant. The results could be because the household sizes of most urban households are small and therefore spend less on healthcare.

When the household size increases, it provides protective effect against catastrophic expenditure, because people residing in a larger household can pull resources together to pay for larger amount of medical care. Additionally, a large household can provide care to other family members and this could lead to less health service utilization. Similar findings were reported by Bromba *et al.* (2011) and Halliday (2009) who found that larger household sizes provided protection against catastrophic health expenditure. Contrary results were reported by Kagarura (2012) in Uganda who established that the larger the household size the more the number of individuals to take care of and this increased the probability of incurring catastrophic health care expenditure.

The coefficient for sex of household head in rural area is negative and weakly significant at ten percent level. This shows that, other factors held constant male

headed household decreased the probability of observing a rural household incur catastrophic health care expenditure. This results show that predicted probability of incurring OOP was 2.1 percent lower in the male headed household than in the female headed household in the rural areas.

In urban areas similar results as for rural areas were reported. The coefficient for sex of household head is negative and significant at five percent level. This shows that, other factors held constant, male headed household decreases the probability of observing a rural household incur catastrophic health care expenditure by 7.9 percent than in female headed households in the urban areas

Female headed households are more vulnerable to economic shocks like OOP health payment, owing to the obstacles women face in accessing the economic resources. Women also participate less than men in the labour market and when they do participate, their earnings are usually lower than men's. Therefore, female headed households are more likely to face catastrophic health expenditure. For example, Kagarura (2012) found that catastrophic health expenditure increased with male headed households in Uganda. Syed and Malik (2012) found that male headed households predicted negative influence on catastrophic OOP than female headed household in Pakistan.

The coefficients of belonging to age below five and above 50 are positive and statistically significant at one percent level in rural area. This shows that other factors held constant a household with a child below five years and an adult above 50 years increases the probability of observing a rural household incur catastrophic health care expenditure. The marginal effects for below five years and above 50 years are 0.103 and 0.067 respectively. This implies that when a household has a child below five years and an adult above 50 years, the probability of a rural household incurring catastrophic health care expenditure increase by 10.3 percent and 6.7 percent respectively holding other factors constant. The implication is that the health of older people is likely to deteriorate than the health of young people.

In the urban areas the coefficient for belonging to age above 50 is positive and statistically significant at five percent level. This shows that other factors held constant age increase the probability of observing an urban household incurring catastrophic health care expenditure. The marginal effect for belonging to age above 50 is 0.053, which implies that when age of household and age of the patient seeking medical care increases, the probability of an urban household incurring catastrophic health care expenditure increase by 0.1 and 5.3 percent.

The coefficient of belonging to age below 5 in the urban areas is statistically insignificant. This implies that in the urban areas having children of below five years do not affect catastrophic health expenditure. This can be because in the urban areas children are rarely exposed to unfavourable environment like cold and also in the urban areas household can easily access medical care and therefore children can be treated before the sickness worsens.

An individual's health stock depreciation rate is likely to increase with age. This implies that the health of older people is likely to deteriorate than the health of young people. The findings show that with aging population, there is high demand for health care compared to the younger population. In addition, the national and the county governments of Kenya have not allocated resources for the management of non-communicable diseases in the elderly. Similar findings were found by Brombal *et al.* (2011), who established that having a high proportion of elderly members in a household greatly increases the likelihood of incurring catastrophic and impoverishing health spending. Contrary results were reported by Kagarura (2012), who established that age of household head reduces catastrophic health expenditure, because as one ages, the household size reduces and the family becomes less susceptible to common diseases like malaria

The coefficient for age of household head is positive and statistically significant at ten percent level in rural areas. This implies that when age of household increases, the probability of a rural household incurring catastrophic health care expenditure increases. Contrary results were reported by Kagarura (2012), who established that age of household head reduces catastrophic health expenditure, because as one ages, the household size reduce and the family becomes less susceptible to common diseases like malaria

The coefficient for primary level of education was statistically insignificant. While secondary, college and university levels of education were also statistically insignificant in the rural areas. This shows that other factors held constant, a household with secondary, college and university levels of education, does not affect the probability of observing a rural household incur catastrophic health care expenditure. Similar findings were also reported in the urban areas. Education levels of the household head were statistically insignificant.

It is always expected that educated people tend to be healthier, they are likely to recognize the benefits of improved health and also they may enjoy eating nutritious food or doing physical exercise (Grossman, 1972). They may also recognize the dangers of engaging in some risky activities that may negatively affect their health status (Grossman, 1972). Also educated people are likely to

take medical insurance covers and some have already been insured by their employers and in addition they have greater probabilities of obtaining higher income, although in the study the coefficient is insignificant. Brombal *et al.* (2012) found that adult literacy rate was associated with the spreading attitude towards health and health-related behaviors and that literacy was a proxy for health protection and reaction to health problem.

Chronically sick persons are a vulnerable group when it comes to health care spending, this group needs to use health care frequently and the accumulated OOP health payments can push households into impoverishment. From the study findings the coefficient for chronic illness in the rural areas was positive and statistically significant at one percent level. This shows that other factors held constant with chronic illness the probability of observing a rural household incur catastrophic health care expenditure increases. The marginal effect for chronic illness is 0.083. This implies that a chronic illness increases the probability of a rural household incur catastrophic health care expenditure by 8.3 percent.

In the urban area similar results were reported. The coefficient for chronic illness was positive and statistically significant at one percent level. This shows that other factors held constant, with chronic illness the probability of observing an urban household incur catastrophic health care expenditure increases. The

marginal effect for chronic illness is 0.045. This implies that a chronic illness increases the probability of an urban household incur catastrophic health care expenditure by 4.5 percent. Chronic illnesses reported in the study included hypertension, diabetes, cardiac disorders, arthritis, HIV/AIDS, ulcers, gout and cancer. Similar findings were reported by Mondal *et al.* (2010) and Brombal *et al.* (2011) who found that chronic illness was a major factor associated with catastrophic health expenditure.

The type of illness increases the likelihood of catastrophic expenditure, especially if it will require the sick person to be admitted or if the treatment is prolonged. In rural areas the coefficient for disease of respiratory was statistically insignificant. While the coefficient for diabetes disease is positive and statistically significant at one percent. The marginal effect of diabetes is 0.121 this shows that other factors held constant when a household member suffers from diabetes the probability of observing a rural household incur catastrophic health care expenditure increases by 12.1 percent.

In the urban areas the coefficients for respiratory disease and diabetes were negative and statistically significant at one percent. This shows that other factors held constant, when a household member suffers from either diabetes or respiratory disease, the probability of observing an urban household incur

catastrophic health care expenditure decreases. The marginal effects for respiratory disease and diabetes are -0.189 and -0.138 respectively. This implies that when a household member suffering from either respiratory disease or diabetes, the probability of an urban household incurring catastrophic health care expenditure decrease by 18.9 and 13.8 percent.

In rural areas those household members suffering from diabetes contributed to catastrophic OOP. This can be attributed to the fact that Kenya does not have adequate funds for diabetes prevention or care. Kenyans who can, independently fund their care [World Health Organization, 2010], leaving many diabetics and their families at risk of poverty and poorer health.

Catastrophic OOP for health care also depend on the type of illness or injury. The coefficient for accidents and injuries were positive and statistically significant at one percent level. This shows that other factors held constant, if a household member was involved in an accident, there is a probability of observing a rural household incur catastrophic health care expenditure. The marginal effect for accidents or injuries is 0.15. This implies that when a household member was involved in an accident, the probability of a rural household incurring catastrophic health care expenditure increase 15 percent. In the urban area, the coefficient for accidents or injuries was statistically insignificant. This shows that other factors

held constant when a household member is involved in an accident or injured was not a factor determining catastrophic health expenditure. In the urban areas the probability is so high that the cost of healthcare is taken care of by the insurance companies. In the rural areas the chances are so high that households are not aware that when they are involved in an accident their medical expenses are suppose to be taken care of by insurance. This might explains the reason why the coefficient was significant in the rural areas.

Road accidents have been on a rising trend in Kenya (Republic of Kenya, 2014) and this contributes to a significant proportion of the burden of disease. Families have been forced to incur health payments that they had not planned for. This has had an impact on the social and economic well-being of individuals, their families, and society in form of OOP for health care.

The coefficient for malaria disease is negative and statistically significant at one percent level. The marginal effect of malaria is -0.096, this shows that other factors held constant when a household member suffers from malaria the probability of observing a rural household incur catastrophic health care expenditure reduces by 0.096. The coefficient for malaria disease in the urban area was statistically insignificant. In urban areas malaria prevalence is lower than in rural areas (Republic of Kenya, 2014) also in the urban areas the households

may be using mosquito nets to protect themselves from mosquito bites. This explains the reason why malaria in the urban areas was not a factor determining catastrophic health payment. Over time malaria drugs have become more effective and the prices have been subsidized (Republic of Kenya, 2014). This can explain the reason why malaria disease is a negative predictor of catastrophic health expenditure in the rural areas.

The other type of health care providers was the basis in the analysis. The coefficient for visiting a public hospital is negative and statistically significant at five percent level. This shows that other factors held constant, visiting a public hospital reduces the probability of observing a rural household incurring catastrophic health care expenditure. The marginal effect for visiting a public hospital is -0.117. This implies that the predicted probability of incurring catastrophic health expenditure was 11.7 percent lower for those households who visited public hospitals than other types of health care providers.

In the urban areas, the coefficients for visiting public and mission hospitals were negative and statistically significant at one percent. This shows that other factors held constant, visiting a public or mission hospital decrease the probability of observing an urban household incur catastrophic health care expenditure. The marginal effect for visiting public and mission hospitals are -0.15 and -0.068

respectively, implying that the predicted probability of incurring catastrophic health expenditure were 15 and 6.8 percent for public and mission hospitals respectively is lower for those households who visited public hospitals than other types of health care providers.

The households in rural areas and urban areas who visited public hospitals were therefore unlikely to incur catastrophic health care expenditure. This could be because most public hospitals services are highly subsidized and hence affordable to all individuals irrespective of their income levels. This supports the findings of Kagura (2012) that government health facilities are non exploitative and their objective is not profit maximization. The results contradict the findings of Kimalu (2013) who established that household members who visited public hospitals had a positive probability of incurring catastrophic health care expenditure.

The coefficients for visiting private and mission hospitals were positive and statistically significant at one percent level. This shows that other factors held constant, visiting a private or mission hospital compared to other health care providers increases the probability of observing a rural household incur catastrophic health care expenditure. The marginal effect for visiting private and mission hospitals are 0.351 and 0.278 respectively. This implies that when a household visits a private or mission hospital than other health care providers the

probability of a rural household incurring catastrophic health care expenditure increase by 35.1 and 27.8 percent.

The coefficient for visiting a private hospital by urban households was positive and significant at one percent. This shows that other factors held constant, visiting a private hospital compared to other health care providers increases the probability of observing an urban household incur catastrophic health care expenditure. The marginal effect for visiting a private hospital is 0.0508, which implies that when a household member visits a private hospital, the probability of an urban household incurring catastrophic health care expenditure increases by 5.08 percent than other health care providers.

Unlike public hospitals, most private hospitals motive, apart from providing medical care, is profit maximization, and therefore the services provided by the private hospitals are likely to be expensive. Also the households are expected to pay the entire amount incurred for the services provided unlike in the public hospitals where there is cost sharing. This supports the findings of Kimalu (2013) who established that visiting a private or mission hospital was associated with higher probability of incurring catastrophic expenditure compared to visiting a chemist or a traditional healer. This result contradicts the findings of Kagarura (2012) who established that visiting mission hospitals reduced the probability of

incurring catastrophic health expenditure because mission hospitals are less exploitative and mostly philanthropic in nature.

Medical insurance scheme is one of the most important mechanisms that can assist in reducing the financial burden of health care (Brombal *et al.*, 2011). In Kenya, the medical insurance uptake is still very low at 12.1 percent and 26.6 percent in rural and urban areas respectively (Republic of Kenya, 2014). The coefficient for medical insurance was statistically insignificant in the rural areas. This may be because majority of households in the rural areas did not have medical insurance cover. In the urban areas, the coefficient for medical insurance is negative and significant at one percent level. This shows that other factors held constant, medical insurance cover reduces the probability of observing an urban household incur catastrophic health care expenditure. The marginal effect for insurance is -0.045. This implies that medical insurance cover decreases the probability of an urban household to incur catastrophic health care expenditure by 4.5 percent.

Inadequate medical insurance cover reduces the well-being of individuals and increases the risk of impoverishment due to high healthcare costs. But if households are adequately covered, they will be cushioned from catastrophic health expenditure. Similar findings were reported by Amendah *et al.* (2015) who

found that belonging to a social safety net reduced the risk of catastrophic expenditure in the slum areas of Kenya. Van Minh *et al.* (2012) also found that households with health insurance had lower rates of catastrophic expenditure. However, Cavanero *et al.* (2006) unexpectedly found that households covered by social health insurance did not show any relationship with catastrophic health expenditure

The poorest wealth quintile was the basis in the analysis. The coefficient of poor wealth quintile was positive and statistically significant at 1 percent level in the rural areas. The marginal value was 0.108, implying that the predicted probability of incurring catastrophic health expenditure was 10.8 percent higher for this group than the poorest wealth quintile.

The poorest households incur financial catastrophe due to OOP health care payments as shown by the regression results. This is mainly due to the limited ability of the poor households to pay for subsistence spending in the rural areas. In addition, the poorest household in the rural areas are likely to face catastrophic payments due to the fact that most of them live below poverty line or are just near poverty line and therefore even with low health expenditure, they easily fall into catastrophic payment (Brombal *et al.*, 2012). Similar findings were reported by Brombal *et al.* (2012), Kawabata *et al.* (2002) and Carrin *et al.* (2007), who found

that poor households were more likely than any other income group to incur catastrophic health expenditure and impoverishment due to health payment.

In the urban areas the coefficient of poor was statistically insignificant. Poor households have poor health seeking behavior because of lack of awareness as well as the risk of loss of income and also the availability and accessibility to health services is limited in around areas where they reside (Garg and Karan, 2005). The coefficient may have been insignificant because most of the urban poor households were not seeking health care because they could not afford.

The coefficient for quintile 5 which represents richest households was positive and statistically significant at one percent level. This shows that other factors held constant rich households increase the probability of observing a rural household incur catastrophic health care expenditure. The marginal effect for quintile 5 is 0.42, this implies that when a household becomes rich, the probability of a rural household incurring catastrophic health care expenditure 42 percent higher than belonging to the poorest quintile.

This is can be explained by the fact that rich households are likely to visit private hospitals where they are likely to seek specialized care. They also spend more on drugs and diagnostic tests. This supports the findings of Xu *et al.* (2006), Karan and Garg (2005) and Cavangero *et al.* (2006) who asserted that rich households

spend more in order to purchase higher quality as well as quantity of health services.

The coefficient for the richest households in urban area, which is represented by a proxy quintile five, is negative and significant at one percent level. This shows that other factors held constant, being rich decreases the probability of observing an urban household incur catastrophic health care expenditure. The marginal effect for rich is -0.267. This implies that a rich patient decreases the probability of an urban household incur catastrophic health care expenditure by 26.7 percent than being poorest.

Rich households from the urban areas tend to spend more in order to purchase high quality and quantity of health care services. In addition, they visit private hospitals where the cost of health care is expensive. However, a majority of rich household have medical insurance cover which cushions them from catastrophic health expenditure. In Kenya the fourth and richest quintiles have the highest medical insurance coverage at 25.4 and 41.5 percent respectively (Republic of Kenya 2014). This finding conforms to the findings of Akinkugbe *et al.* (2011) that the poorer quintiles in Botswana had proportionately more households who are likely to face catastrophic health expenditures than richer quintiles. Contradictory results were reported by Kagarura (2012), Dash and Vaishnavi

(2009) who established that belonging to quintiles 4 and 5 increased the probability of catastrophic health expenditure.

In the rural areas, the coefficients of household size, income, visiting a government hospital, visiting a private hospital, visiting a mission hospital, household member belonging to ages below 5 and above 50, presence of chronic illness, diabetes, accidents and injuries, and malaria in the rural areas were statistically significant. These are therefore the factors that determine catastrophic health care expenditure by households in rural areas.

In the urban areas, sex of the household head, having a household member who is 50 years and above, age of the household head, presence of chronic illness, suffering from either diabetes or having respiratory disease, visiting public, private or mission hospitals, having an insurance cover and being rich are the factors that determine catastrophic health expenditure in urban areas of Kenya.

4.6 The Effects of OOP for Health Care on Households Welfare

In measuring the effect of OOP for health care on household's welfare in rural and urban areas of Kenya, two measures of poverty were used: poverty headcount and the poverty gap (Wagstaff and Van Doorslaer, 2003). Table 4.5 presents the results.

Table 4.5: OOP on Poverty-Poverty Head counts and Poverty gaps

Poverty measures (in percentage)	Rural	Urban
Pre-payment headcount (pre-Hp)	50.04	39.8
Post-payment headcount (post-Hp)	54.22	44.7
Poverty impact-headcount (post-Hp-pre-Hp)	4.18	4.9
Poverty gaps(in Kenya shillings)		
Pre-payment gap (pre-G)	1852	5508
Post-payment gap (post-G)	2897	6736
Poverty impact-gap (post-G-pre-G)	1045	1228
Normalised poverty gaps (in percentage)		
Pre-payment normalised gap (pre-NG)	147.69	208.006
Post-payment normalised gap (post-NG)	231.02	254.381
Normalised poverty impact-gap (post-NG-pre-NG)	56.42	22.29

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

The effect of OOP on poverty head count is higher in urban areas than in rural areas as shown in Table 4.5. The study findings reveal that after subtracting the OOP for healthcare, the poverty impact-headcount increased by 4.18 and 4.9 percent in rural and urban areas respectively. This was the percentage of households in the rural and urban areas respectively who were plunged into poverty after OOP for health care. These figures do not include households below poverty line who are also pushed further down into deeper poverty. OOP for health care make breaking out of the poverty cycle difficult. It does not only impact on present day lives but it also affects the well being of future generations.

The results support the findings of Karan and Garg (2008) who found that after accounting for OOP health payment in India the number of poor increased by 3.2 percent. The impact of OOP on poverty headcount was higher in rural areas than in the urban areas of India. Chuma and Maina (2012) established that poverty head count in Kenya increased by 2.7 percent after accounting for OOP for health care.

The results of the study also shows that the average amount by which people go below poverty line because of OOP increased more in the urban areas by Kenya shillings 1228, compared to rural areas which increased by Kenya shillings 1045. Reduced consumption by households because of OOP for health care affects the present welfare and future wellbeing of household members. Garg and Karan (2008) also found that the intensity of poverty gap was higher in urban areas than in rural areas. At the national level Garg and Karan (2008) found that consumption level of the poor dipped because of OOP for health care.

The normalized poverty gap, which measures the average consumption shortfall because of OOP for the poor showed higher intensity of poverty gaps in rural areas as compared to urban areas at 56 and 22 percent respectively. This shows that the burden of OOP is greater in rural areas as compared to urban areas. This is because in the rural areas a majority of the population is concentrated just

above the poverty line and a small amount of OOP health payments pushes a large number of persons below the poverty line

4.7 Coping Mechanisms to Catastrophic Health Care Expenditure

To measure coping mechanisms to catastrophic health expenditure Engels curve method used by Leive and Xu (2007) was adopted. A system of Engels curves was estimated in the form of budget shares. The results of Three-stage least-squares regression results is shown in Table 4.6.

Table 4.6: Effect of Catastrophic Health Expenditure on other Expenditures

Equation	Obs	Parms	RMSE	R-sq	chi2	P
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Food share	13,109	6	0.595	0.314	323.89	0.000
Housing share	13,109	6	0.861	0.435	543.43	0.000
Education share	13,109	6	0.911	0.528	790.33	0.000
Other expenses share	13,109	6	0.382	0.877	5028.74	0.000
	Coefficient	Std. Err.	z	p> z 	[95%Conf. Interval	
Food share						
Catastrophic	-0.131**	0.061	-2.16	0.031	-0.250	-0.012
Borrowing	-0.049	0.059	-0.83	0.409	-0.165	0.067
Sell of assets	0.177	0.125	1.41	0.159	-0.069	0.422
Use of current income	-3.690***	0.247	14.91	0.000	3.205	4.175
other coping mechanism	3.740***	0.255	14.64	0.000	3.239	4.239
Total expenditure	0.425***	0.025	17.2	0.000	0.377	0.473
Constant	3.740	0.255	14.64	0.000	3.239	4.240
Housing share						
Catastrophic	0.169**	0.088	1.92	0.054	-0.003	0.341
Borrowing	0.132	0.086	1.54	0.124	-0.036	0.299
Sell of assets	-0.177	0.182	-0.97	0.330	-0.533	0.179
Use of current income	0.309*	0.170	1.81	0.070	-0.025	0.642
other coping mechanism	0.177	0.182	0.97	0.330	-0.179	0.533
Total expenditure	0.826***	0.036	23.09	0.000	0.756	0.896
Constant	4.995	0.309	16.16	0.000	4.389	5.601
Education share						
Catastrophic	-0.135	0.093	-1.45	0.146	-0.317	0.047
Borrowing	-0.148	0.091	-1.63	0.102	-0.326	0.029
Sell of assets	-0.171	0.192	-0.89	0.373	-0.548	0.205
Use of current income	-0.292	0.379	-0.77	0.440	-1.035	0.450
Other coping mechanisms	-0.144	0.391	-0.37	0.712	-0.911	0.622
Total expenditure	1.038***	0.039	27.44	0.000	0.964	1.112
Constant	-1.688	0.383	-4.4	0.000	-2.439	-0.937
Other expenses share						
Catastrophic	-0.064*	0.039	-1.65	0.099	-0.140	0.012
Borrowing	-1.69***	0.164	-10.33	0.000	-2.015	-1.372
Sell of assets	0.063	0.081	0.79	0.430	-0.094	0.221
Use of current income	-1.721***	0.159	-10.84	0.000	-2.033	-1.410
other coping mechanism	-0.028	0.038	-0.74	0.462	-0.102	0.047
Total expenditure	1.105***	0.016	69.64	0.000	1.074	1.136
Constant	-1.693	0.164	-10.33	0.000	-2.015	-1.372
Endogenous variables: Food share, housing share, education share, and other expenses share						
Exogenous variables: catastrophic, use of current income, borrowing, sell of assets, other coping mechanisms and total expenditure						
*** Significant at 1%, **Significant at 5%, *Significant at 10%,						

Source: Authors own computation based on Kenya Household Health Expenditure and Utilisation Survey, 2013

The three-stage least-squares regression results show that households are not able to smooth their non-medical consumption in an event of catastrophic health care

expenditure. The study results show that food is not protected from the catastrophic health expenditure. The coefficient for catastrophic variable is statistically significant at five percent level. This shows that other factors held constant catastrophic expenditure reduces the probability of observing a household consume non-medical goods. Catastrophic health expenditure reduces the share of food expenditure, meaning that when households pay for their medical expenditure, they reduce the amount they spend on food. Household therefore, will not be able to smooth food consumption in the face of health shocks and this will negatively impact on the welfare of households.

The coefficient for use of current income is positive and statistically significant at five percent level. This implies that when households use current income to finance OOP health expenditure, food share does not reduce. The coefficients for borrow and sell of assets were statistically insignificant. However, since the coefficients are insignificant, it implies that borrowing and sell of assets are not coping mechanisms when it comes to food share.

The reduction in food consumption resulting from catastrophic health expenditure can worsen existing illness, threaten future health and even increase the future health care costs. This can lead to low productivity both in school and at work which will affect the welfare of an individual. Similar results were reported by

Khuat *et al* (2012) who found that households from quintile one with inpatient and higher level of outpatient treatments faced a reduction in food expenditure. The results of the study contradict the studies by Kagarura (2012) and Xu and Leive (2007) who established that with catastrophic health expenditure food expenditure was protected.

Education expenditure was not affected in an event of catastrophic health expenditure. The coefficient for catastrophic variable is statistically insignificant for education share. Catastrophic variable might have been insignificant because, may be during the illness period there was no fee to be paid, since households do not routinely spend on education. The coefficients of borrowing, sell of assets current assets and other coping mechanisms were all statistically insignificant. When households sell assets to finance their medical expenditure, education is not affected, but they will forgo returns the assets would have yielded and this impact negatively the current and the future welfare of the households. The coefficient for current income was statistically insignificant. When households use current income to finance health expenditure, education expenditure share is not affected. The current income used in financing health care might have been saved to finance education, and this may lead to withdrawal of children from school. This will make it difficult to break the intergenerational poverty circle and inequality. Similar results were reported by Kagarura (2012) and Xu and Leive (2007) where

they reported a negative relationship between education share and catastrophic health expenditure.

Housing is protected in an event of catastrophic health expenditure. The coefficient for catastrophic variable was a positive and statistically significant at five percent for housing expenditure. In an event that households incur high OOP especially in the short run, it is unlikely for them to shift from the place they are residing. The coefficient of current income is positive and statistically significant at ten percent. When households use current income to finance health care housing expenditure does not reduce. The coefficient for sell of assets was statistically insignificant, when households sell assets to finance their medical costs housing is not protected, households might have reduced other housing components like cost of gas, electricity, telephone and water, when households borrowed to cope with catastrophic OOP. This contradicts the findings of Kagarura (2012) and Xu and Leive (2007) who found that there was a negative relationship between housing and catastrophic health expenditure.

Households are not immune to detrimental effects of catastrophic health expenditure on other expenses. The coefficient of catastrophic variable was negative and statistically significant for share of other expenditures. Households facing catastrophic health expenditure reduce the share other expenditures other

than food, housing and education. Other expenses included purchase of plots, cars, clothes, footwear, and payment of dowry. The coefficients for borrowing and sale of assets were negative and statistically significant at one percent. When households borrow and use current income to finance OOP for health care other expenses will reduce. Therefore, the welfare of households will be affected because households will be required to repay the borrowed money. Using current income to finance OOP will reduce other expenditure and this will have a negative impact on the welfare of households. The coefficient for sell of assets was statistically insignificant. If assets were sold then households future income will affected if the asset sold was a source of income to the family. Similar results were reported by Kagarura (2012) and Xu and Leive (2007) who found that households facing high OOP will reduce the share of other expenditures.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter presents the summary of the study findings and conclusions and policy implications on out-of-pocket payment for health care and household welfare in Kenya. It also entails contribution to knowledge, limitations of the study and areas of further research.

5.2 Summary

The study was motivated by the fact that the Government of Kenya since independence has made effort to improve the welfare of households, but from the welfare data, Kenya's national poverty rate still stands at 45.2 percent while the poverty rates in the rural and urban areas are 50.5 and 33.5 percent. This suggests that the living conditions of rural residents are worse than the prevailing conditions in the urban areas. However, OOP for health care continues to be the main source of health financing in Kenya, and this has led to catastrophic health expenditure and especially considering that the health insurance uptake is still very low in the rural areas and generally among the poor people.

Findings from earlier studies on catastrophic health expenditure did not address the effects of out-of-pocket health spending in rural and urban areas considering that the poverty rates are higher in rural than urban areas. The study filled this knowledge gap by analysing the out-of-pocket payments for health and its effects on household welfare in both rural and urban areas of Kenya.

The main objective of the study was to analyse the out-of-pocket health expenditure and its effects on household welfare in Kenya. The specific objectives were to investigate the incidence of OOP for health care among different economic groupings in rural and urban areas; establish the level of inequity of OOP for health care among different economic groupings in rural and urban areas; examine the determinants of catastrophic OOP payments for health; establish the effect of catastrophic OOP healthcare financing to households' welfare in rural and urban areas; and find out the households coping mechanism to OOP health payments in Kenya.

The study used data from the Household Survey of Health Utilisation and Expenditure of 2013. Various diagnostic tests, including tests for presence of heteroscedasticity were conducted. Robust standard error was used to take care of the problem of heteroscedasticity. To confirm that the models fitted the data well, the Hosmer-Lemeshow (H-L) test and estat classification were conducted for the models. The results showed that the models fitted the data well.

The first objective was to establish the incidence level of OOP for health care among different economic groupings in rural and urban areas. The study considered three threshold levels (10 percent 20 and 40 percent of total non-food expenditure). The study found that the poorest households in both rural and urban areas were the most financially vulnerable to the cost of health care.

The second objective was to establish the level of inequity of OOP for health care in rural and urban areas of Kenya. In measuring inequity caused by OOP health care financing, the share of OOP as a proportion of both total expenditure and capacity to pay and concentration index was adopted. The results of the study showed that, the burden of health payment felt more on the households in the richest quintile in both rural and urban areas than other quintiles. The richest households in both rural and urban areas had the largest share of OOP for health care as proportion of both total household expenditure and capacity to pay. Furthermore, the concentration index for both rural and urban areas was positive, indicating that the rich households contribute more than proportionately to health care payments. The results of the study therefore, show that healthcare financing in rural and urban areas of Kenya is concentrated among the rich and thus, the healthcare financing system is progressive.

The third objective of the study was to establish the determinants of catastrophic OOP for health care in both rural and urban areas. In order to do this, Logit regression was used. The results showed that household size, income, government hospital, private hospital, mission hospital, and age of household member below 5 years and above 50 years, presence of chronic illness, diabetes, accidents/injuries, and malaria in the rural areas were the factors that determine catastrophic health care expenditure by rural households. In the urban areas, sex of household head, age of above 50, age of household head, chronic illness, malaria, disease of respiratory, public hospitals, private hospitals, mission hospital, insurance status, and rich were the factors determining catastrophic health care expenditure.

The fourth objective of the study was to establish the effect of OOP for health care on households' welfare in rural and urban areas. In measuring the effect of OOP health expenditure on household's welfare in rural and urban areas, two measures of poverty were used: poverty headcount and the poverty gap. The effect of OOP on poverty head count was higher in urban areas than in rural areas. The results of the study also, showed that the average amount by which people go below poverty line because of OOP for health care increased more in the urban areas compared to rural areas.

Lastly, the fifth objective of the study was to measure the coping mechanisms to catastrophic health expenditure. A system of Engels curves were estimated in the form of budget shares. The Three-Stage Least-Squares regression was used to analyse the coping mechanisms to the catastrophic health expenditure. The results of the study showed that households were not able to smooth their non-medical consumption in an event of catastrophic health care expenditure. Households were not able to smooth food consumption in the face of health shocks. It was also found that other household expenses apart from food, housing and education was not immune to detrimental effects of catastrophic health expenditure. Conversely, housing expenditure was protected in an event of catastrophic health expenditure.

5.3 Conclusions

Two concrete conclusions could be derived from the results. First, the OOP is progressive in both rural and urban areas. This is consistent with objectives of health care financing that a method used should be progressive with the rich shouldering increasing proportion of health payment in income. Second, incidence of health care is regressive in both areas, implying that the poor had the highest number of households experiencing catastrophic health expenditure.

Visiting public hospitals protected households against catastrophic health expenditure. This is because it is expected that any public health facility should create such an impact and protect poor households from catastrophic health expenditure. Chronic illness contributed to catastrophic health expenditure in both rural and urban areas. This is because chronically sick persons needed to use healthcare frequently, and this might lead to accumulated OOP for health care which can lead households into impoverishment. In addition, life style diseases like diabetes have been on the rise, and this has increased the catastrophic health expenditure in Kenya.

Households normally prefer visiting private hospitals and this may be because of poor quality of services and long waiting hours in public hospitals. This leads to households paying more in the private hospitals, therefore increasing the probability of both rural and urban households incurring catastrophic health expenditure. The rich households from the rural areas have higher likelihood of incurring catastrophic health expenditure. This can be explained by the fact that rich households from the rural areas are likely to visit private hospitals where they end up spending more on specialized care. In addition, a small percentage of households from rural areas have a medical insurance cover which could have cushioned them against catastrophic health expenditure.

5.4 Policy Implications

The findings from incidence analysis imply that there is need for government at both national and county levels to design the health financing system that protect poor households from catastrophic health expenditure, since the results of the study found that the poorest households had experienced catastrophic health expenditure. One way is to provide health insurance for the poor households. The insurance can be provided free of premium payments by the poorest households.

Although OOP was found to be progressive, the policy implication for improving welfare for all is to orient health financing towards social health insurance so that those with ability to pay make compulsory contribution. This will reduce catastrophic expenditure even among the rich, whom the study established that the bore the greatest burden of OOP health expenditure.

The system of waiver of payments for the elderly should be introduced where health insurance is not available. This is because chronic illness is mainly associated with the old age and this contributes to catastrophic expenditure.

One of the ways of protecting poor households is by increasing financial protection offered, and subsidizing the cost of healthcare. Also the government should introduce catastrophic risk coverage for poor population. In addition, the

government should also ensure that when coming up with strategies aimed at reducing poverty, the strategies must include ways of increasing the affordability of health services in the country. This is informed by the fact the poor households are the most vulnerable to catastrophic health expenditure in both rural and urban areas.

The national and county governments should also consider subsidizing the cost of providing healthcare services by the private sectors. This will reduce the burden of healthcare for those who visit private hospitals. They should also consider use of private-public partnership framework in provision of health care so that more people can access affordable healthcare from both private and public hospitals. This will reduce the burden of OOP health payment, since the study found that when both rural and urban household members visited private hospital they incurred catastrophic health expenditure.

The national and county government should also consider subsidizing the cost of medication for those already suffering from chronic illnesses which are already very costly. Additionally, the government should also allocate some resources for the management of non-communicable diseases in the elderly and those with chronic illness like cancer, diabetes, and hypertension. This is because the

findings of the study established that those with chronic illness and the elderly incurred catastrophic expenditure.

5.5 Contribution to Knowledge

The findings of the study that the poor households in both rural and urban areas had the highest number of households experiencing catastrophic health expenditure supported the results of the earlier studies. What the study contributed to knowledge was to show that rural households were more likely to incur catastrophic health expenditure compared to households in urban areas. The policies designed by the government should therefore be geared towards ensuring that rural households are protected from catastrophic health expenditure.

The study also established that some factors that determined catastrophic health expenditure in rural and urban areas were different. Household size, having a child below five years, accidents and injuries, and suffering from diabetes determined catastrophic health expenditure in rural areas, while the same factors did not matter in urban areas. Unlike in rural areas, In urban areas, having a medical insurance cover and suffering from respiratory disease determined catastrophic health expenditure. Specific policies should therefore be designed and developed for rural and urban areas.

The study found that in both rural and urban areas households were driven into poverty after OOP for health care. However, the results showed that average amount by which households go below poverty line increased more in urban areas than rural areas. Unexpectedly, OOP for health care was found to be progressive and therefore, the burden of payment felt more on the rich households.

Finally, the findings of the study showed that households reduced their food consumption and other expenses in order to cope with catastrophic health expenditure. This is an important contribution which can be helpful to the government when designing health financing systems. This will ensure that the system of healthcare payment protects households, such that they don't sacrifice food and other expenses which can be detrimental to their welfare.

5.6 Limitations of the Study

In examining the effect of OOP for health care on the welfare, the study considered only those households whose members used health services. In so doing, the study overlooked those who forgo treatment. And yet those who fail to seek treatment might also fail to work. This will lead to income loss and therefore their welfare will be affected.

The study also relied on survey data, based on self-reported income and expenditure. In most cases households tend to under-report income and over-report expenditure. This might have led to overestimation of medical impoverishment in rural and urban areas.

Finally, the OOP for health care used in the study did not include indirect costs, such as transportation and lodging costs for the patients and those accompanying them to hospital which can be substantial. This implies that the estimated medical impoverishment would have been higher, if the indirect costs would have been included.

5.7 Areas for Further Research

The study was able to establish the effects of catastrophic health expenditure on households' welfare. However, there are some areas which were not captured by the study and it might be helpful in further enriching research in this area. First, a study can be carried out using panel data to estimate the long-term effects of OOP for health care. The current study used cross-sectional data which does not allow the estimation of long-term poverty effects of out-of-pocket payment for health care.

Second, a study can be done on the impact of each health expenditure item on catastrophic health expenditure, since the current study used total expenditure. This will help in identifying those items that contribute more to catastrophic health expenditure and therefore policies specifically addressing them can be recommended.

Third, a study on the coping mechanisms by rural and urban households can be undertaken. It will be so important to find out how the rural and urban households are coping to catastrophic health expenditure, unlike this study which considered the whole country.

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APPENDIX

Table A1: Incidence of Catastrophic Health Payments across Household Expenditure Quintiles in Rural and Urban Areas (%)

Urban				Rural		
Quintile	At 10 threshold	At 20 threshold	At 40 threshold	At 10 threshold	At 20 threshold	At 40 threshold
Poorest	11.6	8.9	6.4	14.4	9.3	7.16
2 nd	11.3	7.9	5.2	11.2	6.8	4.9
Middle	9.5	6.8	4.3	9.4	5.5	3.9
4 th	8.4	5.3	3.8	8.3	4.4	3.3
Richest	7.2	4	2.7	6.3	3.5	2.4

Table A2: Distribution of Out-Of-Pocket Payments for Health Care as Share of Total Household Expenditure and Capacity to Pay

Rural			Urban	
Quintile	OOP/total expenditure	OOP/CTP	OOP/total expenditure	OOP/CTP
Poorest	2.2	4.5	4.1	8.1
2 nd	2.4	4.9	3.4	6.6
Middle	3	6.2	6	11.9
4 th	5.1	10.3	5.8	11.3
Richest	8.9	18.1	7.7	15.3

Table A3: Concentration Index for Rural Areas

	Coef.	Robust Std. Err.	T	P>t	[95% Conf. interval	
Concentration index	0.695	0.545	1.42	0.016	0.029	0.103
constant	4.995	0.309	-0.83	0.04	4.389	5.601
Number of obs			6990			
F(1, 5254)			6.01			
Prob > F			0.016			
R-squared			0.407			
Root MSE			1.2201			

Table A4: Concentration Index for Urban Areas

	Coefficient	Robust Std. Err.	t	P>t	[95% Conf. interval	
Concentration index	0.134	0.049	2.73	0.006	0.03784	0.230156
Constant	0.029	0.02	1.46	0.146	-0.01	0.067628
Number of obs			5256			
F(1, 5254)			7.46			
Prob > F			0.006			
R-squared			0.004			
Root MSE			0.613			

Table A 5: Estat Classification Table

Logistic model for determinants of catastrophic health expenditure in urban areas				
	-----	TRUE	-----	
Classified	D		~D	Total
+	1517		856	2373
-	1011		1872	2883
Total	2528		2728	5256
Sensitivity		Pr(+ D)	70.01%	
Specificity		Pr(~D)	78.62%	
Positive predictive value		Pr(D +)	73.93%	
Negative predictive value		Pr(~D -)	74.93%	
False + rate for true ~D		Pr(+~D)	41.38%	
False - rate for true D		Pr(- D)	39.99%	
False + rate for classified	+	Pr(~D +)	36.07%	
False - rate for classified	-	Pr(D -)	35.07%	
Correctly classified				74.58%

Table A 6: Estat Classification Table

Logistic model for determinants of catastrophic health expenditure in rural areas				
	-----	TRUE	-----	
Classified	D		~D	Total
+	2276		1068	3344
-	1203		2443	3646
Total	3479		3511	6990
Sensitivity		Pr(+ D)		75.42%
Specificity		Pr(~D)		79.58%
Positive predictive value		Pr(D +)		78.06%
Negative predictive value		Pr(~D -)		77.00%
False + rate for true ~D		Pr(+~D)		40.42%
False - rate for true D		Pr(- D)		34.58%
False + rate for classified	+	Pr(~D +)		31.94%
False - rate for classified	-	Pr(D -)		33.00%
Correctly classified				77.51%

Table A7: Logistic Model for Determinants of Catastrophic Expenditure in Rural Areas

(Table collapsed on quantiles of estimated probabilities)	
Number of observations	6990
Number of groups	10
Hosmer-Lemeshow chi2(8)	8.04
Prob > chi2	0.015

Table A8: Logistic Model for Determinants of Catastrophic Expenditure in Urban Areas

(Table collapsed on quantiles of estimated probabilities)	
Number of observations	5256
Number of groups	10
Hosmer-Lemeshow chi2(8)	15.69
Prob > chi2	0.0471

Table A9: Correlation Matrix for Rural Areas

	catastrophic	sex of household head	household size	below5	above50	age of household head	primary	secondary	post secondary	chronic illness	respiratory disease	accidents and injuries	diabetes	private	mission	public	Insurance
catastrophic	1																
sex of household head	-0.0631	1															
household size	-0.1532	-0.0114	1														
below 5	0.0925	-0.1287	0.0717	1													
above 50	0.1421	0.0691	-0.1973	0.2745	1												
age of household head	0.0966	0.0457	0.0189	0.2855	0.5306	1											
Primary	0.0967	0.0742	-0.0257	0.4374	0.2263	0.1758	1										
secondary	-0.0231	0.0103	-0.0082	0.2266	-0.0313	0.0572	-0.499	1									
posts secondary	-0.0199	0.0063	-0.0466	0.0935	0.0083	0.0088	-0.2051	-0.0654	1								
chronic illness	0.1433	0.0666	-0.0809	0.2342	0.3946	0.2863	0.1549	0.0343	0.0216	1							
respiratory disease	-0.0227	-0.0356	-0.0175	0.0843	-0.0262	0.0131	-0.024	-0.051	-0.0101	-0.0242	1						
Accidents and injuries	0.0658	-0.0418	-0.0104	0.0509	0.0476	0.0521	0.0339	0.0171	-0.0197	-0.0276	-0.0792	1					
diabetes	0.0731	0.0054	-0.0675	0.0572	0.159	0.1074	0.032	-0.0087	0.053	0.1987	-0.054	-0.0226	1				
private hospital	0.1645	0.0149	-0.022	0.0055	0.0058	0.0008	-0.0568	0.0529	0.0513	0.0153	0.0241	0.0074	-0.0055	1			
mission hospital	0.0911	0.0244	-0.0095	0.0152	0.0764	0.0505	0.012	-0.0078	0.0497	0.0614	-0.0038	0.0029	0.0491	-0.1911	1		
public hospital	-0.1027	-0.0091	0.0347	0.0204	-0.0317	-0.0076	0.0211	-0.0115	-0.0664	-0.0268	-0.0091	0.0197	-0.0111	-0.5478	-0.404	1	
insurance	-0.0328	0.0052	-0.0781	0.0577	0.0519	0.0046	-0.1227	0.1084	0.2542	0.0525	-0.021	0.0046	0.0625	0.0602	0.0994	0.0787	1

Table A10: Correlation Matrix for Urban Areas

	Catastrophic	sex of household head	household size	above 50	below 5	age of household head	primary	secondary	post secondary	chronic illness	malaria	respiratory disease	diabetes	accidents	public	private	mission	insurance
catastrophic	1																	
sex of household head	-0.0813	1																
household size	-0.0628	-0.0246	1															
above50	0.097	-0.057	-0.0158	1														
below5	-0.0772	0.0703	0.0392	-0.1965	1													
age of household head	0.051	-0.0369	0.2661	0.5222	0.2285	1												
primary	0.044	-0.0795	0.0785	0.171	0.3912	0.1719	1											
secondary	0.0358	0.0157	-0.0801	-0.0106	0.2794	0.0038	-0.474	1										
post secondary	-0.0168	0.0212	-0.1004	-0.0099	0.1706	-0.0281	-0.2871	-0.1561	1									
chronic illness	0.0783	-0.0977	0.0065	0.3391	0.2109	0.2213	0.1235	0.0235	0.0375	1								
malaria	-0.1734	0.0078	0.0074	-0.0687	0.0872	0.0085	0.0087	-0.0574	-0.061	-0.1384	1							
respiratory	-0.05	0.0118	0.0254	-0.0399	0.1244	-0.0391	-0.05	-0.0456	-0.0168	-0.0191	-0.304	1						
diabetes	-0.0332	-0.0462	-0.0309	0.194	-0.05	0.0621	0.0328	-0.0085	0.0324	0.197	-0.0766	-0.0422	1					
accidents and injuries	0.0253	0.0618	0.0113	0.0441	0.0351	0.0522	0.0007	0.0311	-0.0168	-0.0158	-0.1094	-0.0604	-0.0168	1				
Public	-0.1134	-0.0616	0.0401	0.0368	0.0081	0.0454	0.0385	-0.0158	-0.0592	0.0293	0.0973	0.0147	-0.01	0.0698	1			
Private	0.0274	-0.022	-0.0218	0.0334	0.0473	-0.0089	-0.0443	-0.0252	0.0277	0.0136	0.0947	0.0513	0.0504	-0.0246	0.4595	1		
Mission	-0.0074	-0.0354	0.0019	-0.0013	0.0072	0.0297	0.001	0.001	0.0062	0.0133	-0.032	0.0598	-0.0026	0.0266	-0.211	-0.2225	1	
Insurances	-0.0049	0.0036	-0.1004	-0.0394	0.0398	-0.064	-0.2021	0.1201	0.2515	0.0084	-0.0487	0.0023	-0.0041	-0.0218	0.1283	0.0875	0.0483	1