

**DETERMINANTS OF HOUSEHOLD HEALTHCARE EXPENDITURES IN RURAL
KENYA**

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Declaration

I declare that this project is my original work. It has not been submitted to any university for any award.

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

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DR. MARTINE OLECHE

Dedication

I would like to dedicate this research project to David, Grace, Jane and my parents for their support throughout this journey.

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Abbreviations and Acronyms

CHE	Catastrophic Health Expenditure
EDA	Exploratory Data Analysis
IPS	Inpatient Stays
KDHS	Kenya Demographic Health Survey
KHHEUS	Kenya Household Health Expenditures and Utilization Survey
MOH	Ministry of Health
NGOs	Non-Governmental organizations
OOP	Out-Of-Pocket
OPV	Outpatient Visits
SES	Socio Economic Status
SSA	Sub-Saharan Africa
UHC	Universal Health Coverage

Abstract

Despite a country's income improving, it does not obviously eliminate catastrophic expenditures. The study was conducted with an objective of establishing determinants of household expenditures in rural Kenya. The specific objectives were; to determine trends of household out-of-pocket spending on health services in rural Kenya, to determine the pattern of healthcare services utilization in rural Kenya and to establish the core determinants of household healthcare expenditures in rural Kenya. The study made use of the latest Kenya Household Health Expenditure and Utilization Survey (2013) dataset. The study used a multiple regression model to estimate the impact of respective determinants on health expenditures in rural Kenya. Ordinary Least Square estimation technique was adopted in estimation. Significance was tested at 1%, 5% and 10% levels. The findings indicate that; gender of the respondents, marital status, medical insurance and chronic illness were found to be positively related with health expenditure whereas education levels (primary, secondary and higher levels), wealth index (second and third wealth quintiles) were found to be significant predictors but had a negative relationship with health expenditures. Based on the findings, the study suggests for equality between men and women when it comes to health seeking and the use of incentives as well as training on men to practice preventive care so as to reduce costs going into hospitals for treatment unlike their female counterparts. Similarly, the study suggests for enhancing strategies that could facilitate couples to be healthier and live longer. The study suggests for creation and implementation of awareness programmes and share across organizations, schools or government agencies. There is need to create empowerment programmes for the population so that they lower hospital visits and consequently lowering health expenditures. There is need for the government to provide more public health facilities to boost or facilitate more use of the subsidized services in the rural areas. The national and county governments to ensure presence of transparency and addressing underlying inefficiency, since it's difficult to know the actual cost of healthcare. There is need to reduce the cost and to improve the quality of care for chronic diseases.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Improving population health outcomes is the central role for any healthcare system in addition to protecting households from illness-linked financial catastrophe. Many developing countries have embraced health initiatives that form agenda for both Universal Health Coverage together with Sustainable Development Goals. The initiatives are geared towards improving accessibility to fundamental health services for all as well, facilitate provision of financial risk shield to initiate lower Out-Of-Pocket health expenditures. Global health policies often concentrate on public expenditure focusing on health and its distribution, efficacy and related issues to set the agenda (Ndikumana & Pickbourn, 2017). Basics of insurance together with the economic value of reduced uncertainty anchors back on the theoretical idea of financial protection (Arrow, 1965). It also may lead to exposure to financial risk due to large healthcare costs (Hsu, Flores, Evans, Mills & Hanson, 2018).

In most developing countries a great proportion of the household healthcare expenditure also called the out of pocket expenditure accounts approximately 60% to 80% of the total health expenditure when compared to public spending on health which forms only small portion of the economy as a whole (Ndikumana & Pickbourn, 2017; Rodney, 2018). The amount of money dedicated for health sector for both private and public in totality is referred as total health expenses (De Mooij, 2019). The following are some of the services covered by total health expenses: first is the provision of health services that is preventive along with curative, second is the activities embracing family planning, and third is the activities concerned with nutrition. Finally, the relief support that purely does not support sanitation as well as water activities (Yates, *et al.*, 2018).

Historical and technological factors have made it difficult to compare the level of spending on healthcare across continents and regions (Runciman, Merry & Walton, 2017). As earlier elaborated the status of health as well as public spending have been used greatly as a benchmark even though it is vague to compare the efficiency of public spending on health and draw policy inferences. Health care expenditure for example in the Sub-Saharan Africa (SSA) differs significantly over time and across countries (Ndikumana & Pickbourn, 2017). Health financing plays a key role in any economy to promote the health level (Evans & Stoddart, 2017). The

health care expenditure level and growth at any macroeconomic level are accredited to the country level (World Health Organization, 2016).

According to Zhao, (2019) in spite of a country's income improving it does not obviously eliminate catastrophic expenditures. The national health financing system, in its quest to shield households from financial catastrophe, should aim at enabling the citizens to access services whenever required, while embracing ways of reducing out-of-pocket spending (Chuma, & Maina, 2012). This requires a long-term strategy that enhances development of prepayment mechanisms. These mechanisms can be embraced through the following ways: it can be by promoting tax-based financing of health care, encouraging adoption of social health insurance, and by boosting some mix of prepayment mechanisms that are available. Total household consumption may be jeopardized in instances where gross household consumption due to some reasons goes beyond out of pocket spending.

Research that has been done shows clearly that there is an existing disparity in many areas. First, is the disparity in terms of resources available. Second is the accessibility in conjunction with usage of health services, and that health outcomes have clearly demarcated the rich and the poor well represented in sub Saharan Africa countries. To better understand healthcare expenditure and services utilization as well as financial risk protection level, Zeng, Lannes, & Mutasa (2018) suggest for more studies to evaluate the use of inpatient as well as outpatient amenities. They further recommend estimation of Catastrophic Health Expenditure (CHE) incidences, and even exploring the poverty effect of spending in OOP health as they enhance attainment of UHC.

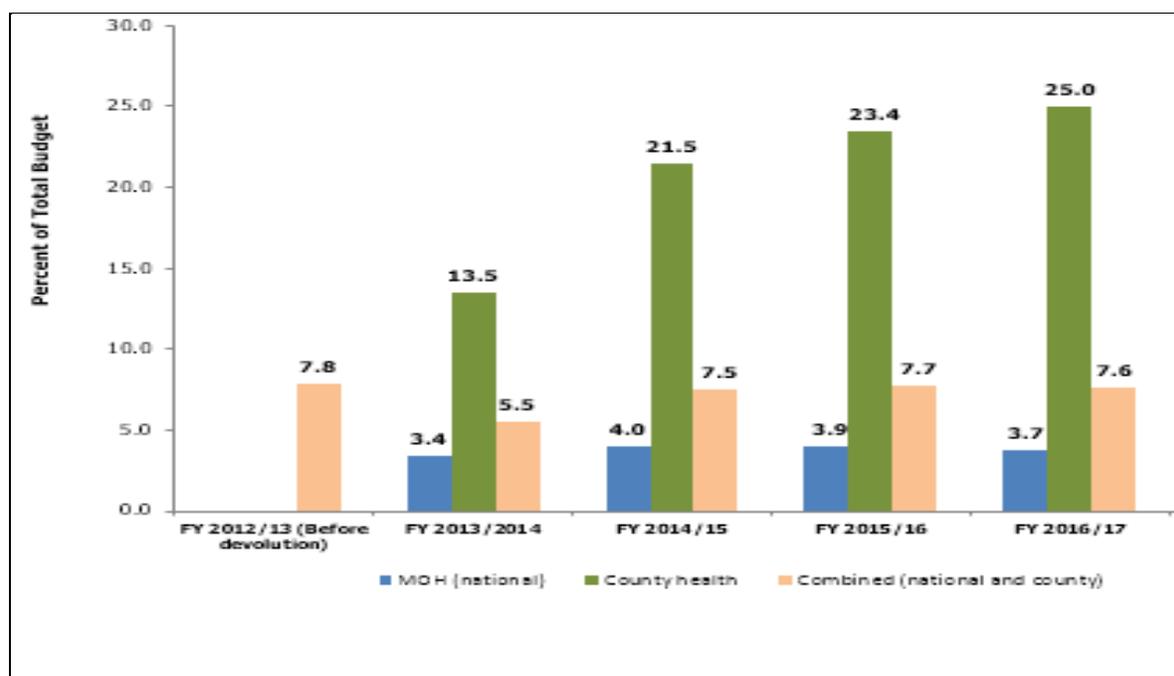
1.1.1 Sources of Funding for the Health Sector in Kenya

The overarching goal in the area of health is to achieve the utmost level of health in a responsive way (Ministry of Health, 2014). To achieve the predetermined overarching goal the division of health in Kenya depends on funding from various foundations. These include the private sector firms, public (government), household's donations, donors that is faith-based organizations and NGOs without forgetting the health insurance schemes (World Bank, 2014). With devolution, Kenya national treasury has been funding the health sector through budgetary allocations to the Ministry of Health besides the 47 Counties. Each county bears the responsibly of channelling funds meant for health expenditure to the county health departments for utilization geared

towards improved performance (Tsofa, Molyneux, Gilson & Goodman, 2017). The national treasury has set three-year budget ceilings for each sector in Kenya due to concerns over government spending in general. In reality, it means that the County Health department makes budgets based on their needs but the approval is guided by the pre-determined ceiling on financial allocations for health expenditures for each County for a particular financial year. This means that counties are required to minimize the needs in their annual budgets in order to suit the pre-determined ceiling leaving some key needs out of their budgets (Tsofa, Molyneux, Gilson & Goodman, 2017).

Budget shortfalls for health can be manifested clearly by various factors. They include poor maintenance of equipment, transport facilities as well as lack of adequate drugs, and staff shortage. The development component of the national health budget in Kenya has significantly been supplemented by donor funding (Patcharanarumol *et al.*, 2014). Moreover, dependency on external sources for Kenya's health sector has increased over the years. Besides, this step wise structure in Kenya's health care system has proven to be complex when cases are supposed to be addressed at a higher level (Barasa, Cleary, Molyneux & English, 2017). As the nation moved to devolved units, the Ministry of Health (MOH) in the financial year 2014/15 was allocated 4% while the fiscal years 2015/16 and 2016/17 the allocations were 3.9% and 3.7% respectively. Specifically, allocations to the health department in the county governments showed an increasing trend over the last five years unlike the allocations to the MOH (see figure 1.1). For example, the fiscal year 2016/17 recorded the highest at 25% while fiscal years 2014/15 and 2015/16 received 21.5% and 23.4% respectively (Republic of Kenya, 2018).

Figure 1.1: Total Budget allocated to Health (2012-2017)

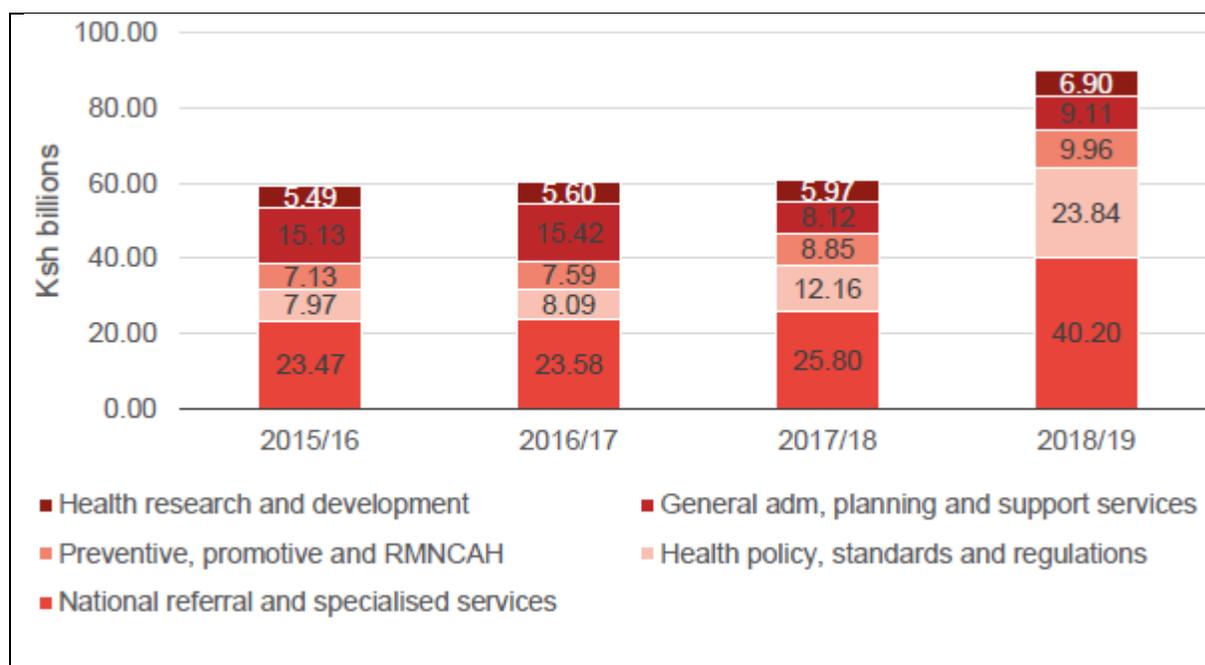


Source: Republic of Kenya (2018)

The Ministry of Health has been allocated Ksh 90 billion or 3.6% of the 2018/19 budget. This amount is higher than allocations in 2017/18 by 47.8% (Republic of Kenya, 2018). As Figure 1.2 illustrates, much of the increase in allocation is attributed to nationwide medical appointment and specialised treatment and health standards, without ignoring the regulations and policies. The increase in allocation to national referral and specialised services is explained by the government’s plan to revamp and expand health infrastructure, which has seen allocations to specialised medical equipment increase over three times to Ksh 16.4 billion from Ksh 5 billion in 2017/18 (Owino, 2018). Furthermore, allocations to referral services¹ has increased by 21.6% to Ksh 20.3 billion from Ksh 16.7 billion in 2017/18. The increase in allocation to health policy, standards and regulations is attributed to the planned improvement in access to health services through subsidised health insurance and free primary healthcare (Owino, 2018).

¹ This refers to allocations meant to cover the cost of providing referral health services – staff costs, transfers to institutions that provide these services, and regular supplies.

Figure 1.2: Health Budget Allocations in Kshs Billions (2015-2019)



Source: Adapted from Development Initiatives (DI) based on budget documents for various fiscal years

Religiously run units as well private facilities have proven their worth in filling the gaps in the system (VanderWeele, 2017). The overall objective of the health policy in Kenya as contained in various government policy papers such as Kenya Health Sector Strategic Plan (2013-2017) as well as Kenya Health Policy 2014-2030 is to increase access to equitable, quality and affordable healthcare. The key purpose of the policy is expanding the health status of the populace through increased demand for healthcare services. One strategy to meet this objective has been continuous increase in government allocations as well as support the county governments in healthcare service delivery (Tsofa, Molyneux, Gilson & Goodman, 2017).

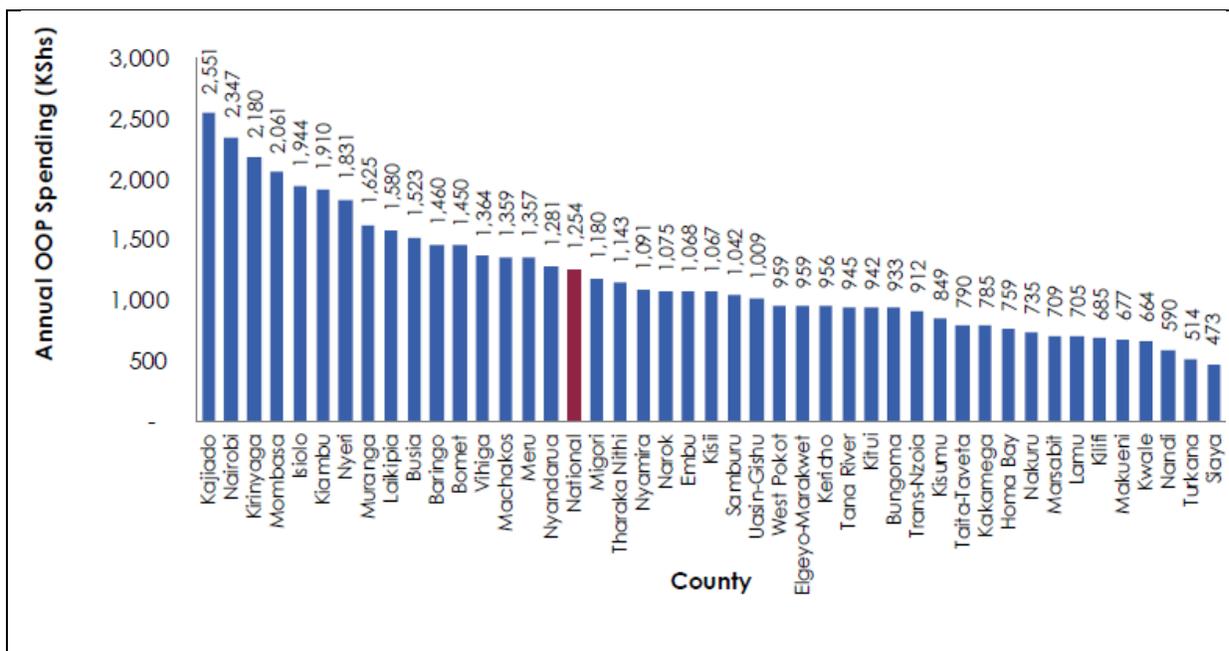
1.1.2 Analysis of Out of Pocket Payments in Kenya

In some situations, patients have been subjected to paying bills where insurance does not take care of the whole health medical cost. These payments are commonly called out of pocket payments to address the excess expenses by the patient. It can involve sharing the cost between the relevant actors or applying the case of self-medication. In addition to these it may further include expenses that are subjected directly to the private households. Besides these, in other nations these payments may go an extra cost of approximating some of the informal payments

to the care system providers forcing a few of the affected households to incur more out of pocket payments than usual. In general, whenever a house hold spends beyond 40% of income when basic needs are met, this is known as catastrophic health expenditure. Unfortunately, whenever called to additional medical bills during the time of seeking medical care, it has been a big problem for the households that have no access to financial protection. The money spent on healthcare as OOPs, when careful analysed, is observed to have interfere with material living standards in a given house hold which otherwise should have been used for purchase of basic needs (O'Donnell *et al.*, 2008). Catastrophe can be faced in a situation where households' budget is relatively inferior to healthcare payments causing interference on the normal living standards. OOP expenditure also acts as a deterrent for utilization of the healthcare services for a considerable proportion of the population (Sharma, Prinja, Aggarwal, Bahuguna, Sharma & Rana, 2017).

Creation of barriers to health care access in some nations due to the burden of out of pocket spending has called for urgent need to protect the people through insurance in order to pay at least reduced amount directly for medical care. The impact of OOP can be monitored through checking the total household income share of a given house hold as well as evaluating the household total consumption. Evaluation of out-of-pocket health burden can be done through determining the share of total household income or consumption. For instance, Kenya, over a decade when taking into account the first and third surveys in nominal terms, out-of-pocket spending declined, from a tune of Kshs 61.5 billion in the year 2003 to about KShs 43.9 billion in the year 2007, these was followed by an increase to approximately KShs 62.1 billion in the year 2013, a rise that translated to around 42%. Outpatient care accounted for about 78 percent that is about KShs 48.4 billion of the total OOP health spending. The other 21.6% was subjected upon the inpatient group. It was observed that KShs 1,254 as an average annual per capita was spent on outpatient services while Kshs 355 was the average spending on inpatient per capita in the year 2013. Figure 1.3 shows trends in OOP for outpatients across counties in Kenya.

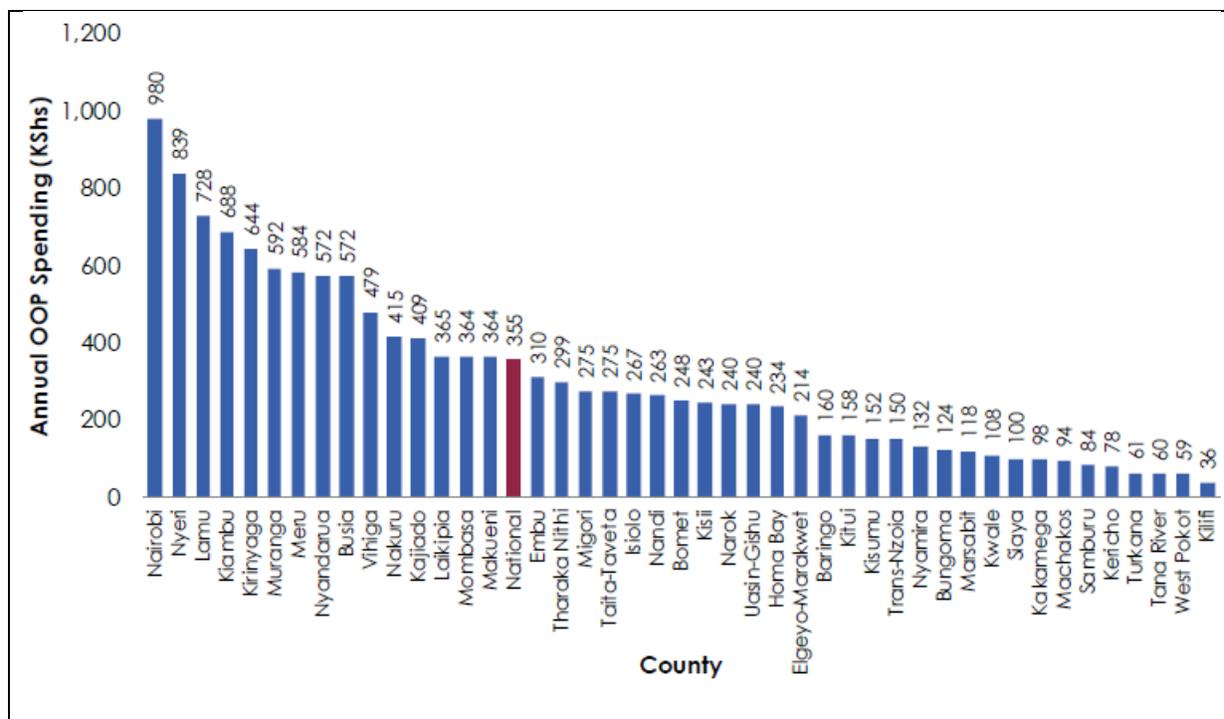
Figure 1.3: Annual Per Capita OOP Spending on Outpatient by County



Source: Kenya Household Health Expenditures and Utilization Survey (KHHEUS, 2013)

To demonstrate variation for instance more than KShs 2,000 on outpatient care was spent in Kajiado, Nairobi, Mombasa, and Kirinyaga counties while about KShs 500 was spent on the same category of patient in Siaya and Turkana. It was further observed that socioeconomic factors distribution has greatly influenced healthcare services utilization thus contributing to the above variations as well as underlying differences. Nairobi, Kajiado, and Kirinyaga counties which are categorized as rich spent substantially high amount in terms of per capita when equated to poorer devolved units, like Makueni, Lamu, and Turkana which spent substantially a smaller amount on health per capita. Furthermore, although relatively rare, admissions are deemed to be a very expensive event. Figure 1.4 shows trends in hospital admissions per county in Kenya.

Figure 1.4: Annual Per Capita Out-of-pocket Expenditure on Admissions by County



Source: KHHUS (2013)

When analysing in nominal terms inpatient treatment category increased from KShs 343 in the year 2003 to KShs 505 in the year 2007. This was further followed by a decrease to KShs 355 in the year 2013 in terms of annual average per capita spending. As illustrated in Figure 4.2, it is clear that about fifteen counties’ average on hospital admissions was greater than the national average. It was noted that Nairobi was leading in spending amounting to KShs 980 per capita whereas Kilifi was least in spending about KShs 36 per capita. The differentials noted in expenditures across the counties and even geographical locations has prompted concern about individual living standards of health expenditure on households to be monitored. Therefore, the growth of interest on financial protection should be looked into at every level of government that is national and county. Accessibility to better health care has become a concern to citizens due to financial challenges and should be looked into by ensuring equitable health systems and universal coverage are effective. OOP being one way of health spending has not always been easy to cope with as it also acts as a deterrent for utilization of the healthcare services for a considerable proportion of the population.

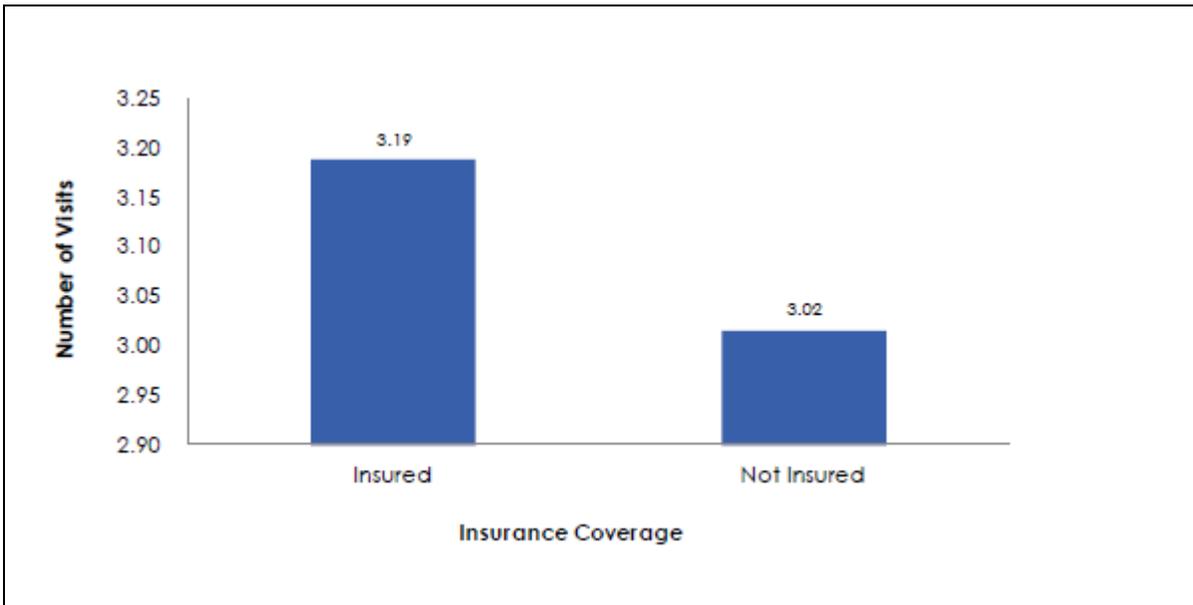
1.1.3 Patterns of Utilization of Health Care Services in Kenya

Demand for health is concerned with the extent to which the health behaviour e.g. social, psycho-biological and behavioural factors and determinants of health affect the health services usage alongside how the systems are responsible for modelling this relationship (Pathak, 1981). Studies conducted in most parts of the developing countries consider these factors to be associated with inadequate resources and thus making it difficult for them to deal with mortality and morbidity due to newer challenges. The emerging challenges are like poverty, communicable disease, as well as sexual and reproductive health issues among heart diseases (Naicker, 2003; Correa-Rotter *et al.*, 2004).

People have various reasons for utilizing health care services; obtaining treatment whenever they fall ill, prevention of diseases, reducing pain, increasing quality of life and also acquiring crucial information about their health status. Despite this, utilization of health care services has been far from satisfactory in many countries (Abel-Smith, 2018), the level of economic development notwithstanding. Both developed and underdeveloped countries have exhibited lower utilization rates than expected despite tremendous progress in health infrastructure (World Health Organization, 2016). Given various investments from stocking of drugs to infrastructure done on the advent of devolved system of governance in Kenya, one would expect more people to have access to health care services, but that is not the case. These advancements in health systems at the national hospitals seem to have been coupled by increased cost of medical care on the part of consumers and utilization of health providers-leading to the notion of supplier induced demand and catastrophic expenditure by poor households (Anarwat, 2018). The scenario is similarly unimpressive at county referrals hospitals.

Increasing access to healthcare services should be made a right as one way of improving the health of Kenyans. Hospitalization caused by demanding health conditions for at least 24 hours is termed as inpatient care which can be associated to serious health complaints. Inpatient stays and outpatient visits have been used as a measure of utilization. From Andersen's healthcare service utilization theory, individuals usually chose health providers and facilities based on their perceived need when wealth status is held constant (Pilar, *et al.*, 2019). Figure 1.5 shows trends in hospital healthcare service use for individuals with and those without health insurance coverage in Kenya.

Figure 1.5: Health Insurance Coverage and HealthCare Service Use in Kenya



Source: KHHEUS (2013)

Considering ownership of health insurance cover, for outpatient services in the recent Household Health Expenditures and Utilization Survey, it was demonstrated that the idea of using insurance as a parameter to know the demand for outpatients in various facilities was not ideal. It was clear that both the insured and uninsured recorded approximately similar that is 3.2 and 3 visits per capita respectively. In certain instances insurance enhanced access to healthcare due to the fact that 76 admissions per 1,000 population was recorded as inpatient services. On the same note there were 30 admissions per 1,000 population with the uninsured. It was further observed that private facilities had 26% share of inpatient stays while mission facilities provided 18% of inpatient care. Approximately 56% of all admissions were recorded in public facilities² (KHHEUS, 2013).

It is argued that there has been massive reduction of about 30% since the year 2003 to the year 2013 of outpatient services in public hospitals. This survey demonstrated a declining trend. However, outpatient services use has generally improved by 90% from what was reported in the year 2003. About 1.2 million Kenyans were hospitalised as based on the 2013 findings at least once in the year preceding this survey.

² Hospitals and Health Centers

On the other hand, the level of self-reported admission improved significantly. It rose from 1.5% of the population in the year 2003 to about 2.5% in the year 2007. Similarly, it increased at the same rate of 2.5 % in the year 2013. Between 2003 and 2013 it was noted that public hospital admissions dropped by about 63 percent and 48 percent respectively (KHHEUS, 2013). Due to various health provider characteristics individuals are at liberty visiting or not visiting a facility or even where to be hospitalized. These characteristics when observed well were as follows; first facility was recommended on the basis of availability of medicine, second the distance covered before reaching the hospital, three the cost of services like a facility exact price level of their health services, fourth the patient waiting time alongside staff attitude. In addition to these was referrals without forgetting the cleanliness as well as free services.

1.2 Statement of the Problem

Health has been declared as a universal right and is envisaged so in the Kenyan Constitution enacted in 2010. It is a key priority for the health sector in Kenya during the financial years 2019/20-2021/22 to scale³ up Universal Health Coverage (UHC). The advancement towards UHC in Kenya however, has been inadequate (Obare, Brolan & Hill, 2014; Abuya, Maina & Chuma, 2015; McCollum, Taegtmeier, Otiso, Mireku, Muturi, Martineau & Theobald, 2019). Nevertheless, there has been continuous increment of health budgets in Kenya.. Skewness in terms of health care service utilization in Kenya as well is evident (Okech, & Lelegwe, 2016). Insurance coverage for example is greater among the urban population, at about 26.6 percent, compared to the rural population which stands at 12.1 percent (KHHEUS, 2013)The burden from OOP of the households living in upcountry is greater than the households living in urban areas due to various factors (Sangar, Dutt, & Thakur, 2018).

Due to inequitable distribution of services it is evident that the ability to pay rather than need for care has been largely evaluated in many studies that have focused healthcare advantage incidences in Kenya (Chuma, Maina & Ataguba, 2012; McCollum, *et al.*, 2019). Individuals not seeking care due to high costs in Kenya were estimated to be about 21.4 percent (KHHEUS, 2013). Many households especially in rural areas of Kenya are said to have devoted a large

³ The scaling is linked to several government initiatives such as; the Linda Mama or reducing out of pocket/CHEs among others.

portion of the resources relative to a household's budget for health consumption, prompting them to CHEs (Akazili, *et al.*, 2017; Sangar, *et al.*, 2018). According to KHHEUS (2013), when OOP health spending exceeds a tenth of total expenditure along with 40% of non-food spending, this is considered catastrophic. Following available statistics, in the year 2003 about 10% of the gross expenditure was apportioned to medical treatment while in the year 2007, 15.5% was put aside for the same. Similarly, in the year 2103, 12.7% was also set aside as medical cost. This cut across to about 6.7% of households as reported in (KHHEUS, 2013). This is already catastrophic!

Most studies conducted have concentrated in establishing determinants for health care use in private/public hospitals as well as how health expenditures influence health outcomes (Muthaka, 2013; Nyambura, 2016; Awoke, Moller, Negin, Farell, Yawson, Biritwum & Kowal, 2017; Chatterjee, Nayak, Mahakud & Chatterjee, 2019). Some studies have explored the burden of CHEs for specific diseases in developed countries such as China, India, and USA (Wang, Li & Chen, 2015; Sharma, *et al.*, 2017; Saxena, Khera, Hong, Arrieta, Virani, Blankstein & Nasir, 2018; Hsu, *et al.*, 2018). In Kenya, studies have mostly examined catastrophic spending and poverty, as well as assessment of the factors related with the occurrence of catastrophic health care payments due to poverty effects (Buigut, Ettarh, & Amendah, 2015; Barasa, Maina & Ravishankar, 2017). More is to be done to establish the elements which influence health care expenditures in rural Kenya in the wake of devolution. This has also been noted by other recent health or health related studies conducted in the resource-limited rural areas in Kenya (Ngugi, Agoi, Mahoney, Lakhani, Nderitu, Armstrong & Macfarlane, 2017; Kabia, Mbau, Muraya, Morgan, Molyneux & Barasa, 2018). Therefore, the aim of this research is both to fill the knowledge as well as empirical gap by determining the trends for both household OOP expenditures, and healthcare services use and establishing the main elements of household expenditures in rural Kenya.

1.3 Research Questions

- i. What are the trends of household out-of-pocket spending on health services in rural Kenya?
- ii. What is the pattern of healthcare services utilization in rural Kenya?
- iii. What are the determinants of household health expenditures in rural Kenya?

- iv. What are the possible policy recommendations to minimize household health expenditures in rural areas in Kenya?

1.4 Objectives of the Study

The aim of this study is to establish determinants of household expenditures in rural Kenya. The specific objectives are;

- i. To determine the trends of household out-of-pocket spending on health services in rural Kenya.
- ii. To determine the pattern of healthcare services utilization in rural Kenya.
- iii. To establishing the core determinants of household healthcare expenditures in rural Kenya.
- iv. To determine the appropriate policy recommendations to minimize household health expenditures in rural areas in Kenya.

1.5 Justification of the Study

Health financing is one of fundamental blocks in health systems strengthening and remains to be the key component as a performance measure of health care schemes more so to assurance of universal quality and access to health care. It also serves the key role of providing information to form rational foundation for policy making on health care financing. Linkage between public and household spending need to be recognised and established while formulating policies globally since failure to do this has resulted in more complex health systems which unfortunately have remained unresponsive to most policy changes. Exclusion of consistent information on out-of-pocket expenditure which is an important category for health policy planning at national level has been found to be a major reason for the inadequacy of these policies.

According to Republic of Kenya, (2010) devolution of health and development functions from national level, in the case of poor and marginalized counties, calls for urgency for the county government health docket to allocate enough resources. Further, county government health docket are advised to scout out key elements and areas to be given priority so as to cushion their people at the same time efficiently utilizing the scarce resources among these competing

demands. This study therefore is helpful in key decision making and policy preparation for the health care expenditure of counties in the rural Kenya. This research is a reference for doing further research on health care expenditures in the devolved system of governance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section reviews theoretical as well as empirical literature. Finally, summary of the literature and empirical gaps to be filled is provided.

2.2 Theoretical Literature Review

2.2.1 Household Production Theory

Household expenditure theory can be modelled if the household production utilization is taken into account (Becker, 1965). Combination of commodities to maximize utility through careful consideration of resources, time as well as technology constraints is one way the theory elaborates how households choose the best alternative. According to Engel (1895) both income and family size have relevance in determining household expenditure. As noted by Lazear, and Michael, (1981) that the size of family influences budget. For instance, taking income level constant it has been observed that usually larger budget shares are associated with bigger families when compared to smaller families. The households under consideration have various socio-economic and demographic characteristics. These can be evaluated through the nature and patterns of health expenditure of the households that gives a clear reflection. Dias, *et al.* (2018) acknowledges that determining consumers' purchasing decisions has been influenced by non-economic factors like non price/ income which are crucial in making the decision.

2.2.2 Public Expenditure Theory

Tanzi and Schuknecht, (2000) argued that when the government of a country spends on the general wants and needs like providing good infrastructure, pension among other provisions for the people this is what is called public expenditure. Money left in private hands remained underutilized. Until the 19th century, it was believed that it could lead to great returns since the expenditure by the public was limited as noted by laissez faire philosophies (Mazzucato, 2015). It is during the 20th century when John Maynard Keynes presented his argument on the part played by public expenditure in defining the levels of distribution of income (Keynes, 1937; 2018). The expenditure by governments since then has been on an upward trend.

Brennan (2008) argued against the necessary assumption of the theory which contracts the external effects of consumption. When selecting the best among two competing alternatives the analysis of practical situations is usually ill-suited. Further, a formal basis for interpersonal comparisons is required most in plans that involves someone faced by a loss of welfare. This is sufficient ground to rule out rigid prescriptions due to the fact that the economist has no particular right which is attached in social weights as well as individual welfare in the social welfare function (Brennan, 2008).

2.2.3 Investment Model of Demand for Health

The call for ‘good health’ commodity has been evaluated in this model concerning its theory as well as empirical investigation (Nixon and Ulman, 2006). This model considers a capital good in terms of health that has depreciated over time as it is inherited in nature (Evans, Barer, & Marmor, 1994). Investment in health is considered to be a process that involves combination of medical care as a process using specific elements to come up with a new health package as part of the process (Evans & Stoddart, 2017). If the new health is not produced, the health stocks tend to zero, and finally result to death. The models of human capital are however not different in the sense that the variables used in their approaches are the same. The approaches are also of the production functions category. The fundamental difference, however, comes in when the analysis is at the macro and micro level (Nixon and Ulman, 2006). It has been argued that at the macro level health is a luxury good (Getzen, 2000), whereas studies at the micro level show that it is a necessary good (Epping-Jordan, Pruitt, Bengoa & Wagner, 2004).

Investments in human capital are derived from expenditures in health and education and the wealth accumulated by households and communities over time (Grossman, 2000). Health is a capital good, which enables individuals to engage in labour market and hence contribute to invention of goods and services. Good health increases the chances of people to work more hours and hence increase labour supply (Halliday, He, Ning & Zhang, 2017). In terms of education, health may be positively related to the level of educational attainment. Thus, healthy children are expected to demonstrate less school absence and school drop-out. Healthy individuals are also inclined to have more savings than individuals in poor health (Nixon and Ulman, 2006; Halliday, *et al.*, 2017). Savings eventually increase investment opportunities and hence have future influences on income and wealth.

2.3 Empirical Literature Review

Provision of financial protection to the people in most of the Sub Saharan Africa nations has been a challenge due to high incidence of OOPs. Njagi, Arsenijevic & Groot, (2018) conducted a systematic review to scrutinise the discrepancies due to OOP healthcare payments in the Mekong Delta in comparison with rest of Vietnam in the prevalence of CHE and hardship. Arksey and O'Malley scoping review framework were utilized which acted as a guide for review. From the results, it was evident that catastrophic health expenditure/impoverishment was related to risk factors. To get a clear picture thirty-four studies were assessed following the concept that they attained the inclusion criteria. The findings revealed that respondents receiving treatment for the conditions like HIV/ART, TB, malaria as well as chronic illnesses had higher CHE. Despite these CHE was associated with risk factors. These factors are comprised of the type of health provider, the household member characteristics in terms of socio-economic level, the kind of illness as well as the schemes in social insurance. Additionally, the other factors involved were household size/composition alongside geographical location and economic status of the household. Needy cases in recent years have been observed to be rising in various countries in terms of household percentage.

While CHE is characterised with household spending for health the threshold of household resources has no gold standard. Hsu *et al.*, (2018) investigated and analysed expenditure of households from 47 countries that acted as a sample by focusing on the effect of varying two methodological choices. They assessed various parameters like testing for restricted dominance and sensitivity in a range of thresholds while comparing cross-country. The study further highlighted various ways of describing household resources. These resources when carefully analysed include non-subsistence, non-food expenditure alongside total expenditure by utilizing sensitivity of comparisons through conducting correlation tests of country rankings. From the study, it was revealed that rankings of countries are biased following those commonly used in the literature, depending on the level of restrictions. When restricted to 5 to 40% it rose to half while when restricted to 5-85% it rose to a tenth to quarter of comparison. Various methods of defining household resources were moderate when capitalizing on correlations rankings of countries in question.

Zeng, Lannes and Mutasa, (2018) conducted a study on the burden of OOP health expenditure alongside use of health care in Zimbabwe. The study employed a multistage sampling approach, whereby a total of 32,294 individuals in 7,135 households based on their OOP as expenditure of health, consumption level in household which implied the kind of living standards as per 2015 when using a survey in earlier 2016 on the use of health services. Findings showed that the poor felt comfortable with outpatient visits while the destitute had minimal inpatient care access. For instance, in 2015, a quarter of total expenditure of health in Zimbabwe was made up of household OOP expenditure while households that incurred CHE were about 7.6%. On the same note when comparing the rich and poor about 13.4% of the poor compared to 2.8% of the rich recorded the incidence of CHE.

Aregbeshola and Khan (2018) examined in Nigeria the level of household financial burden due to OOP health payments. Living Standard Survey of 2009/2010 data which was secondary in nature clearly showed the depriving impacts of OOP spending on health among families. To carry out data analysis STATA 12 was used. The findings indicated that the level of catastrophe on households differed according to level of threshold employed. Whenever the threshold was 40% of non-food expenditure about 13.7% faced catastrophic health payment while at 10% of the expenditure of total consumption the catastrophic was 16.4%. On the other hand, when using \$1.25 a day poverty line it was revealed that poverty head count stood at 97.9% total payments of health. Further OOP health payments pushed many into poverty. This resulted in about 0.8% increase in poverty headcount translating to about 1.3 million Nigerians.

Bayar and İlhan (2016) investigated the determinants of household education expenditures where the study explored whether the poor spend less on education or not. The specific objective was examining the impact of various income groups on the education expenditures and determinants of education expenditure of Turkish households. To fully explore these objectives the following were treated as independent variables. They are as follows: level of education of parents, number of children in the households as well as age, gender, the annual income of the household and the employment of status of the parents and regions. The natural logarithm of household income and expenditure were applied. The household coefficient on income variable estimated the education expenditure of income elasticity. To better evaluate this the Tobit model estimations used the years 2002, 2010 and 2013 Household Budget Survey

(HBS) conducted by Turkish Statistic Institution (TurkStat). From estimations it was observed that higher educational expenditures translated to higher household income levels. Other covariates that were of great significance included: parents' level of education, and employment status.

For the magnitude of the economic burden of HIV/AIDS to be quantified it called for different population groups' expenditures on management of HIV/AIDS to families to be examined in Nigeria. Onwujekwe, *et al.*, (2016) investigated differences in consumer expenditures for treating HIV/AIDS along geographical as well as socio-economic for both inpatient and outpatient in Nigeria. The researchers administered household surveys particularly in Adamawa representing South-East, Akwa Ibom representing North-East and Anambra representing South-South. All these were major zones in Nigeria. Pretesting of field instruments was conducted by administering 1200 questionnaires to respondents living with HIV/AIDS. Expenditures, both medical and non-medical for three months prior to the interview, date were recorded. While disaggregating data along socio-economic status (SES) as well as geographic location of the households the incidence of CHE on ART treatment services was computed. From the study results, it was revealed that regardless of the variations across SES and urban-rural residence US\$6.1 was benchmark as an average OPV expenditures experienced by patients per OPV for HIV/AIDS treatment. The findings further noted that the level of spending in households varied from one use to the other for instance on food for OPV took around 70% while transport for treatment used more than 95%. In the case of medical expenditures, it was observed that it differed depending on the locality. For example, it was noted that the people in the urban areas paid more than rural dwellers. Reverse, urban dwellers, paid less compared to rural dwellers who incurred more CHE for outpatient and inpatient visits.

Wang *et al.*, (2015) analysed the extent of chronic disease among elderly patients in terms of inequality of CHE and associated factors in China. A national survey on elderly households conducted by China Health and Retirement Longitudinal Study was useful in data collection. According to the proportion used to measure CHE, OOP health expenditures to non-food family spending was measured. To estimate associated factors of CHE and its measure of inequality the study took into account Ordinary least square and logistic regression modelling together

with concentration index with the corresponding decomposition. The findings revealed that the elderly with chronic diseases were vulnerable to CHE incidence and intensity.

For CHE to be well understood it was analysed along various major factors. These major elements include: having members with equal to or more than two chronic diseases, members of the household who are elderly that are showing health seeking behaviour plus having members more than sixty-five years. Out of the findings it was observed that healthcare insurance insignificantly affected CHE risk. The probability of experiencing CHE among poor elderly households was greater while disproportionate concentration of CHE among elderly households was also observed. These major elements included: having members with equal to or more than two chronic diseases, household size, per capita income plus having members aged more than sixty-five years are among the great contributors to inequality of CHE. The inequality of CHE can be negatively contributed to by some inpatient and outpatient services.

Expenditure effect cuts across social levels. The magnitude differs according to social class. For instance, poor households are prone to financial trap in any extra spending on health expenditure while in the rich class it can cause financial catastrophe alongside bankruptcy. Catastrophic health spending is a continuing problem in Kenya. A study was done by Kimani, Mugo, & Kioko, (2016) to estimate the burden of OOP in Kenya; the incidence and intensity of catastrophic health care expenditure and impoverishment. The study used KHHEUS data of 2007, where both econometric and descriptive analysis were applied. To achieve this, the study heavily borrowed from previous studies by Wagstaff and Doorslaer (2003) as well as Xu *et al.* (2005) who used numerous thresholds to establish the sensitivity of catastrophic measures. Logit model was used to elaborate elements and determinants of catastrophic health expenditures. The study findings revealed that about 4 % among those who utilized health care, were pushed to poverty by health care payments while 11.7 % experienced catastrophic expenditures. In regard to these, the poor faced the greatest incidence of catastrophic expenditures which translated to about 2.5 million people who were hard-pressed into poverty.

Kiplagat, Muriithi & Kioko (2013) did a study on factors affecting health insurance choice in Kenya. They utilized the Kenya Demographic Health Survey of 2008-2009. The study estimated a multinomial logit model and concluded that health insurance ownership and choice have key determinants. These elements included the wealth index, the status of employment,

education level as well as household size. Further it was acknowledged that the level of awareness influenced the chances of enrolling for any health insurance scheme. It was found out that when considering the overall spending on health, OOP health expenditure by households accounted for around 36% of total health expenditure. Consumption spending on other goods as well services was revealed to be affected greatly if OOP payments become so much forcing the normal lifestyle to be totally crippled. To try to cap this outrageous level of OOP in health expenditure health insurance has come in to help cushion impoverishing effects hence considered as one of the possible instruments. However, despite having a variety of schemes dealing with health prepayment in Kenya, health insurance has been having limited coverage.

Muthaka (2013) using Kenyan household data supplemented with county level data estimated own and joint effects of health expenditures in both public and private on child mortality. The study estimated structural probability linear models of neonatal, infant, and under-five mortality. From the findings, child deaths depend critically on age. Health expenditures in both public and private were found to have a significant influence.

Sekhampu (2012) in South Africa investigated on low income township expenditure patterns on food items narrowing down to a few choices of socio-economic characteristics. A multiple regression model was used to explain responses as per questionnaires to derive the results. These looked into household food expenditures in relation to socioeconomic factors. It was observed that the following had a role on food expenditure: first was the income of the household, second was the size of household and third age. Additionally, employment status, alongside level of educational of the household head were found to have progressive impact on food expenditure. The most significant predictors of food expenditure which stood out were the size of household and employment status.

The effect of health assistance spending on child death in Kenya, for the period between 1980 and 2010 was studied by Njenga (2011). Health care financing creates a base for health system performance since it is expected to provide the resources and economic incentives for operating health systems. It is argued that knowledge about health care financing helps to inform government policy by providing an assessment of the effects of their policies on healthcare delivery systems and overall health standards of a country. The study examined the impact of

health in line with aid expenditure on child mortality in Kenya between 1980 and 2010, and identified other factors that influence child mortality in Kenya. Time series data for a period of thirty years was used alongside employing error-correction methodology. This was followed by semi log regression analysis on the model. The study revealed that the total health aid expenditure influences the under-five mortality rate in Kenya. Other factors that were also found to influence under-five mortality in Kenya included population density and immunization coverage.

2.4 Overview of the Literature Review

It is through the careful synthesis of the literature review that we come up with the following conclusions; that healthcare as a system gets its resources significantly by OOP spending in both developed and emerging states. (Hsu, *et al.*, 2018; Zeng, *et al.*, 2018). Exorbitant OOP expenses have denied equitable access to care hence calling for provision of financial protection which is an important tool for a country's health system (Onwujekwe *et al.*, 2016). CHE are driven by socio-economic factors which push the poor to be the most affected albeit variably across countries (Njagi, *et al.*, 2018). To fully elaborate and comprehend household expenditures key factors include not only income, but also technological change and variation in medical practice in health (Sekhampu, 2012; Bayar and İlhan, 2016; Njagi *et al.*, 2018). Health financing indicators act as enablers for provider payment mechanisms and service provision. (Kiplagat *et al.*, 2013; Aregbeshola & Khan, 2018). Other studies reviewed include Njenga (2011) who examined the effect of health assistance on child mortality in Kenya whereas Muthaka (2013) explored how health expenditures affects health child health outcomes in Kenya. Different econometric models such as binary regression models, multinomial logit models or structural linear probability model, Ordinary Least Square (OLS) model among others have been employed. Regardless of the fact that the factors contributing to health expenditures (especially CHE) in households are well known, inadequate studies have been explored in the context of globally susceptible regions, such as rural areas. Therefore, this study fills this empirical gap by exploring determinants for health expenditures in rural Kenya using the appropriate econometric model.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This part highlights details of the study approach to be employed. It begins with an introduction then the theoretical framework, then empirical model. It further proceeds to definition and measurement of variables before concluding with the data sources.

3.2 Theoretical Framework

Rural areas are characterised by poor populations who heavily depend on public/government health services. Coupled with the belief that private health facilities have superior quality, the cost of treatment of illnesses is higher in these facilities. (Nyambura, 2016). Choosing among alternatives by an individual from a variety purely depend on the level that gives the highest total anticipated value as postulated by utility maximization theory (Kiplagat, *et al.*, 2013). This theoretical framework considered the theory of health care demand which Grossman human capital approach to health forms its root (Grossman 1972; 2000). As per this model, services of health are sought because they improve health status of an individual. According to Grossman model one inherits an initial stock of health which decreases with age, but can be replenished through investments. In order to restore declining health conditions, it calls the decision to seek medical care as an ingredient to assist preventing the natural depreciation of the health stock (Nixon & Ulmann, 2006). Other inputs include exercise, education, nutrition, and lifestyle choices. Unlike the normal buying of goods and services medical care is unique in its own way as what you buy is good health as argued by Grossman. In addition to increasing productivity, better health ensures that there is sufficient and enough time for production of income and commodities (Orayo, 2014). Therefore, health is demanded simply because it enters into individual utility function in terms of consumption commodity. At the same time, it boosts stocks of health in terms of investment which increases the haven of healthy days that allow both market and nonmarket activities (Nixon & Ulmann, 2006, Muthaka, 2014).

In a typical consumer theory of demand, every individual has a utility function that acts as a reference for ranking by combinations of goods and services that are purchased. Subject

to income constraints, individuals are compelled to pick a combination that maximizes utility function (Grossman, 1972). The model also incorporated consumer behaviour as a production function of household so as to bring out the difference that arises when input uses medical care while output uses health. Goods and services are distinguished from commodities. The commodities are used as a function of goods as well as services, and user time. The individual purchases medical services and other goods to come up with “health” as a product which goes into the utility purpose rather than medical care being a direct input into the utility role. In the rural setting, illnesses like diarrhoea, and cough and cold are not uncommon. Households spend a tidy sum to treat such. Therefore, the empirical model of estimation that uses the composition and determinants of health-care expenditure in rural areas was estimated through the specified model.

3.3 Empirical Model

The study took into account the empirical model used by Qureshi (2008) in modelling and simulating public expenditure. Since this is a household decision making behaviour, our model followed Strauss & Thomas (1995) empirical modelling of household and family decisions. This associates individual household spending to its factors which ease the usage of spending equations. In this study, we developed an econometric maximizing individual model centred on expenditure of health decisions largely taken from the perspective of health production following human capital model. Expenditure estimation function through the cross-sectional analysis for rural areas in this study was considered. Following general health expenditure model is expressed as follows;

$$HHEXP = F(X, W) \dots\dots\dots 3.1$$

Where: *HHEXP* is household healthcare expenditure, *X* can be described as a group of variables which are explanatory and which affect household expenditure on health while household incomes are represented as *W*.

The expenditure equation comprises of a collection of household features that associates with the extent of spending on health. These are family income, geographical location, family head level of education, number of children in the household as well as other

characteristics that may have effects on household health spending decision. Then, to empirically specify household health expenditure in rural Kenya; a multiple functional form is considered in the empirical specification as follows

$$HHEXP = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon \dots\dots\dots 3.2$$

Where:

X_1 =Age

X_2 =Gender

X_3 =Educational Levels

X_4 =Marital Status

X_5 =Wealth Quintiles

X_6 =Type of health provider

X_7 =Medical Insurance

X_8 =Chronic illness

and X_9 =Distance to health facility.

Also, $\beta_1 - \beta_9$ are coefficients to be estimated for the respective variables whereas β_0 and ε is the coefficient for constant and error term respectively.

Equation (3.2) is estimated using the Ordinary Least Squares (OLS) estimation technique.

3.4 Definition of Variables and Measurement

OOP health spending to be estimated in first objective can be expounded simply as the payments made by households at the point of receiving health services. In determining the level of household OOP expenditures, we consider costs such as registration, consultation, drugs (including over-the counter drugs and alternative and/or traditional medicine) and vaccines, diagnosis, and medical check-up fee. This information is available.

Transportation cost and opportunity cost of waiting time are excluded from the OOP payments, because the data set does not have these two variables.

Healthcare use variable was measured by the number of medical trips made to a health care provider. The survey asked respondents to state whether any member of the household was sick during the one month preceding the survey and whether medical care was sought. If medical care was sought, the respondents were asked to state how many visits they made to the respective health care provider.

Table 3.1: Definition and Measurement of Variables

Variables	Measurement	Expected Sign
Dependent Variable Household healthcare expenditures in rural Kenya	This is average per capita expenditure on healthcare calculated as the average of individual spending on outpatient and inpatient healthcare expenses for rural households	
Independent Variables		
Age	Age in complete years	Positive
Gender	1 if male, 0 female	Negative
Marital Status	1 if married, 0 if otherwise	Positive
Educational Levels	No education=1 (reference)	Indeterminate
	Primary education=2,	
	Secondary education=3	
	Higher education=4	
Socioeconomic Status	Poorest=1 (reference),	Positive
	Poorer=2,	
	Middle=3,	
	Rich=4	
	Richest=5	

Type of health provider	Type of health service provider sought (public=1 and private=0)	Negative
Medical Insurance	Own health insurance cover (1 if yes, 0 if no)	Positive
Chronic illness	Captures whether a member of the household has a chronic illness or not. Equal to 1 if one has a chronic illness; 0 otherwise	Positive
Distance to nearest health facility	Distance in Kilometres (KM) to the health care provider visited	Positive

Note that participants in the survey were required to state whether any member of the household had any chronic illness such as hypertension, HIV/AIDS, diabetes, cardiac diseases, arthritis and gout among others. This constituted the chronic illness variable (which proxied health status) being equal to one, if a member of the household had any of the chronic illnesses, and zero otherwise.

3.5 Diagnostics Tests

3.5.1 Normality Test

The descriptive statistics (means, standard deviation, minimum maximum, skewness etc.) was provided for all the variables in the model. Exploratory Data Analysis (EDA) also served as indicator for skewness and potential non-normality of the variables. This is crucial as the multiple linear regression model makes assumption on normality of the data. In addition to that Shapiro Wilk tests for normality was performed so as to confirm findings from the EDA.

3.5.2 Multicollinearity Test

The presence of multicollinearity was detected using variance inflation factors as well as computation of correlation matrices. The study adopted both VIF test and correlation matrix. From the VIF test results, all variables are supposed to have a VIF value of less than 10 and

tolerance value of more than 1 implying absence of multicollinearity. The highly collinear variables have values of correlation matrix being greater than 0.7. The addition of highly related factors can lead to inflated coefficients which have an effect on policy suggestions if the findings thereof are to be used in a simulation exercise. Therefore, they have to be dropped so as to validate the results.

3.5.3 Heteroscedasticity Test

Heteroscedasticity also known as heterogeneity of variance was tested by the Breusch pagan test or residual plots. Its remedy involves the adoption or employment of robust standard errors in case it is deemed present.

3.6 Data Type and Sources

The study used KHHEUS, (2013) which is cross-sectional in nature. It consisted of a national and county representative sample survey of 38,620,391 individuals. This is the first data set in Kenya which disaggregated data by county. Of importance, the place of residence variable in this study was determined through multistage sampling design used to choose clusters as representative and households who formed the sample. This sample was further distributed to the urban and rural strata using power allocation method⁴. KHHEUS (2013) agreed to the fact that estimates of key indicators both for rural and urban regions were incorporated in this sample constructed. Of the surveyed individuals, 25,361,149 were rural residents whereas 13,259,242 were from urban areas. The multistage sampling design was utilized in order to choose specific clusters and households. From 1,347 clusters chosen a total of 33,675 households were derived from which it was further divided in ratio 3:2 of rural to urban groups. The sample studied was developed to permit proper approximations of crucial parameters at county as well as national levels for each of the 44 counties⁵ without forgetting urban and rural domains. The data mainly collected included; the illness episodes information for all, the one month prior to survey use of health services, as well as the expenditures of health correspondence. Furthermore, data for one year preceding the survey

⁴ See Kenya Integrated household budget survey (KHIBS) 2015/2016

⁵ These counties include only those covered by KHHEUS (2013)., KNBS had not update the master sample/frame at the time of the survey to incorporate counties like Mandera, Wajir and Garissa meaning that these counties were not included in the study.

was collected too alongside household characteristics, health insurance coverage, inpatient service use and related health expenditures. OOP data was directly obtained from the survey as it was already computed. This study disintegrated the same data first to isolate respondents in rural areas from where information on various individual and household indicators namely; total household spending on healthcare, health status, gender, age, education levels, wealth quintiles, and type of provider whom health services were sought from, employment among others were obtained and estimated.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

The main aim of the study was to establish determinants of household expenditures in rural Kenya. Ordinary Least Squares method was used to estimate the parameter coefficients of the multiple regression model. OLS estimators make different assumptions which are tested. Thus, diagnostic tests are carried out before actual estimation in order to ensure that these OLS properties hold. The data used in the analysis was cross-sectional data.

4.2 Descriptive Statistics

The descriptive statistics considered in this study include average, standard deviation, minimum and maximum values. The mean shows the average value for each variable whereas the standard deviation shows variations from the mean. A total of 33, 675 individuals were surveyed. Place of current residence was used to extract rural respondents from urban respondents. As shown in Table 4.1, out of the surveyed individuals, a total of 20,205 respondents were from rural areas. In particular, the study considered factors such as age, gender, marital status, education, and socioeconomic status, type of health provider, medical insurance, chronic illness and long distance to health provider as independent variables.

Table 4.2: Summary Statistics for Determinants of Health Spending in Rural Kenya

Variable	Observation	Mean	Std. Dev.	Min	Max
Age	20, 205	29.42	10.45	15	98
Gender (Male=1)	20, 205	0.3692	0.4826	0	1
Marital status	20, 205	0.5878	0.4922	0	1
Education levels					
No education	20, 205	0.1604	0.3670	0	1
Primary	20, 205	0.5521	0.4973	0	1
Secondary	20, 205	0.2401	0.4272	0	1
Higher	20, 205	0.0474	0.2124	0	1
Wealth Index					
Poorest	20, 205	0.3122	0.4634	0	1
Poorer	20, 205	0.2426	0.4286	0	1
Middle	20, 205	0.2372	0.4254	0	1
Richer	20, 205	0.1617	0.3682	0	1
Richest	20, 205	0.0464	0.2104	0	1
Type of health Provider	20, 205	0.7822	0.4127	0	1
Medical Insurance	20,205	0.1263	0.3321	0	1
Chronic illness	10,134	0.0542	0.2264	0	1
Distance to Health provider	20, 205	0.7548	0.4302	0	1

Source: Computation Based on KHHEUS (2013)

The respondents were approximately aged 29 years on average with the youngest being 15 years while the oldest was 98 years. The variation in general was little at 10 years. The study found out that about 36.92 percent of respondents were male. On education attainment, the study showed that about 16.04% had no any education at all while 55.21% had primary level of education. About 24.01% had secondary while 4.74% had higher education level.

On wealth index, most of the respondents were in the first and second wealth quintiles. However, it could be noted that the distribution was almost equal across the wealth quintile

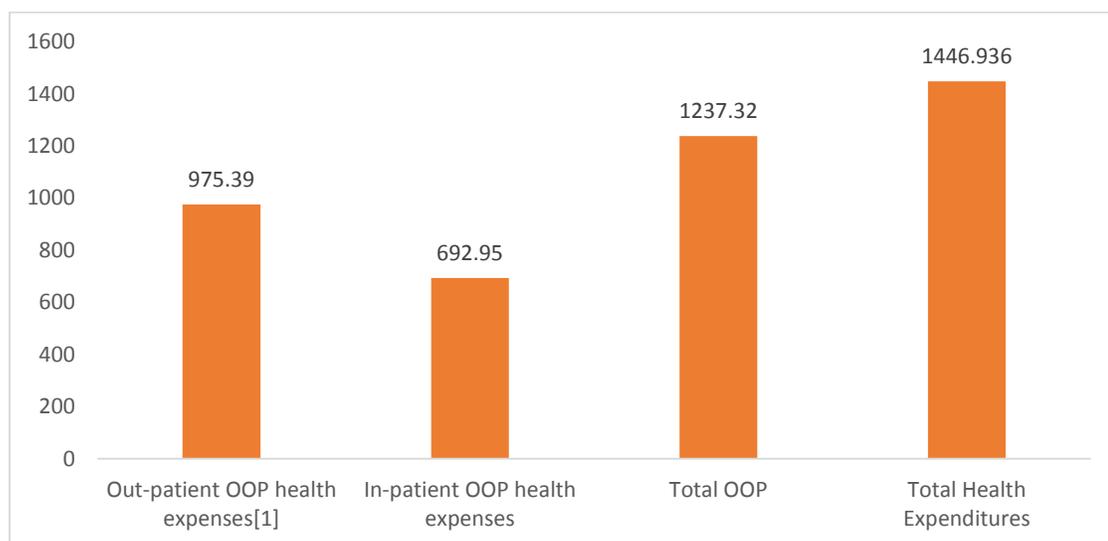
levels. The poorest and poorer respondents were 31.22% and 24.26% respondents. Those who were in middle wealth level were 23.07%. Both the rich and richest were 16.17% and 4.64% respectively.

Most respondents that is 78.22% were reported to use health facilities whereas only 12.62% were covered by health insurance or owned health insurance cover. The results also revealed that 5.42% of the respondents had reported to have chronic illness. Finally, majority of the respondents that is 75.48% failed to seek for healthcare services due to long distance.

4.3 Trends in Annual Per Capita Out of Pocket Health Expenditures in Rural Kenya

In the first objective, the study was meant to establish trends of household OOP spending on healthcare services in rural Kenya. Gross household expenditure on health is the summation of household spending on inpatient, and outpatient services which incorporates routine health expenses. The findings were as indicated in figure 4.1 and table 4.2. The results showed that annual per capita spending varied considerably on outpatient care, and inpatient health expenses. Mean OOP spending on outpatient's visits as well as average out-of-pocket expenditures on inpatient's admissions were established.

Figure 4.1: Trends in Average Out of Pocket Health Expenditures (Kshs) in Rural Kenya



Source: Computation Based on KHHEUS (2013)

The mean yearly per person expenditure for all inpatient and outpatient visits were found to be Kshs 975.39 and Kshs 692.95 respectively. The highest individual spent Kshs 1749.24 and Kshs 1299.93 on outpatient care and inpatient care respectively while the lowest spent around Kshs 10.46 and Kshs 15.19 for outpatient and inpatient respectively. Health expenditure for rural Kenya was used as the dependent variable in this study. Considering the OOP spending, the study revealed that residents in rural areas spent on average Kshs 1237.32 per person in seeking healthcare with the highest OOP expenditure being Kshs 1987.92 and lowest spending being Kshs 100. It was established that, on average individuals spent about Kshs 1446.94 in seeking healthcare in the rural areas with the highest spending Kshs 2356.33 while the lowest spent Kshs 100.

Table 4.3: Annual Per Capita Out of Pocket Health Expenditures (Kshs) in Rural Kenya

Component of OOP	Observation	Mean	Std. Dev.	Min	Max
Out-patient OOP health expenses ⁶	20,205	975.39	216.49	10.46	1749.235
In-patient OOP health expenses	20,205	692.95	134.88	15.19	1299.93
Total OOP	20,205	1237.32	284.59	100	1987.92
Total Health Expenditures	20,205	1446.936	989.0485	100	2356.325

Source: Computation Based on KHHEUS (2013)

4.4 Pattern of HealthCare Service Utilization in Rural Kenya

In the second objective, the study was focused on determining the pattern of health care utilization. Rise in the utilization of healthcare services was a measure of increased access to health services and was considered inspiring as long as individuals sought suitable health

⁶ Routine expenses are part of outpatient OOP expenditures

providers in the rural areas. The utilization rate for outpatient services was on average 4.07 annual visits per capita. The findings are as shown in table 4.3.

Inpatient care on the other hand was assessed on cases where a person is hospitalized for at least 24 hours. These cases were severer than those handled as outpatient (KHHEUS, 2013). The probability of an individual being hospitalized in the last year gives one measure of inpatient health utilization. The findings as established indicated that on average, the percent of population requiring admission was 3.2 whereas about 2.5% were admitted. It was found that approximately 0.61% of people requiring hospitalization were not admitted. Admissions per 1,000 population per year was 38 in rural hospitals.

Table 4.4: Outpatient and Admissions Rates in Rural Areas per Year

Hospital Admissions	Observation	Mean	Std. Dev.	Min	Max
Per capita Outpatients Visits	20,200	4.0655	0.7473	2.0863	15.9968
Potential Admissions	20,203	3.2004	0.0482	2.0863	4.6300
Met Need (admitted)	20,203	2.4997	0.0454	1.0464	3.5090
Unmet Need (Not admitted)	20,203	0.6051	0.0989	0.5780	3.4704
Admissions per 1,000 population	19,834	37.95	1.8193	22.03	53.9369

Source: Computation Based on KHHEUS (2013)

4.5 Diagnostic Tests

Since the data was obtained by observing subjects at the same point in time, multicollinearity analysis was necessary. The variances of the error terms in regression models usually vary across observations implying presence of heteroscedasticity. Ordinary least squares estimation in the presence of multicollinearity and heteroscedasticity renders the estimators as inefficient. Due to this, correction of multicollinearity and heteroscedasticity if present was needed in order to obtain correct standard errors that would be used in hypotheses testing.

4.5.1 Multicollinearity Analysis

Multicollinearity exists when there is a clear linear relationship between independent variables. Table 4.4 and appendix 1 shows VIF test results and correlation matrix. From the VIF test results, all variables had a VIF value of less than 10 and tolerance value of more than 1 implying absence of multicollinearity. Further, to check for pairwise correlation, the correlation matrix result showed that health expenditure variable had a positive correlation with age, gender, marital status, and medical insurance. On the other hand, education levels, wealth index, type of health provider, chronic illness and distance to health provider were found to have a negative correlation with dependent variable which is health expenditures. As can be observed, the correlation coefficients were less than 0.5 implying absence of multicollinearity. However, the correlation coefficient between distance to health provider and the type of health provider were highly correlated ($r=0.9505$) implying multicollinearity. As a remedy, the researcher dropped distance to provider as recommend in the literature (Mukras, 1993; Wooldridge, 2004).

Table 4.5: Variance Inflation Factor Analysis

Variable	VIF	1/VIF
Age	1.03	0.969452
Gender	1.11	0.901251
Marital status	1.14	0.880923
Education		
Primary	2.48	0.403624
Secondary	2.45	0.407404
Higher	1.53	0.654635
Wealth Index		
Poorer	1.63	0.612807
Middle	1.71	0.584418
Richer	1.65	0.605012
Richest	1.26	0.791333
Health Provider	1.56	0.642966
Medical insurance	1.08	0.928545
Chronic illness	1.03	0.972729
Mean VIF	1.51	

Source: Computation Based on KHHEUS (2013)

4.5.2 Tests for Heteroscedasticity

The test that was used for detecting heteroscedasticity was the Breusch Pagan test. It involved testing of hypothesis as opposed to plotting graphs in order to assess presence of heteroscedasticity. The diagnostic test confirmed presence of heteroscedasticity. The p-value of less than 0.05 in the Breusch pagan test led to the failure of rejecting of the null of homoscedasticity. The outcomes are as depicted in table 4.5.

Table 4.6: Table Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity

Variables: fitted values of Natural Logarithm of health Expenditure	
chi2(1)	1129.83
Prob > chi2	0.0000

Ho: Constant variance

Source: Computation Based on KHHEUS (2013)

Since estimation of the model with no constant variance leads to ambiguous estimates, the study used robust standard errors which correct the problem.

4.5.3 Normality Analysis

The study conducted Shapiro Wilk analysis where the p value for residuals was less than 0.05 implying that data was not normally distributed (see table 4.6). Given non normality of data, study adopted a nonlinear model where the dependent variable was transformed into natural logarithm and estimation proceeded.

Table 4.7: Shapiro Wilk Test for Normality

Variable	Observations	W	V	z	Prob>z
Residuals	10,134	0.76791	1168.925	18.917	0.00000

Ho: Data is normally distributed

Source: Computation Based on KHHEUS (2013)

4.6 Discussion of Regression Results for Determinants of Health Expenditures in Rural Kenya

To achieve the major aim of this study, that is estimating socioeconomic factors affecting household health expenditures in rural Kenya, a regression model was utilized. For assessment of overall fit of model, the R-squared statistic and F test were used. The value of R-squared of 0.0432 shows that the model explains about 4.32% of the variation in health expenditures in the non-linear model and the p value of 0.0000 which is less than 0.05 meaning that the regression coefficients are not simultaneously equal to zero. This

implies that variables used in the model explained the dependent variable significantly. Table 4.7 shows regression results.

Table 4.8: Multiple Regression Model (Dependent Variable: Health Expenditures)

Linear Regression						
Number of observations	=	10,134				
F (14, 10119)	=	24.01				
Prob > F	=	0.0000				
R-squared	=	0.0432				
Root MSE	=	0.65781				
Ln Health Expenditure	Coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	0.0035	0.0029	1.22	0.222	-0.0021	0.0092
Age Squared	-0.00004	0.00004	-1.14	0.253	-0.0001	0.00003
Gender	0.0601***	0.0150	4.02	0.000	0.0308	0.0894
Marital status	0.0513***	0.0171	2.99	0.003	0.0176	0.0849
Education levels						
Primary	-0.2453***	0.0239	-10.26	0.000	-0.2921	-0.1984
Secondary	-0.2162***	0.0274	-7.89	0.000	-0.2699	-0.1625
Higher	-0.1105***	0.0321	-3.44	0.001	-0.1734	-0.0476
Wealth Index						
Poorer	-0.0606***	0.0182	-3.33	0.001	-0.0963	-0.0250
Middle	-0.0200	0.0193	-1.03	0.301	-0.0578	0.0178
Richer	0.0288	0.0217	1.33	0.183	-0.0136	0.0713
Richest	0.0762**	0.0297	2.57	0.010	0.0180	0.1345
Type of health Provider	-0.0619***	0.0196	-3.17	0.002	-0.1002	-0.0236
Medical Insurance	0.0443**	0.02196	2.02	0.044	0.0013	0.0874
Chronic illness	0.0655***	0.02074	3.16	0.002	0.0248	0.1061
Constant	6.1220	0.0581	105.39	0.000	6.0082	6.2359

Source: Computation Based on KHHEUS (2013)

From the regression results; gender of the respondents, marital status, medical insurance and chronic illness were found to be positively associated with health spending in line with our a priori expectations. Moreover, these relationships were statistically significant at 1% and 5% levels of significance. Contrary to expectations, variables such as education levels (primary, secondary and higher levels), wealth index (second and third wealth quintiles) were found to be significant predictors but had a negative relationship with health expenditures.

The discussion of the study findings is focused on the significant and non-significant factors or determinants. From the estimated model, the constant value was 6.122 meaning

that holding all determinants (age, gender, marital status, education, wealth index, type of health provider, insurance, and chronic illness) constant, health expenditures rose significantly at 1% level by 612.2%. This is also supported by a t statistic value of 105.39 and a p value of 0.0000. This is a multiplicative effect of health expenditures by the rural population.

Age and age squared were both shown to be statistically non-significant. An extra year to the age of an individual leads to a 0.35% increase in health expenditures in rural areas holding other factors constant. The insignificance of this rise is based a t statistic value of 1.22 which is less than 1.96. This is similar to age squared which had a negative and a non-significant effect. Its respective t and p values were -1.14 and 0.253 which were less than 1.96 respectively.

Gender of the respondents was statistically important in determining household health expenditures. It was shown that, males were associated with increased health expenditures by 6.01% at 1% level of significance holding other factors constant compared to female. The t statistic for this variable was 4.02 which was above 1.96 and the p value of 0.0000 which was below 0.001. The findings imply that males, who were more likely to double as the head of households, spent more on their own health as well as health of the household. The findings differed with the study results obtained by Bayar and İlhan (2016) who was investigating the determinants of household education expenditures where the study explored whether the poor spend less on education or not. They found gender not to be a significant factor. Similarly, the study results differed with that of Sekhampu (2012) in South Africa who concluded that unlike other predictors, gender of the household head was insignificant to expenditure of household food.

The study established that marital status that is being married was statistically significant in impacting household expenditures. It was revealed that, being married led to higher household expenditure at 1% level of significance by 5.13% holding other factors constant compared to those who were not married. The p and t statistics were 2.99 and 0.003 respectively. This result may be attributed to the fact that married individuals are more likely to have larger households with more health needs hence more health expenditures. From the literature, the study by Sekhampu (2012) in South Africa investigated on low

income township expenditure patterns on food items narrowing down to a few choices of socio-economic characteristics differ with our finding as they also found that marital status was associated with a negative influence on household expenditure on food.

On education, the study compared primary, secondary and higher levels of education to no education. It was revealed that respondents with primary level of education, secondary level of education and higher level or tertiary level of education lowered their health expenditures by 24.52%, 21.62% and 11.05% respectively compared to those who had no education *ceteris paribus*. The three levels of education were shown to have a significant effect at 1% level since their respective p values were 0.000, 0.000, and 0.001 while t statistics in absolute value was 10.26, 7.89 and 3.44. The findings imply that education equips individuals with necessary health skills and knowledge required in producing and maintaining health which is a capital stock according to Grossman (1972). These would thus make individuals not to seek healthcare multiple times as they will be enjoying good healthy days. The study findings conform to the study results found by Bayar and İlhan (2016) who focused at examining household education expenditures. From estimations they conclusively observed that higher educational expenditures translated to higher household income levels.

Socioeconomic status measured through wealth index was also found to have a significant effect on health status. However, the variable demonstrated a mixed effect on health expenditures. Specifically, it was demonstrated that individuals who were in the second wealth quintile (poorer) were more likely to experience lower health expenditures whereas those in the fifth wealth quintile (richest) were associated with more health expenditures. Individuals considered to be in the second wealth quintile have less health expenditures at 1% level of significance by 6.06% whereas those in richest or fifth wealth quintile had significantly higher health expenditures at 5% level by 7.62% holding other factors constant. Their respective p values were 0.001 and 0.01 which were less than 0.001 and 0.05 respectively. Their respective t statistics was 3.33 and 2.58 which were all more than 2.57. The findings support the results by Kiplagat, Muriithi & Kioko (2013) who conducted a study on determinants of health insurance choice in Kenya and concluded that wealth index significantly impacted demand for health insurance choice. The study

however found that individuals in the third and fourth wealth quintiles were not statistically significant as their p values (0.301 and 0.183) were more than 0.05. Their respective t statistics also was 1.03 and 1.33 which were all less than 1.96.

Also, the type of health providers was revealed to have a significant effect on health expenditures. It was found that using public health facilities led to significant reduction in health expenditures by 6.19% at 1% level of significance *ceteris paribus* compared to private healthcare facilities. The respective p value and t statistic were 0.002 and 2.17 which were less than 0.01 for former and more than 1.96 (for the latter). The finding may be ascribed to the fact that public health hospitals are subsidized compared to the private health facilities hence attract lower health budgets. The results were conforming to the findings obtained by Muthaka (2013) using Kenyan household data.

As postulated in the literature, medical insurance was revealed to have a significant influence on health expenditures in rural areas. The study established that being insured led to an increase in health expenditures by 4.43% holding other factors constant compared to those who were not insured. The effect was significant at 5% level. The p value and t statistic were also 0.044 which was less than 0.05 and 2.02 which was more than 1.96 respectively. This implies that owning health insurance cover enables an individual to access affordable healthcare, prompting to more use of the existing healthcare services. It could as well be associated with moral hazard where individuals in rural areas sought medical care even for minor ailments.

Lastly, the study evaluated the link between individuals with chronic illness and health expenditures. It was shown that having chronic illness, at 1% level of significance, increased health expenditures by 6.55% holding other factors constant compared to those without chronic illness. The p value was 0.002 which was less than 0.01 level of significance and had a t statistic value of 3.16 which was more than 2.57. Chronic illnesses are associated with continuous seeking of health care services which consequently is linked to higher health expenditures. This finding supports the study results obtained by Wang, *et al.*, (2015) who analysed the extent of chronic disease among elderly patients in terms of inequality of CHE in China. Their findings revealed that elderly households with chronic disease individuals were susceptible to CHE incidence and intensity.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study and thereafter, conclusions are arrived at based on the established relationship between identified determinants and health expenditures by rural population in Kenya. Later policy recommendations and areas of further research are suggested as a way of filling the gap.

5.2 Summary of the study findings

The main goal in the area of health is to achieve the utmost level of health in a responsive way. One of the major priorities for the health sector in Kenya in each financial year is scaling⁷ up Universal Health Coverage (UHC). In spite of income improving, it does not obviously eliminate catastrophic expenditures. In other nations, expenses that are subjected directly to the private households may call for an extra cost of approximating some of the informal payments to the care system providers forcing a few of the affected households to incur additional OOP payments than usual. The study was conducted with the key aim of establishing determinants of household expenditures in rural Kenya. The specific objectives were; to determine trends of household OOP expenditures on health services in rural Kenya, to determine the pattern of healthcare services utilization in rural Kenya. The third objective was to establish the core determinants of household healthcare expenditures in rural Kenya. The study made use of the latest KHHEUS (2013) dataset.

To model the hypothesized relationship, the study employed a multiple regression model to elucidate the estimated impact of various determinants on health expenditures in rural Kenya. Ordinary Least Square (OLS) estimation technique was adopted to test the relationship among the variables. All three levels (1%, 5% and 10%) of significance were adopted in testing significance. Trends and patterns were purely descriptive and were analysed such. From the estimation of the model; gender of the respondents, marital status, medical insurance and chronic illness were found to be positively related with health expenditure. Unexpectedly, education levels (primary, secondary and higher levels), wealth index (second and third wealth

⁷ The scaling is linked to several government initiatives such as; the Linda Mama or reducing out of pocket/CHEs among others.

quintiles) were found to be significant predictors but had a negative relationship with health expenditures.

5.3 Conclusions

There are various reasons for utilizing health care services, for instance obtaining treatment whenever one falls ill, prevention of diseases, reducing pain, increasing quality of life and also acquiring crucial information about individual health status. Despite the above, utilization of health care services has been far from satisfactory in many countries. Based on the estimated model, demographic, socioeconomic and sociocultural factors were significantly associated with healthcare expenditures. Thus, to project or forecast healthcare expenditures for the population, there is need to consider gender of the respondents, marital status, medical insurance, chronic illness, education levels, socioeconomic status, type of health provider, medical insurance and chronic illness as the empirical analysis revealed them as significant predictors. Most of them had a positive effect while few others had a negative relationship with health expenditures.

5.4 Policy Recommendations

Demand for health explores the extent to which the health behaviour and behavioural factors and determinants of health affect the health services usage. Also, many households especially in rural areas of Kenya are said to have devoted a large portion of the resources relative to a household's budget for health consumption, prompting them to catastrophic health expenditures. Based on the findings, the study suggests for equity between men and women when seeking health services and the use of incentives as well as training on men to practice preventive care so as to reduce costs going into hospitals for treatment unlike their female counterparts. Similarly, the study suggests enhancing of strategies that could facilitate couples to be healthier and live longer. The study suggests that married individuals need to continue practising preventive medical care.

Since educational levels were significant in lowering health expenditures, the study suggests for creation and implementation of programmes such as awareness creation. Also, wealth index which is the socioeconomic status has a negative and significant effect on health expenditures. Thus, there is need to create empowerment programmes for the population so that they will have lower hospital visits and consequently lowering health expenditures. Public health providers have been linked with lower health expenditures. Thus, there is need for the

government to introduce more public health facilities to boost or facilitate more use of the subsidized services in the rural areas.

It is of no surprise that individuals who reside in rural areas spend a lot in healthcare. Medical insurance was found to have a significant as well as positive effect on health expenditures. The study suggests for presence of transparency and addressing underlying inefficiency. It is difficult to know the actual cost of healthcare. Most persons know the cost of care is increasing but with little details as well as complex medical bills, it's not easy to understand what one is paying for.

Experiencing illness in rural areas may lead to very high OOP payments for healthcare. While the current literature typically examines the levels of spending, what happens when households lack sufficient resources has not been explored exhaustively. Chronic illnesses were found to be positively related with health expenditure. There is need to improve the quality of and access to care for this segment of the population.

5.5 Areas for Further Studies

The study has mainly focused on establishing determinants of household expenditures in rural Kenya. It was limited to determination for trends of household OOP spending on health services in rural Kenya and the pattern of healthcare services utilization in rural Kenya. Also, it was limited to investigating the core determinants of household healthcare expenditures in rural Kenya. There is need for a study focusing on the devolved units in Kenya as well as another one employing a different estimation technique. More studies need to be conducted using the sociocultural factors, infrastructural development among other factors.

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APPENDICES

Appendix 1: Correlation Matrix

Variables	Health Expenditures	Age	Gender	Marital status	Education	Wealth Index	Type of Health provider	Medical Insurance	Chronic illness	Distance to provider
Health Expenditures	1.0000									
Age	0.0232	1.0000								
Gender	0.0481	0.0544	1.0000							
Marital status	0.0165	0.1032	-0.2841	1.0000						
Education	-0.1981	-0.0753	-0.0306	-0.1200	1.0000					
Wealth Index	-0.1497	0.0119	-0.0371	-0.0833	0.5838	1.0000				
Type of health Provider	-0.2026	-0.0467	-0.0762	-0.0459	0.4750	0.4606	1.0000			
Medical Insurance	0.0865	0.0355	-0.0145	0.0936	-0.0965	-0.0660	-0.1257	1.0000		
Chronic illness	-0.0316	0.0049	-0.0072	-0.0048	0.1405	0.1456	0.0897	0.0076	1.0000	
Distance to provider	-0.1956	-0.0451	-0.0826	-0.0439	0.4526	0.4423	0.9509*	-0.1236	0.0785	1.0000

Source: Author's calculations: *Highly correlated.