

Addis Ababa University
School of Graduate Studies

**THE DETERMINANTS OF PUBLIC HOSPITAL VISITING
HOUSEHOLDS OUT OF POCKET HEALTHCARE EXPENDITURE IN
ADDIS ABABA**

BY
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June 2019

**Addis Ababa University
School of Graduate Studies**

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HOUSEHOLDS OUT OF POCKET HEALTHCARE EXPENDITURE IN
ADDIS ABABA**

**A Thesis Submitted to the School of Graduate Studies of Addis
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Partial Fulfillment of the Requirements for the Degree of Master of
Science in Economics (Development Economics)**

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June 2019



DECLARATION

I, Selamawit Tezera Chaka, hereby declare that the thesis entitled “**THE DETERMINANTS OF PUBLIC HOSPITAL VISITING HOUSEHOLDS OUT OF POCKET HEALTHCARE EXPENDITURE IN ADDIS ABABA**”, submitted by me to the award of the degree of Master of Science in Economics at Addis Ababa University, is original work and it hasn't been presented for the award of any other Degree, Diploma, Fellowship of any other university or institution.

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This is to certify that the thesis prepared by Selamawit Tezera Chaka, entitled: *THE DETERMINANTS OF PUBLIC HOSPITAL VISITING HOUSEHOLD OUT OF POCKET HEALTHCARE EXPENDITURE IN ADDIS ABABA* and submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics (Development Economics) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

The sustainable development goals (SDGs) have encouraged governments to facilitate effective mobilization, management and optimal use of financial resources in order to ensure the goals are met and living standard of citizens are improved. The health sector is one of the main sectors that necessitate sustainable investment to achieve Universal Health Coverage and to attain higher standard of living. However when this is not happening, households will be forced to rely on out-of-pocket healthcare spending in order to purchase a good health. A hospital based cross sectional study was conducted in selected public hospitals in Addis Ababa by using outlier robust regression method with the aim of analyzing which socio-economic factors determines household's out-of-pocket healthcare expenditure. The result of the study shows that income, family age structure, chronic disease, completing primary education and inpatient admission affect out-of-pocket healthcare expenditure positively while household size has a negative association. Therefore, real government's commitment is required to reduce the huge burden on households by investing, properly planning and implementing quality health services that provide the necessary medicines as well as treatments for groups that are vulnerable to financial burden.



LIST OF ACRONYMS AND ABBREVIATIONS

CBHI	Community Based Health Insurance
CVD	Cardio-vascular Disease
EDHS	Ethiopia's Demographic and Health Survey
FMoH	Federal Ministry of Health
GDP	Gross Domestic Product
GNI	Gross National Income
HEP	Health Extension Program
HEWs	Health Extension Workers
HH	Household
HIV	Human Immunodeficiency Virus
HMIS	Health Management and Information System
HSDP	Health Sector Development Plan
HSTP	Health Sector Transformation Plan
LMICs	Lower and Middle Income Countries
MDG	Millennium Development Goal
NCDs	Non-communicable Diseases
NGOs	Non-governmental Organizations
NHA	National Health Account
OLS	Ordinary Least Square
OOPHE	Out-of-Pocket Healthcare Expenditure
OPD	Outpatient Department
SHI	Social Health Insurance
SSA	Sub Saharan Africa
TB	Tuberculosis
USD:	United States Dollar
WHO	World Health Organization



CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Healthcare expenditure, mostly defined as, the money expenditure made for the provision of medical and related services aiming at maintaining a good health; especially through prevention and treatment of diseases (Reeves, 2014). It typically includes; hospital bills, purchase of drugs and any pharmaceutical products, co-payments, consultation fees, therapeutic equipments and so on (Wagstaff and van Doorslaer, 2003).

Out of pocket healthcare expenditure is an important feature of health care systems all over the world. However, this expenditure could be luxurious expenditure for some households while it is considered as a necessity for others (WHO, 2015). In addition, the impact of continuous out of pocket expenditure on health care is known to cause psychological stress on patients and their family. This expense also intensifies poverty on most disadvantaged households and leads to severe medical consequences because patients might forgo crucial treatments due to unaffordability (Eskinder E., 2014). Out of pocket health expenditure is mostly catastrophic for poor households and it is regarded as an important issue faced by policy makers when developing health care policy and insurance mechanisms (IdrissaBeogo et al, 2016).

Total healthcare expenditure may fall under either public or private spending on health. Public healthcare expenditure is an expenditure made by the government by using its own finance or loans donated by other countries; it is mainly for non-profit motive and to satisfy basic human right (Baltagi BH and Moscone, 2010). Government can sometimes subsidize some pharmaceutical products in case of emergencies. According to Rannan-Eliya et al (2008); (NIDI, 2011) private healthcare expenditures are expenditures incurred by organizations or individuals outside the government; it includes expenditure made by households, firms, non-governmental organizations (NGOs), medical insurance schemes, employment based insurance policies, and out of pocket health expenditure.

According to Sarah Brown et al (2012), private healthcare expenditure primarily consists of out of pocket expense, which is a direct healthcare expenditure by individuals or households,

including gratuities made to health practitioners, suppliers of pharmaceuticals and other related goods, and services, whose primary intention is to restore or enhancement health status.

For decades, Sub Saharan African countries recognized by poor health system and policy. Ethiopia, as part of Sub-Saharan African country, characterized by weak healthcare system, wretched healthcare infrastructure, diminutive government spending and regulations, with no strong national health policy and expensive pharmaceutical and therapeutic appliance (FMoH, 2014; Wamai, 2009). Hence, Ethiopia has a mending health outcomes in the world; with high under-5 mortality and maternal mortality rates, 48 per 1,000 live births and 412 per 100,000 live birth respectively in 2014 (WHO, 2015; EDHS, 2016).

Ethiopia's total health spending significantly improved since the implementation of HSDP in 1995/6. It has increased from 1.2 billion USD in 2007/8 to 2.5 billion USD (and 4.73 percent of the GDP) though; spending on health is still far from adequate to purchase a good health for all citizens and below the 2001 Abuja declaration pledge of African government to allocate 15% of the GDP to health sector (WHO, 2011; FMoH, 2017). The country's general health care is underfinanced both in absolute terms and when compared to Sub-Saharan Africa (SSA) standards. For instance, the per capita national health expenditure for the country was reported to be USD 28.65 during the year 2013/14 (FMoH, 2017) while the low-income African countries average was USD 37.7. This per capita health expenditure is also below the WHO's recommended USD 60 per person needed to cover vital health care by (FMoH, 2017; WHO, 2015). The out-of-pocket health expenditure in Ethiopia was measured around 80% in 2011; this figure is higher than the 62.2 % in Sub Saharan Africa during the same period (world bank, 2012). Thus, out of pocket is the principal financing scheme to utilize healthcare service in Ethiopia.

1.2. Statement of the Problem

In recent era, economists are giving more emphasis for human capital development. The theory base of human capital development comes from increasing health facilities and education (Weil, 2006). Healthy human beings are important for fostering one's economic growth by spending more of their time in labour forces, as well, they are more productive and efficient in their work as to maximize their income (Andrew E. et al, 2007). Employers seek healthy worker with

healthier family members, because workers' efficiency will be affected, if one of the worker's family member do not have a good health status (Jonathan G, 2000). Poor health leads to poverty, and has a negative consequence on households' income by lessening household's capacity to earn income and accumulate wealth, by lifting up medical expenses and reduction savings. In some cases, individuals that are affected by certain chronic diseases may never develop the capacity to earn enough income to get out of the illness–poverty trap (Baltagi BH & Moscone F., 2010). According to Bolin K et al (2003) cited in Ali H. et al (2013), most of expenditures for health are financed by private and out of this; out of pocket health expenditure took the lion's share.

Least developing countries healthcare spending is very high both in absolute terms and on a per capita basis. For most low-income countries, out of pocket healthcare spending are regressive while social assistance and fee exemptions are either non-existent or where present, are not well targeted at those most in need (Obinna E, 2010). Given the level of income and high poverty, health spending can be prohibitive for many households and catastrophic for others (FMoH, 2014); the WHO report indicated that on average, 100 million individuals are impoverished, and another 150 million individuals face severe financial difficulties during any given year because they incurred a direct out of pocket health expenditures (WHO, 2014). In Ethiopia alone, percapita out-of-pocket payment estimated to be 231 birr and it shows a 34% increase from NHA V (FMoH, 2017). Out-of-pocket healthcare expenditure, though, cover up a smaller share in countries which have made progress toward universal health coverage.

Witter (2005) verified that, most Ethiopians do not go to health care institutions when they are ill. Of those who did, two thirds intensify their poverty to cover the healthcare costs: by putting up their asset, land and livestock for sale, borrowing money or mortgaging their crops; reducing the sustainability of their livelihoods in the long term and with devastating consequences to children. Withdrawing children from school and falling into debt are other very common consequences of unaffordable healthcare. Children are forced to drop out of school to work and pay healthcare costs (Emmett, 2004).

Different scholars have explored what determines out-of-pocket expenditure at household level; however, the answer varies mainly due to difference in methodology and time. The place the

research conducted is another factor for the difference in result. Wealth index and consumption expenditure has been used as a proxy for income in majority of researches conducted in LMICs rural parts (Nahu A. (2006), Aregawi (2013), Rama P. et al (2010), Felix M. et al (2016), Obinna E. et al (2010), Ethiopia Ministry of Health (2014), Cheng-Kun (2014)). Alice S. et al (2014); Idrissa B. et al (2016); Rama P. (2010); Tin Tin Su et al (2006), cite household size is a major determinant of out of pocket expenditure. Households with more than five members have a probability of becoming impoverished due to out-of-pocket healthcare payment (Bolaji Samson et al (2017)).

Despite the context of emergence and development of disparity in out of pocket healthcare financing in urban Ethiopia scanty evidence exists on determinants of out of pocket expenditure. Studies that are conducted in Ethiopia are mainly qualitative and done by health professionals. Even though out of pocket healthcare expenditure is a hub of health policy, little has been done yet in Ethiopia to investigate what determines out of pocket healthcare financing. The attention given to this component from academic front is by far very low in Ethiopia as it's an area neglected by both health practitioners as well as economists.

A household survey for out of pocket healthcare expenditure is usually very expensive, takes a lot of time and resource as well as it is susceptible to recall bias. Self-reporting and seeking healthcare visit is very low if one is not severely ill (FMoH, 2014). Additionally, studies mentioned the problem of accessing household on visit, which led them to non-response bias (Tibebe Akalu, 2013). Thus, household healthcare expenditure survey is susceptible to numerous zero outcomes. In addition, the six round NHA survey shows 80% of the general population utilizes government healthcare providers. Utilization of private health facilities is growing however; it's still below public health facilities for both inpatient and outpatient services. Thus, this study used institutional based study by employing outlier robust regression to investigate what determines out of pocket expenditure.

1.3. Objective of the Study

The main objective of this study is to identify the factors determining households' out-of-pocket healthcare expenditure among hospital visiting individuals in Addis Ababa and their households. Specifically, the study aims

1. To determine the extent of annual public hospital visiting households' out of pocket expenditure on health
2. To analyze which of the socio-economic and demographic variables determines households' out of pocket expenditure.

1.4. Significance of the Study

There have been many studies about public healthcare expenditure based on health service coverage and private health care service and infrastructure worldwide. Even though, there are studies on households' out-of-pocket expenditure by different actors in Ethiopia, households' out of pocket expenditure is neglected in academic arena. The consequent Ethiopia's national health account surveys shows nothing more than the allocation of out of pocket spending to different inpatient and outpatient treatment. This study, therefore, will be helpful in showing which socioeconomic factors determine households' health expenditure among Addis Ababa residents who visited healthcare institution in Addis Ababa.

1.5. Scope and Limitation of the Study

This study is concentrated on the capital city of Ethiopia, Addis Ababa. Addis Ababa is selected based on prevalence of many healthcare providers, existence of pervasive income gap among urban dweller, most importantly resource and time constraint.

Private hospitals were excluded from this study with the assumption of presence of large number of employment health insurance and this is out of the scope of this study. With hospital admission data collected from Addis Ababa Health Bureau, Addis Ababa residents who were admitted in the three sample public hospitals for the month Yekatit randomly selected by systematic random sampling and interviewed. In addition, patients from outside of Addis Ababa are not part of this study because they pass through a minimum of two or three health facilities

before coming to Addis Ababa hospitals. If they pass through the same process akin to Addis Ababa patients after visiting Addis Ababa public hospitals, their necessary expenses like accommodation and meal would inflate the result.

Households' healthcare expenditure is believed to be the most difficult data to collect and compile because the question that are going to be asked are plentiful. Additionally, because it requires primary data, the data accuracy will be affected by sampling error. Non-response rate is usually high because people believe the research will not bring any alteration in their life. To triumph over these problems, the interview questions have been minimized as much as possible. Data collectors have been given a proper training on the importance, objective and significance of the study. The researcher supervised data collection and encoding closely to curtail most errors arising in this study.

1.6. Organization of the Thesis

The rest of the thesis is organized as follows: the second chapter addresses the theoretical framework and empirical literatures of healthcare expenditure. The Grossman health demand theory and Anderson's behavioral health model will be covered under theoretical framework. In addition, studies conducted by different individuals on out-of-pocket health expenditure discussed under the same chapter. Chapter three gives emphasis to econometrics model that has employed for this study. Chapter four reviews the background of health sector in Ethiopia. It mainly focuses on health sector system, plans and policies in post-1991 era.

Chapter five presents the results of the determinants of out-of-pocket healthcare expenditure as well as the discussion of the major findings. The last chapter provides concluding remarks and policy recommendation based on the findings.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews both the theoretical and empirical studies on the factors that influence households' expenditure and demand for healthcare services. The first section of the chapter presents operational definitions of terms as used in this study. Next, the theoretical models of health care seeking behavior will be discussed. The empirical section will review empirical findings on the factors which influence the demand and expenditure for health care services as found in previous studies. Papers done based on Ethiopia's case have also been included. The review of both the theoretical and empirical literature will help to identify variables and methodology to be used in modeling the determinants of households' out-of-pocket healthcare expenditure.

Grossman (1972) defines health broadly to include longevity and illness free days in a given year, which is demanded and produced by consumers. Health is currently identified as the most crucial human and economic development in the world. Countries are investing substantial amount to improve health outcome in order to attain global goals (WHO, 2013).

2.1. Definitions of Terms

- * **Health:** A state of complete physical, mental, and social well-being not merely the absence of disease or infirmity (WHO, 1948).
- * **Health Financing:** the function of health system concerned with mobilization, accumulation and allocation of money to cover the health need of the people.
- * **Out of pocket expenditure:** Out of pocket expenditure is any direct outlay by households, including gratuities and in-kind payments, to health practitioners and suppliers of pharmaceuticals, therapeutic appliances, and other goods and services whose primary intent is to contribute to the restoration or enhancement of the health status of individuals or population groups. It is a part of private health expenditure.
- * **Household:** a group of people who lives together or belongs to one another for essentials of living.

- * **Public healthcare expenditure:** expenditure made by the government by using its own finance or loans given by other countries; it's basically for non-profit motive and to satisfy basic human right.
- * **Private healthcare expenditure:** are expenditures incurred by organizations or individuals outside the public sector; it includes expenditure made by firms, non-profit organizations and medical insurance schemes, employment based insurance policies, household's out of pocket health expenditure.
- * **Catastrophic Healthcare Expenditure:** expenditures those are likely to force household members to cut their consumption of other minimum needs trigger productive asset sales or high levels of debt and lead to impoverishment.

2.2. Healthcare Behavior in Theoretical Perspective

This theoretical literature part discusses Grossman's model and Andersen's model for healthcare. Most of healthcare related papers were conducted based on Grossman's seminal paper published in 1972 until Anderson's behavioral health model comes into light. The extension of the Grossman's model will be discussed under the Andersen's model of health care demand.

2.2.1. Grossman's Demand for Health Model

Building from Becker's human capital investment model of 1965, Grossman (1972) came up with the first model of the demand for health capital, by differentiating health capital from other forms of human capital. The Grossman's model of demand for health is based on certain underlying assumptions. One of the central assumptions of the model is that individuals are producers of health. The other assumption is that individuals inherit an initial stock of health that depreciates over time at an increasing rate, at least after some stage in the life cycle. Stock of health can also be increased through acts of investment; health is seen as endogenous variable. Death occurs when health stock deteriorates below a certain point (Grossman, 1972).

In the model, the production function depends on some socio-economic variables. Education, health status and income are the most important variable that influences the efficiency of the production process. Health is demanded for two reasons namely as a consumption good as it enters directly in individual's preference function (sick days are a source of disutility) and as an

investment commodity which determine the total amount of time available for market and non-market activities. Lastly, the consumers are assumed to have full knowledge on their health production function and they have infinite planning horizon for their health investment decisions (Grossman, 1972).

Grossman (1972) defines health broadly to include longevity and illness free days in a given year which is demanded and produced by consumers. Health is a source of utility and it enters directly into the utility function. The consumer preferences represented by the following utility function:

$$U = U (H_{\tau}, \Phi_{\tau}, Z_{\tau}); \text{ where } \tau = 0, 1, 2, \dots, n \dots \dots \dots (2.1)$$

Where H_{τ} is the stock of health at age τ , Φ_{τ} is the service flow per unit stock, $h = \Phi_{\tau} H_{\tau}$ is the total consumption of health services and Z_{τ} is the consumption of other commodities. The stock of health in the initial period (H_0) is given, but the stock of health at any other age is endogenous. The length of life as a planning date (n) is also endogenous. Death occurs in period τ if the level of health in that period equals or is below the lowest level of health stock that can sustain life i.e. when $H_{\tau} \leq H_{\min}$

Therefore, the length of life is determined by the quantities of health capital that maximize utility subject to the production and resource constraints. Since an individual can control their level of health stock, the model implies that a person can choose his or her level of health stock implying that a person can choose his or her length of days. Good health is important because an individual derives satisfaction from being healthy (Grossman, 1972).

Health determines the total amount of time available for market and non-market activities as investment goods. In the model, an individual inherits an initial health stock that depreciates with age and increases with investment in health. Net investment into health equals gross investment (I_{τ}) minus depreciation as given by:

$$H_{\tau+1} - H_{\tau} = I_{\tau} - \delta_{\tau} H_{\tau} \dots \dots \dots (2.2)$$

Where, δ_{τ} is the rate of depreciation during period τ ($0 < \delta_{\tau} < 1$). The rate is assumed to be exogenous, but may vary with age of the individual.

Consumers produce gross investment in health and other commodities in the utility according to a set of household production functions (Grossman assumed that all production functions are homogenous of degree one in the goods and time inputs):

$$I_\tau = I_\tau (M_\tau, TH_\tau, E)$$

$$Z_\tau = Z_\tau (X_\tau, T_\tau, E) \dots \dots \dots (2.3)$$

Where, I_τ is gross investment which is a function of medical care (M_τ), the time input in the investment function (TH_τ) and the stock of human capital (education level) given by E . Z_τ is the consumption of other goods and is a function of X_τ which is a vector of goods input that contribute into the production of the commodity Z_τ , T_τ is time inputs for Z_τ and E which is the stock of human capital. Grossman assumed that a shift in the human capital changes the efficiency of the production process in the non-market sector of the economy (Grossman, 1972).

In the Grossman's model, medical care is treated as the most important market good in the gross investment good function. However, medical care is not only the market good as inputs such as housing, diet, cigarette smoking and alcohol consumption among others, influence one's level of health. Thus, health status can be improved by individual demands health care together with other health enhancing activities. A healthy person is able to devote more time to work and earn income. Consequently, health is an investment good. A person will continue to invest in health to continuously earn a return, good health (Grossman, 1972).

This model also assumes that an individual is faced with goods budget constraint that equates the present value of outlays on goods to the present value of earnings income over the life cycle plus initial assets (discounted property income):

$$\frac{\sum_{t=0}^n P_t M_t + V_t X_t}{(1+r)^t} = \frac{\sum_{t=0}^n W_t T W_t}{(1+r)^t} + A_0 \dots \dots \dots (2.4)$$

Where P_t and V_t are the prices of medical care (M_t) and X_t respectively, W_t is the hourly wage rate, $T W_t$ are hours of work, A_0 is initial assets and r is the market rate of interest. The consumer is faced with a time constraint requiring that the total time available in any period given by Ω , should be spent on all possible uses such that:

$$TW_t + TH_t + T_t = \Omega \dots \dots \dots (2.5)$$

Where, TH_t is the lost time from market and non-market activities due to illness or injury. A single full wealth constraint is obtained by substituting for hours (TW_t) of work from equation (5) into equation (4) as given below:

$$\frac{\sum_{t=0}^n P_t M_t + V_t X_t + W_t (TL_t + TH_t + T_t)}{(1+r)^t} = \frac{\sum_{t=0}^n W_t \Omega}{(1+r)^t} + A_o \dots \dots \dots (2.6)$$

From equation (2.6), full wealth (RHS) equals to initial assets (A_o) plus present value of the earnings an individual would obtain if he spent all his time at work. Part of this wealth is spent on market goods, another part on non-market production and the last part of it is lost due to illness.

The theoretical predictions of the Grossman’s model are based on age, education and wages. In both variants of the model, age is inversely related to health demand. This means that the demand for health decreases when people grow old because age reduces payoffs from investment in health. Older people are less efficient at turning health investment in health stock. If age increases, the marginal cost of holding an additional unit of health stock also increase. Thus, age reduces demand for health in both the consumption and investment variants. However, the model predicts that health stock decreases with age and people are expected to demand more health care as they grow up. Education in the model is positively related to demand for health stock in both variants. Increasing in education captures increasing knowledge in the production of health and it enables individuals to choose more health consumption decisions which lower the rate of health capital depreciation. If a person is more educated, that person can also be regarded as more efficient producer of health investments. The implication of education in the model is that those individuals with more number of school years are likely to effectively utilize resources to produce health and demand less health care services (Grossman, 1972; Aregawi, 2013).

Grossman’s model of health stock is very important because it gives important factors which influence demand for health and health care. As demand for health increases, the demand for health care services should also increase hence demand for health care is a derived demand. An individual may determines his optimal stock of health capital by the choice he or she makes. From this model, health care utilization is considered as choice decision by individuals who

demand and produce health. In summary, demand for health care is hypothesized in the theory to depend on age, sex, education, time variables, in addition to price and income.

2.2.2. Andersen's Behavioral Model of Healthcare Demand

Andersen and Newman (1973) model, states that the use of health care services in any given society is a complex behavioral event. This behavioral model gives an overview of relevant social determinants for seeking health care services. The theoretical framework describes the process of health care utilization as a causal interaction of three different levels which are societal, health care system (program factors) and individual determinants (Andersen et al, 1973).

The societal and system determinants are postulated to influence family determinants that in turn directly influence the use of health care services. The societal determinants include the current state of knowledge as well as people's attitude and beliefs about health and illness. The health care system in turn allocates available resources to health care institutions and forms the organizational framework to provide health care services. The system factors include structures and activities through which health care and health education are provided. The organization component of the system factors addresses how services are delivered to people who are in need. These factors include distance to the nearest health facility, access to village health workers and user fees (Andersen et al, 1973). The theoretical framework hypothesizes that the individual's decision to seek healthcare services is a function of three sets of variables namely the predisposing, enabling and need factors. These factors are explained below:

♠ Predisposing factors

The model postulates, there are certain factors that predispose people towards health care service utilization. These factors influence an individual to seek health care services. For instance, the basic demographic characteristics such as age, sex and past illness may have an influence on the demand for health care services. The social structure factors such as education, household size, occupation and race are also important predisposing factors. More so, beliefs, values and knowledge about health and medical care services can affect a decision to seek health care services (Andersen et al, 1973).

♠ Enabling factors

Enabling condition makes health service resources available to an individual. Even if an individual may be predisposed to the use of health care services, some means must be available for him or her to do so. These factors include both individual and household resources. The availability of the health care services is also an enabling factor. Attributes of the community or region in which people live such as place of residence are important since they indicate geographic proximity to the source of care as well as local attitudes about health care services (Andersen et al, 1973).

♠ Need factors

The need for a healthcare service is perhaps the most important factor that influences health care service utilization. Even with the existence of predisposing and enabling factor, the individual seeking health care services must still perceive the need for health care before seeking it. A perception of illness is necessary for the use of health care services. The need for care may be perceived by the individual and reflected in reported symptoms or disability days (Andersen et al, 1973).

2.3. Empirical Literature on Healthcare Demand and Expenditure

Health care expenditure is highly related with demand for health and utilization of health service, which is a complex behavioral phenomenon, affected by a multitude of factors including wealth, availability, accessibility, affordability, as well as other personal attitudes and socioeconomic characteristics.

I. Income

Income has a positive association with households' out of pocket healthcare expenditure in all studies and thus poor households are vulnerable for catastrophic health expenditure. Wealth status index, land possessed and consumption expenditure are mainly used as a proxy in many studies (Nahu A. (2006), Aregawi (2013), Rama P. et al (2010), Felix M. et al (2016), Obinna E. et al (2010), Ethiopia Ministry of Health (2014)). These are taken as good proxies due to the problem of seasonality of income in least developed countries.

In these studies, income and/or variables used as proxy are key positive determinant of household out-of-pocket healthcare expenditure. However, O'Donnell et al (2005) as cited in Rama P. (2010) indicated consumption expenditure can be endogenous thus using wealth index can avoid endogeneity problem. Household's who have higher income will have high health expenditure although low income households bear higher burden of health spending hence they are susceptible for catastrophic health expenditure that disrupt living standards, by either pushing households into poverty or deepening the levels of their current poverty (Njuguna K. et al, 2017; Cheng-Kun Wang, 2016; Obinna E. et al, 2010). Evidences in Ethiopia shows that the poorest spend 15% of their income on health care while wealthier groups pay only 5.7% of their income (Dibaba A et al, 2014). Empirical studies attested the positive statistically significance of income and income elasticity, for some studies, is greater than one. An out of pocket study conducted on hypertension patients in Addis Ababa by Bedane SN (2018) shows that the direct cost of hypertension was estimated at mean 290.74 birr (13.22 US dollar) per patient per month.

II. Household head characters

Sex and education variables are generally used as the major medical-risk adjustment factors. Living in a household in which the head has a secondary or tertiary education increases health expenditure (Felix M et al, 2016). Due to lack of knowledge of healthcare facilities as well as preference of self-treatment, households led by a head with no formal education spend less on healthcare than household with educated members does. Studies conducted in Bangladesh and India, on another hand, shows educated individual are more likely follows a healthy lifestyle and take care of their health well, thus they have less OOP health expenditure and likelihood of incurring catastrophic health expenditure (Rama P., 2010; Azaher Ali, 2010; Rashidul Alam et al, 2017).

Studies have observed that sex differences in reproductive biology has created difference in utilization of healthcare services, which are revealed in total OOP expenditures (Rama P., 2010; Rashidul Alam et al, 2017). Thus, households with more female members incur high health expenditure that leads them to catastrophic health expenditure. In addition, female literacy matters more for health outcomes and health expenditure. However, in most household out-of-pocket health expenditure studies, household's head Gender is a commonly is not a significant

contributor to the amount of out of pocket health care expenditure (You X et al, 2011; Masiye F et al, 2016; Idrissa Beogo, 2016).

III. Household Size

Studies that are undertaken in developing countries shows household size is the main determinant of healthcare utilization as well as expenditure. There is a negative correlation between household size and health expenditure. Households with fewer numbers of people usually were noted to have expenditure more on the health of the household compared to large household who are spending significantly less. For a large families, scarce income and high level of poverty, opportunity cost plays important role in the utilization of the meager resources such that health may take the back seat in some consideration except when it becomes life threatening.

Household size has a strong association with out-of-pocket expenditure as well as impoverishment. This suggests that people in large household size could provide support for other family members and thus lead to reduction in health service utilization (Minh et al., 2013). Households with more than five members have a probability of becoming impoverished due to out-of-pocket healthcare payment (Bolaji Samson et al, 2017).

2.4. Overview of Ethiopia's Healthcare Financing Scheme

Even though, healthcare service in Ethiopia is financed by four main sources; the major share almost equally financed by public (government and donors) and household through out of pocket expenditure. Public health care expenditure has a tremendous increase since the beginning of health care financing reform. Total spending on health has increased from USD 1.2 billion in 2007/8 to USD 1.64 billion in 2010/11, and it has reached USD 2.5 billion in 2013/14. The fifth round NHA revealed that nominal total health spending on health grew by 138% in 2010/11 compared to the total budget estimated in the fourth round of the NHA in 2007/08. Attributable to the devoted efforts made to mobilize international funding and implementation of the health care financing reform, the per capita health expenditure increased from USD 16.10 in 2007/08 to USD 21 in 2010/11, which is a five-fold growth from USD 4.07 in 1995/96. The reforms in HCF based on increasing health resources, protect the poor, and introduce equitable financing mechanisms. These reforms are now being implemented in the majority of the regions that have

more than 80% of health facility coverage. However, the increment is short of HSDP IV target of increasing the total health budget from 16.1 USD/Capita to 32.2 USD per capita (FMoH, 2014; FMoH, 2017; HSTP, 2015).

Table 1: Total Health Expenditure by Source of Financing, 2004/05-2013/14

Source of Financing	NHA III (2004/05)	NHA IV (2007/08)	NHA V (2010/11)	NHA VI (2013/14)
Government including parastatals	1,376,331,696	2,476,381,390	4,126,681,043	14,718,750,380
Households	1,382,770,265	4,125,367,110	8,926,754,560	16,491,438,560
Rest of the world	1,661,413,034	4,364,465,742	13,193,919,360	17,633,708,800
All others	87,228,590	156,807,872	217,511,290	729,771,260
National Health Expenditure	4,507,743,585	11,123,022,114	26,464,866,253	49,573,669,000

Source: FMoH, 2017

2.4.1. The Healthcare financing reform in Ethiopia

Ethiopia was recovering from civil war in 1991, the health infrastructure was severely affected and deteriorated, as well as health service delivery was inefficient and of poor quality due to shortage of electric and water utilities, shortage of medical supplies and absence of a functional governance structure. The country's budget was limited thus; inadequate finance was allocated for health sector. In addition, health institutions were required to channel income to the central treasury and received operational funding in the form of a government budget. Therefore, despite a tradition of payment for health services, many health institutions faced a shortfall in budget. With the aim of advancing allocation and availability of financing, the government of Ethiopia launched a pro-poor health policy and escalated on health care financing reform in 1998 (WHO, 2012; USAID, 2011; FMoH, 2015).

This health care financing reform strategy focuses on financing health care through multiple channels to guarantee sustainability, stress upon the importance of promoting cost-sharing mechanism in provision of health services. These health care financing reforms aim to improve the availability of financing and use of available resources efficiently to boost equitable and quality health care services. These reforms included different interventions:

- **Revenue retention and utilization at health facility level:** service fees are preserved by the health facilities to institute quality improvements and eliminate drug shortages.
- **systematize a fee-waiver system:** households who cannot manage to pay for health services are recorded to receive the services for free
- **Standardizing exemption services:** Basic standardized package is applied for the entire population, as well as for user fees to make it more transparent
- **Outsourcing of nonclinical services in public hospitals:** some public hospitals outsource certain services
- **Setting and revising user fees:** public user fee rate has been set standard and revised regularly
- **Initiating health insurance schemes:** introduction and financing of two type of health insurance system by the government i.e. Community Based Health Insurance for agricultural and informal sector, and Social Health Insurance (CBHI) for formal sector.
- **Establishing private wings in public hospitals:** most public specialized and referral hospitals established private wings for patients who are willing to pay for higher standard of services at premium over the public user fee rates
- **Establishing health facility autonomy through the introduction of a governance system:** facilities are governed by boards and bodies; oversee annual planning, budget allocation and review of expenditure reports (USAID, 2011).

Figure 1: Pictorial Description of Health Financing System



Source: Jonathan G. (2000)

2.4.1.1. The Impact of Health Financing Reforms on Health Service Delivery

One of the biggest impact of healthcare financing reform is allowing health facilities to retain and use their revenue for health service quality improvements. This initiative was started in 2005/06 in the three biggest regions hospitals and health centers. Currently, this health revenue retention program is being implemented in all regions as Ethiopia's national program. Health facility budget improved significantly due to the revenue retention initiative (USAID, 2010; USAID, 2015).

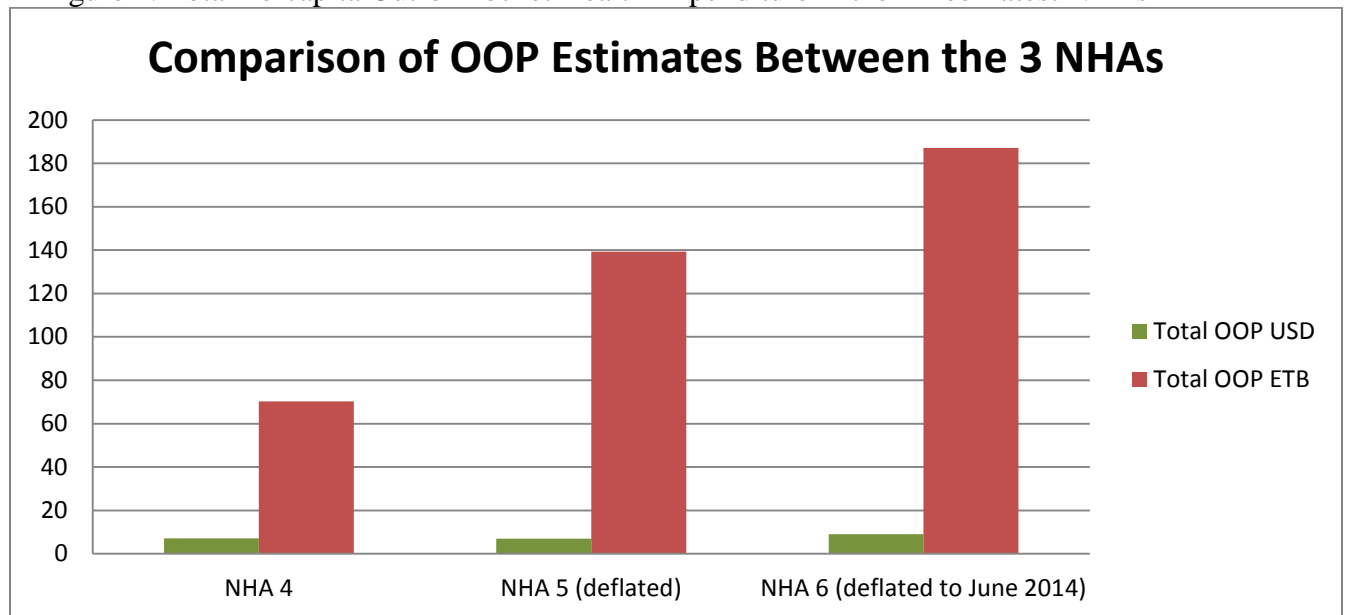
The increase in revenue at the health facility level has enhanced the quality and availability of services through greater availability of essential medicine, increasing health facility infrastructure as well as facilities and increasing health service delivery equipments (USAID, 2010).

These improvements in quality of health care has improved citizens' insight for health services, performance of health professionals, and increased the general performance of the health system. The implementation of fee waiver system for unprivileged populations protects them from catastrophic healthcare expenditure and promotes equity within the system. Furthermore, reduction in disease burden, improved health facility governance, increased outsourcing of nonclinical services in public hospitals, improved capacity in financial management, and increased utilization of health care through the piloting of health insurance schemes can be considered as other key success of the reform (USAID, 2015).

2.4.2. Household's Healthcare Expenditure

Households contribute in three major ways for health financing in Ethiopia: out of pocket expenditure, community contributions to support the health sector, and premium payments for health insurance schemes (FMoH, 2017).

Figure 2: Total Percapita Out-of-Pocket Health Expenditure in the Three Latest NHAs



Source: FMoH, 2017

In the NHA V, the greater portion of households who got outpatient and inpatient health care services paid the entire user fee out of pocket. Particularly, 58.99% and 87.99% of individuals who sought outpatient and inpatient health care services, respectively, paid for healthcare service out of pocket (FMoH, 2014).

Means of payment is another important part in discussing household's out-of-pocket healthcare expenditure. Generally, household uses two means of financing out-of-pocket healthcare expenditure. One is own finance and the other is borrowing. About 55% of the total out of pocket spending on health was financed through the household's own cash, while another 6% was financed through selling household asset. The other major source of financing was assistance from friends and family members, serving as the source for 35% of total out of pocket spending. Borrowing money sourced the remaining 4% of OOP expenditure. This is somehow similar with NHA V in which, 95.31%, 58.58% and 59.85% of outpatient visitors, respectively, used their savings, support from relatives and friends, and borrowing. The proportion of patients who used these funding sources varies among their wealth and the rich use each of the above-mentioned options than the poor (FMoH, 2014; FMoH, 2017).

2.5. Summary and Conclusion on Literature Review

The two main theoretical models discussed in the first part give a good theoretical foundation for healthcare seeking behavior and health expenditure pattern especially for least developed countries. They raised important variables that explain healthcare seeking behavior; however, Grossman (1972) model mainly lays its bases on individual decision rather than household. Household characteristics and collective resources highly influences demand for healthcare behavior more than individual decision. In addition, in Lower and Middle Income Countries (LMICs), the decision of one family member to visit healthcare facilities is not individual's sole decision but head of household has important role in decision-making.

From empirical literature discussed in 2.3, there is evidence to suggest that the health demand and expenditure is mainly influenced by socio-economic and demographic factors such as income, sex, education, household size. Most studies revealed the importance of income as positive predictor of out-of-pocket healthcare expenditure. However, the effect of household's head gender and educational status is controversial in most studies conducted in LMICs. It needs further investigation as it has insignificant association in most LMICs.

Despite evidence from other LMICs on determinants of out-of-pocket healthcare expenditure, there is little evidence in the context of Ethiopia. Household's out-of-pocket study is important for health financing policy. Thus, guided by these empirical literatures, this study seeks to investigate what determines household's out-of-pocket healthcare expenditure in hospital setting.

CHAPTER THREE: METHODOLOGY AND DATA

3.1. Study Area

Ethiopia is one of the fast growing African countries found in eastern part of the continent with more than 104 million inhabitants. The country used to be characterized by high diseases burden and low life expectancy before the end of MDG period (Alemayehu Geda et al, 2009). Even though the 2007 census indicates that Addis Ababa has 2.74 million residents, sources like UN Habitat, 2016 and World Bank, 2015 indicate the city's rapid expansion might lead the population to be double than this figure. The huge fancy buildings, residential areas, and the slum and shanty house are the two sides of the city, which shows a higher income disparity. Addis Ababa is sub divided into 10 sub-cities; and people in this city work both formal and informal job. Even though, the city has the highest unemployment rate of 23.5% in 2014, the informal sector employs 30% of the population (World Bank, 2015).

All sub-cities have at least one public primary healthcare centre and numerous private health facilities. In total, there are six public hospitals administered under Addis Ababa Health Bureau, four federal hospitals and 86 public health centers with few specialist doctors and assistants are providing healthcare service (Bedane SN, 2018). There are also two public and four private teaching hospitals in the city. Enormous private health care providers (including traditional medicine practitioners) are concentrated in Addis Ababa with unregulated price charging mechanism.

Table 2: Average Outpatient and Inpatient admission in Addis Ababa Public Hospitals

Organizational Unit	Average Outpatient visit (Meskerem-Tir. 2011)	Average Inpatient admission (Meskerem-Tir. 2011)
Alert Specialized Hospital	Not specified	733
Amanuel Referral Hospital	10068	175
Dagmawi Menilik Referral Hospital	15000	1195
Gandhi Memorial Hospital	4735	417
Ras Desta Damtew Memorial Hospital	5830	490
St. Peter TB Specialized Hospital	9378	671
Tikur Anbessa Specialized Hospital	20557*	1756
Tirunesh Beijing Hospital	4887	458
Yekatit 12 Medical College Hospital	12674	1077
Zewditu Memorial Hospital	847	2811

Source: Addis Ababa Health Bureau- HMIS data; *TASH OPD Unit

To select sample hospitals, random numbers were assigned to all the ten hospitals and three were chosen randomly. Thus, 384 samples have been drawn from Tikur Anbessa Specialized Hospital, Yekatit 12 Hospital and Medical College and Dagnawi Menilik Referral Hospital.

3.2. Sample Size Determination

Single population proportion formula has used to determine the number of hospital visiting individuals included in this study, where the proportion and standard deviation of out of pocket health expenditure not available. Thus, minimum sample size was made by using the assumption of, since health insurance coverage is very low, at least 50% of hospital visiting individual pay out-of-pocket payment directly or indirectly (Bedane SN, 2018; Tibebe A., et al, 2012), with a marginal error of 5% and 95% confidence interval.

$$N = \frac{(Z_{\alpha/2})^2 Pq}{d^2}$$

N = the desired sample size

Z = the standard deviation at the required confidence level

P = the proportion in the target population estimated to have characteristics being measured

q = 1-p

d = the level of statistical significance set

$$\text{Thus, } N = \frac{1.96^2 \cdot 0.5 \cdot 0.5}{0.05^2} = 384.16$$

Thus, the sample size is 384.

The inclusion criteria was any randomly selected patient living in Addis Ababa from patient chart who visited the three hospitals during the month of Yekatit and who was willing to participate (with signing a written consent form) in the study was included. Whereas, patients who came from outside of Addis Ababa were excluded as they would have high out-of-pocket expenditure and would overestimate the result.

Table 3: Number of Participants

S.N	Study Area	Average Admission/visit		Sample Size
		OPD	Inpatient	
1	Tikur Anbessa Specialized Hospital	20557	1756	164
2	Yekatit 12 Medical College Hospital	12674	1077	101
3	Dagmawi Menilik Referral Hospital	15000	1195	119
Total		48231	4028	384
NB: the data is obtained from Addis Ababa City Administration Health Bureau and Tikur Anbessa Specialized Hospital				

3.3. Data Collection Procedure and Quality Assurance

The data collection tool (questionnaire) was developed based on WHO's standard national health account (NHA) questions consulting with Ethiopia's NHA questions that goes in line with the objective the study wants to achieve after reviewing relevant literature. The questionnaire was primarily prepared in English and translated to Amharic and then back to English to check its consistency. A face-to-face interview was conducted with patients who are Addis Ababa residents. In total, 10 data collectors (enumerators) who are a fourth year medical school students who had previous experience in similar projects have been used to collect the data. Half-day training was given to the enumerators for two days on the purpose, procedures and data collection tools to ensure the quality of the data.

The questionnaire has been pre-tested in St. Peter TB Specialized Hospital on 13% of the sample size to check and improve its clarity. Participants who were involved in the pretest were outpatient department (OPD) visitors who do not have any follow up in other public hospitals. Finally, the data collection was carried out under the close supervision of the researcher. Data completeness was checked after every interview.

3.4. Ethical Consideration

This research has ethically approved by Addis Ababa Public Health Research and Emergency Management Core Process- Ethical Review Committee and Tikur Anbessa Specialized Hospital-IRB. Additionally, participant involved in this study were fully informed about the nature of the

study, the research objectives and confidentiality of the data. An informed consent form written in Amharic has been used to ask the Addis Ababa resident patients or his/her close family member who has knowledge about the family's finance and health status to participate in the study.

3.5. Econometrics Model Specification

The purpose of this study is to model the out-of-pocket expenditure for healthcare utilization in hospital setting. Based on the objectives the study aims to analyze, robust regression method employed.

Robust regression model is employed due to robust regression residuals are much better than OLS residuals for diagnosing outliers because the OLS regression tries to produce normal-looking residuals even when the data themselves are not normal. Since different individual (household) pays different amount of out-of-pocket expenditure and receives different amount of income, some outliers have been observed.

By using the chapter two Grossman and Anderson model, this part uses Deaton and Muellbauer's (1980) Almost Ideal Demand System (AIDS) model to derive the expenditure equation. This model specifies out-of-pocket healthcare expenditure as a function of prices and other factors and gives the share equations in an n-good system as

$$e(p, u) = a(p) + b(p)u \dots \dots \dots (3.5.1)$$

Where, u is utility and a(p) and b(p) are expenditure costs on survival and pleasure respectively defined as:

$$a(p) = \alpha_o + \sum_{i=1}^N a_i \ln(p_i) + \left(\frac{1}{2}\right) \sum_{i=1}^N \sum_{j=1}^N \gamma^* \ln P_i \ln P_j \dots \dots \dots (3.5.2)$$

$$b(p) = \beta_o \prod P_i^{\beta_i} \dots \dots \dots (3.5.3)$$

Where, the ith commodity price is denoted by P_i and γ* is the parameter on the natural logarithm of the ith commodity price and the natural logarithm of the jth commodity price. Applying

Shepard's lemma to the expenditure function, out-of-pocket healthcare expenditure on health function is

$$OOPHE = \alpha_i + \sum_{j=1}^N \gamma_{ij} \ln P_i + \beta_i \ln \left(\frac{Y^*}{P} \right) + X_i + U_i \dots \dots \dots (3.5.4)$$

Where, γ_{ij} is the parameter on the logarithm of the j^{th} commodity price, β_i is the parameter on the logarithm of total income divided by price, X_i is other variables that influences OOPHE and U_i is an error term.

Since price is unknown for this case, we can take one, thus the first equation on the left hand side becomes zero. Rearranging and reshuffling 3.5.4 gives:

$$OOPHE = \alpha_i + \beta_i \ln Y + X_i + U_i \dots \dots \dots (3.5.5)$$

Based on previous studies, AIDS model and literatures, out-of-pocket expenditure is specified as follows:

$$OOPHE = f(\{INCOME, HHSIZE, FAS, SEX, EDU, CHRONIC_DISEASE, INPATIENT\})$$

3.6. Data Analysis

Based on the objectives the study aims to analyze, the study employs ordinary least square (OLS) method to estimate out of pocket healthcare expenditure. Due to the problem of variation in healthcare payment, large numbers of outliers are expected to happen thus outlier robust regression method is employed to curtail problems. Fundamentally, any healthcare expenses covered by insurance companies are out of the scope of this study. All analysis is going to be carried out in STATA version 13.1.

3.7. Variable Specification

The variables used in the analysis are explained below. These variables are chosen based on available literature. In order to make the estimation of the model more clear and make it easier for the reader to understand, the variables used are discussed below:

Dependent Variable: logarithm of annual out-of-pocket healthcare expenditure. This is the sum of monthly medical service fee, monthly medicine cost, OPD visit payment (excluding monthly payments), inpatient admission payments, transportation cost and abroad medication fee (including accommodation, meal and transportation).

Independent variables: Based on literature review and past studies, the following factors are expected to influence out-of-pocket healthcare expenditure.

- i. **Income:** logarithm of household's annual income. This is the sum of monthly income (salary) including pension, income from Share dividend, income from renting house/car, and remittance.
- ii. **Family Age Structure (FAS):** it's one of the independent variables assumed to affect the out of pocket healthcare expenditure. Families with under5 children and elderly member are expected to incur additional costs. The dummy specification code is household who has at least one above 60 member as "0" (reference variable), household who have at least one under five years old member along with above 60 years old member specified as "1". Household who doesn't have under five and above 60 member coded as "2" and household who has at least one member who is under five coded as "3".
- iii. **Sex:** Refers to the sex of the household head. Women headed households are more vulnerable to health problems. For the purpose of this study, dummy specification is adopted coding female household heads as "0" (reference group) and male household heads as "1".
- iv. **Education:** this is specified as a dummy variable. It is classified as "0" if the head has bachelors degree and above (reference group), "1" if the head has a collage diploma. Primary education, secondary education, TVET, uneducated coded as "2", "3", "4" and "5" respectively.
- v. **Chronic disease:** this variable is specified as dummy variable where "0" is if respondent specifies there is no family member with a chronic disease (reference group). "1" is if the respondent has at least one member who has chronic disease.
- vi. **Inpatient:** refers to if one of the family member has been admitted to the hospital between Jan.2018-Jan.2019. The dummy variable specification is "0" for HH who

doesn't have hospitalized member (reference group) and "1" for HH who have at least one member who was admitted in hospital for period Jan.2018-Jan.2019.

- vii. **Household size:** continuous variable specifying the number of people living in the household.

Table 4: Variable Specification Table

Description of Variables			
Variable		Definition	Measurement
Dependent Variable			
	Out-of-pocket healthcare expenditure (oophe)	Healthcare expenditure directly made by the family from January 2018 to January 2019	In birr
Explanatory Variables			
1	Total Family's income (Tinc)	Total yearly earning of a family from all sources	In birr
2	Sex of a household head (sex)	0= female 1= male	Dummy variable
3	Inpatient Admission	0= no inpatient admission within a year 1= inpatient admission within a year	Dummy variable
4	Chronic diseases	0= no chronic disease in HH 1= presence of chronic disease in HH	Dummy variable
5	Education attainment of household head (edu)	0= bachelor and above 1=diploma 2=primary education 3=secondary education 4=TVET 5=uneducated	Categorical variable
6	Household size (hhsiz)	Number of people living under one roof	In number
7	Family Age Structure (FAS)	0= no child and at least one elderly 1= at least one child and one elderly 2= at least one child and no elderly 3= no child and no elderly	Categorical variable

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1. Descriptive Statistics

This section presents the descriptive statistics of the major household characteristics and the health status of household members including the head of the household's gender, marital status, level of education, employment status as well as age distribution of the family. In the same manner, it also discusses the health status of the sample households.

Table 5: Summary Statistics of Social and Demographic Variables

Variables		Frequency	Percentage
Household Head Gender	Female	139	36.2
	Male	245	63.8
	Total		100
Family Age Structure	HH with under-five children	68	17.7
	HH with members above 60	90	23.4
	HH with both Under-five and elderly	43	11.2
	HH with no elderly and under-five children	183	47.7
	Total		100
Household Head's Marital Status	Single	26	6.7
	Married	279	72.6
	Divorced	25	6.6
	Widowed	54	14.1
	Total		100
Household Head Occupation	Public Organization employee	92	24
	Private Company employee	125	32.5
	Retired	45	11.7
	Owner of business Co.	62	16.2
	Not working	60	15.6
	Total		100
Household head Educational Status	Uneducated	61	15.9
	Primary Education	78	20.3
	Secondary Education	76	19.8
	TVET (Technical Education)	29	7.5
	Diploma	48	12.5
	Degree and above	92	24
	Total		100

The gender distribution of the study population indicated that out of the total 384 sample respondents, 63.8% of households are headed by males and 34.2% were headed by females. Even though this figure is high for low and middle-income countries where male are the head of the household, it is compatible with the latest EDHS result where female heads 38.4% of the household in urban areas (EDHS, 2016).

Rather than using household head's age, this study uses family age structure since the later can clearly show behavioral pattern of household's health service utilization. Four household age structure have been used for this study. These are households with age structure of 6-59 (households with neither under-5 children nor elderly), households who have at least one under-five child, households who at least have one above 60 years old in the house, and households who has under-five member along with at least one member above 60 years. Similar age structure has been used in Molla et al, 2017 study. In this regards, households with neither under-five children nor member above 60 years account 47.7%, households with both under 5 children and above 60 years account 11.2%. About 17.7% of the household have at least one under-five child and 23.4% of the households have at least one person who is above 60 years old.

Regarding household head's marital status, the majority of the respondents stated that, they are married 279 (72.6%), followed by those who are widowed; accounting 14.1% of the households. Single and divorced households took the remaining share of 6.7% and 6.6%, respectively. In most household researches and survey, married took highest share (Bedane SN, 2018; FMoH, 2017; FMoH, 2014).

As it is shown in table 5.1, 32.5% of the respondents were identified to be employed in private sector enterprises, whereas 23.7% work in government organizations. Around 16.4% of the sample own small businesses like kiosk, shops and groceries, 15.9% are not currently working and 11.5% are retired.

The study also showed the household head's highest educational attainment. About 24% of the household heads have completed bachelor degree and above followed by those who completed primary education, which are 20.3%. Those who have completed secondary education are 19.8% of the sample followed by the uneducated, diploma and TVET holders with 15.9%, 12.5% and

7.5%, respectively. This result suggests that the literacy rate is higher than the demography and health survey.

Figure 3: Distribution of mean annual OOPHE among educational group over HH head gender

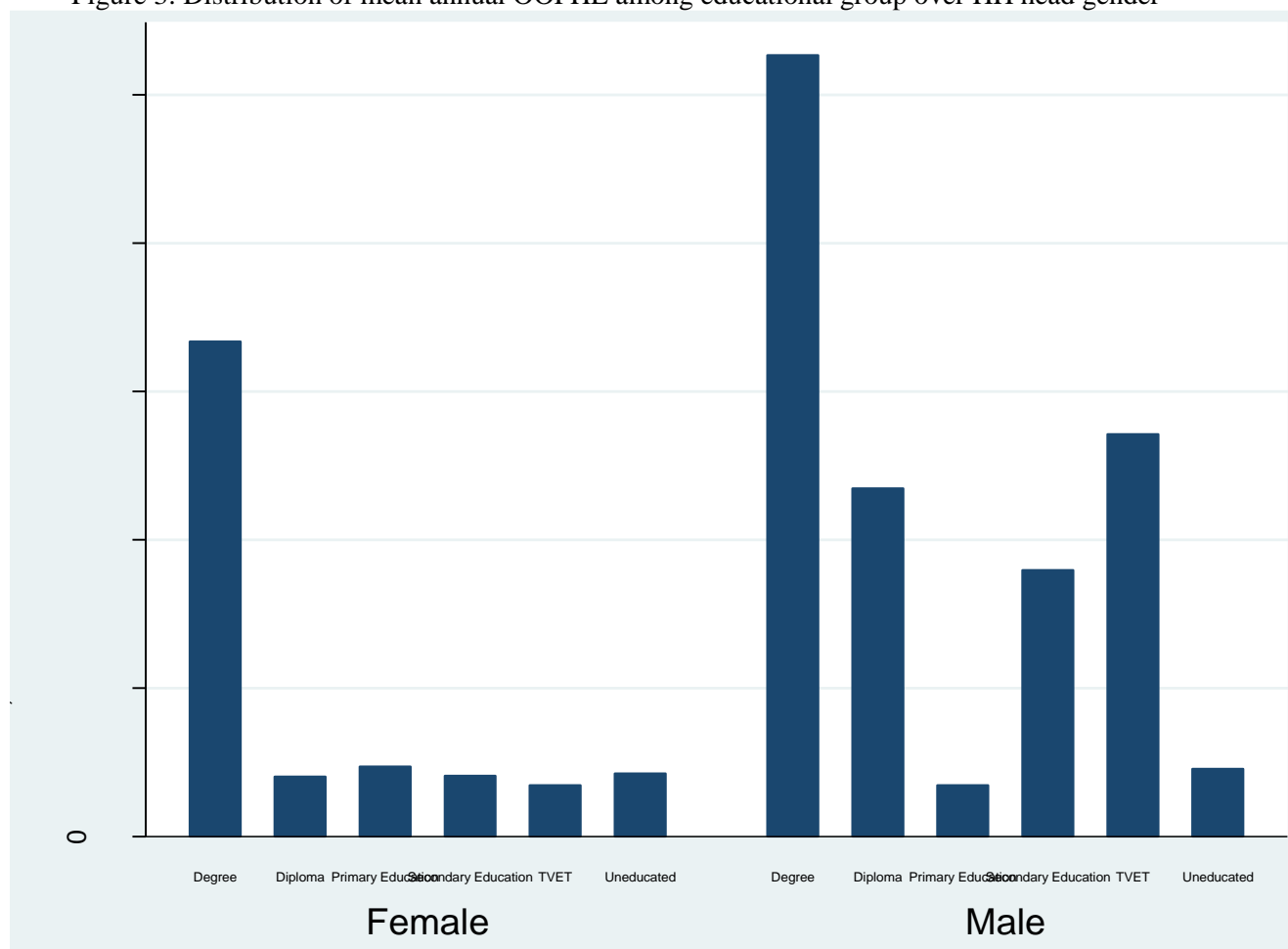


Figure 3 shows the distribution of annual out of pocket healthcare expenditure among different educational group over household head sex. As it can be seen on the graph, there is a wide difference on mean annual out of pocket healthcare expenditure between female and male headed households where male headed households spend more on health than their female counterpart.

When it comes to educational status, female headed households spend comparatively the same among different educational groups except households led by bachelor's degree and above holder. Even though female headed household who have bachelor's degree spend much higher amount on health, it is smaller than their male counterpart. Male headed household who have

bachelor's degree and above spend on average an out-of-pocket amount of 10,000 birr on health compare to their female counterpart.

For male headed households, out-of-pocket health expenditure increases with an increment in educational level. Bachelor's degree and above holder spend high amount of out-of-pocket health expenditure followed by household led by TVET complete, diploma holder, secondary education, primary education and uneducated respectively.

Table 6: Summary Statistics of Household Members Health Status

Health Status			
Chronic Disease	Member/s of HH affected by chronic disease	191	49.7
	No member is affected by chronic disease in HH	193	50.3
	Total		100
Constant Care	Seek constant care in HH	257	67
	No member seeking a constant care	127	33
	Total		100
Regular Medicine	Member of HH taking medicine regularly	213	55.5
	Member of HH not taking a regular medicine	171	44.5
	Total		100
Drug Availability	the prescribed medicine is available in public pharmacies	79	37.1
	the prescribed medicine is not available in public pharmacies	134	62.9
	Total		100
Inpatient care	Inpatient admission of HH member within a year	185	48.2
	No inpatient admission in the HH within a year	199	51.8
	Total		100
Abroad Medication	Member/s of HH who went abroad for treatment	13	3.4
	No abroad travel for treatment	371	96.6
	Total		100

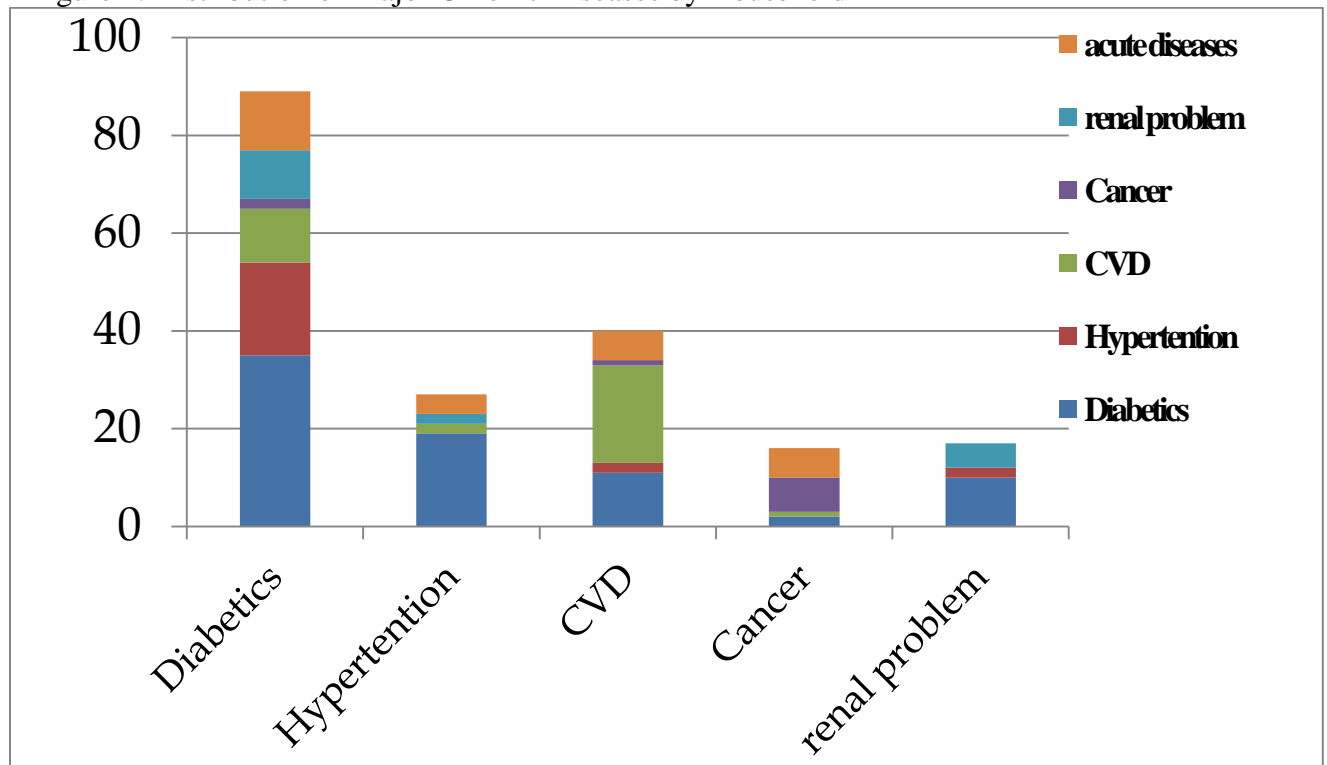
With respect to health status, 49.7% of the hospital visitors and their households have at least one member with chronic disease like diabetics, cardiac and related problem, cancer and so on. About 67% of the hospital visitors seek constant care related with old age, chronic disease, disability, injury, or any other problems. Among the 384 hospital visitors and their households included in the study, 213 took a prescribed medicine regularly and 62.9% of whom do not get the prescribed drug in public hospital pharmacies as well as in other public pharmacies. Thus, they are forced to incur additional healthcare cost by purchasing them from private suppliers. As most of quality as well as old age treatments are not available in the country, 3.4% of the household member/s went abroad for medical treatment in the period January 2018 to January 2019.

Table 7: Number of Member within Households with Chronic Diseases

Number of Member of Household with Chronic Diseases	frequency	Percentage
0 member	193	50.3
1 member	88	23
2 members	94	24.4
3 or more members	9	2.3
Total	384	100

Table 9 describes the number of member of household with chronic diseases. Among the respondents, one hundred ninety three of them reported that they do not have a household member that is affected by chronic disease. Approximately 23% reported that they have one member affected with at least one chronic disease and 24.4% of the respondents stated they have two members with chronic disease and nine respondents declared they have three or more household members with chronic disease.

Figure 4: Distribution of Major Chronic Diseases by Household



Regarding chronic diseases, five non-communicable chronic diseases are commonly reported. These are diabetics, hypertension, cancer, cardio-vascular disease and kidney failure. Diabetics has the highest share followed by cardio-vascular disease, hypertension, kidney failure and cancer respectively. This result is slightly the same with NHA VI as the commonly reported chronic NCDs are diabetics, cancer, kidney diseases and mental disorder in the recent National Health Account. In addition, this latest National Health account shows 23% total out-of-pocket health expenditure goes to NCDs (FMoH, 2017).

Out of the 89 households who have at least one member with diabetics, 39.3% of them are diabetic patients only, 21.35% have diabetics and hypertension, 12.4% of them have diabetics along with cardio-vascular disease; 11.2% of diabetic patients have renal related problem some of whom are taking dialysis, cancer and diabetic patients account 2.2% of the total diabetic patients. 13.5% of diabetic patient have acute diseases.

Among the 384 respondent, 40 reported at least one member of the household has cardio-vascular disease; out of which 50% have only cardiac problem. 27.5%, 5%, 2.5% and 15% of

CVD patients have diabetics, hypertension, cancer, and acute diseases, respectively. Additionally, twenty-nine households reported that at least one member of the household has hypertension problem among whom 19, 2, 2, 2 and 4 have hypertension and diabetic, hypertension and CVD, hypertension and renal problem, hypertension and HIV/AIDS and hypertension and other acute disease respectively.

Households reported that they have at least one member with kidney (renal problem) are 17 with renal disease accounting 29.4% of the kidney related diseases. Households with kidney disease and diabetics and household members who have kidney and hypertension problem account 58.8% and 11.8%, respectively. Among the 16 households who have reported at least one member has cancer, 43.8%, 12.5%, 6.2% and 37.5% have cancer only, cancer and diabetics, cancer and CVD and cancer along with acute diseases, respectively.

Table 8: Summary Statistics of Continuous Variables

Variable	Obs	Mean	Standard Deviation	Min	Max
Annual OOPHE	384	9576.4	39741.9	112	374680
Annual Household Income	384	64582.5	28774.2	7200	190000
Household Size	384	4.79	2.04	1	12
Hospital Visit per Annum	384	5.3	2.3	1	25
Annual Food Expenditure	384	31863.8	13315.1	2880	78000
Annual Non-food Expenditure	384	31336.5	19772.8	1260	109500

As can be read from table 10, the reported statistics indicate that annual out-of-pocket healthcare expenditure among public hospital visiting Addis Ababa residents and their household members ranges from 112 birr to 374680 birr with mean annual expenditure of 9576.4birr per annum. The figure is elevated due to thirteen patients and their household members who had traveled abroad for medication during the period from January 2018 to January 2019, in addition, it also takes into account any health expenditure paid to private health facilities. This figure is less than the result from a hospital-based study in Kenya by Nicholas et al (2015) and a cohort study by Mieraf T. et al (2017) in Addis Ababa hospitals.

Table 10 also indicates that the total annual mean income was 64582.5birr. Of this annual mean income, annual food expenditure took the lion share, around 49.3% and annual non-food expenditure 48.5%. According to Bedane SN (2018) hospital based study, food expenditure accounts only 12.85% of total household expenditure. Furthermore, the six round Ethiopian

National Health Account survey attested A.A resident households spend 39.8% of their annual income to food expenditure and 42.2% to non-food consumption expenditure (FMoH, 2017). On the other hand, the high standard deviation of the mean annual income and expenditures shows the prevalence of income and spending inequality among hospital visiting households in Addis Ababa.

Household size ranges from a single person in the house to twelve people in the household with an average of 4.79 people per household; this is compatible with the recent NHA as well as EDHS. The mean annual health center (Public, Private and traditional healer) visit for those Addis Ababa residents was around five times.

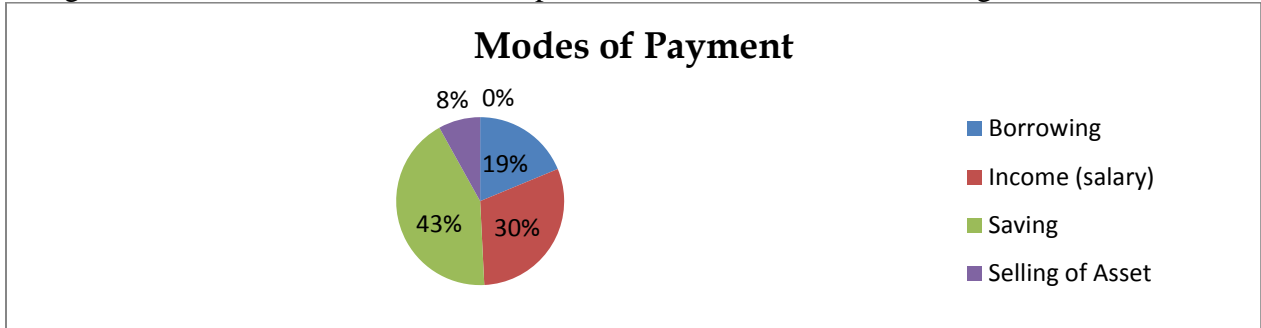
Table 9: Distribution of Out-of-Pocket Healthcare Expenditure

Distribution of OOPHE	Mean Spending (in Birr)	Percentage (%)
Drug/Medicine	4,022.1	42
laboratory and diagnostics	3208.1	33.5
Surgical/Inpatient admission	1656.7	17.3
Transportation (including accommodation for abroad medication)	670.35	7
Patient Chart (card)	19.15	0.2
Total	9576.4	100

Out of the 9576.4birr average annual out-of-pocket healthcare expenditure, 4022.1 birr or 42% was for medicine/drugs. This takes the highest share, as most of the drugs are not available in pharmacies located inside public hospitals as well as in other public pharmacies. When this is the case, households are forced to incur additional expense by purchasing those drugs from private pharmacies whose prices are often higher than those at public pharmacies. In addition, as the country does not have adequate drug factories, most of the medicines are imported and there are times where excess demand (shortage) is experienced. NHA VI attested this fact as drug and medicine supplies constitute 45% of out of pocket expenditure (FMoH, 2017). Laboratory and diagnostic test expenditure accounts about 33.5% of the average annual out-of-pocket healthcare expenditure. For most of the public hospital visitors in Addis Ababa, most laboratory and diagnostics tests are not available in the public hospitals. Thus, they are forced to go to private diagnostic centers or clinic/hospitals for tests prescribed by the physician. Payment for transportation and patient chart took 7% and 0.2% of the out-of-pocket expenditure.

Healthcare Expenditure Financing Mechanism

Figure 5: Out-of-Pocket Healthcare Expenditure and Household Financing Mechanisms

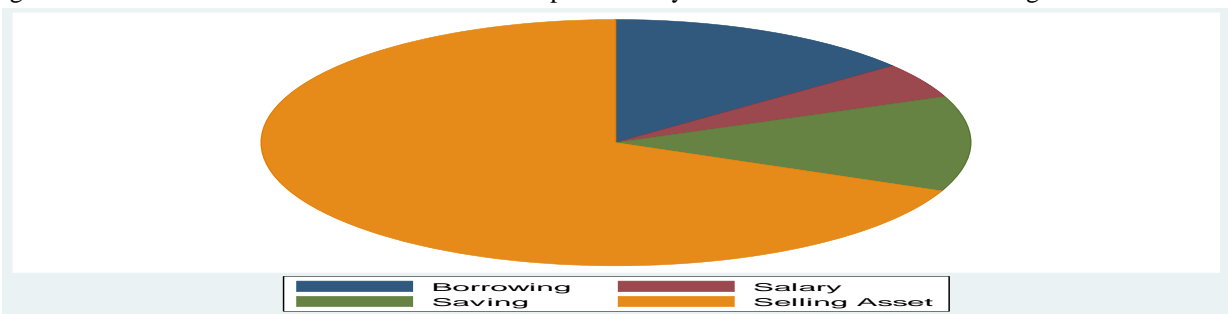


Households use different mechanism to finance their medical expense. According to the WHO report, globally, 100 million people drive to poverty annually because they made a direct out of pocket payment to purchase a good health. Moreover, 150 million people made a catastrophic expenditure thus; they are forced to cut their basic needs to finance their medical expense (WHO, 2014).

The most common mechanisms to purchase a good health include own saving, monthly income (salary), borrowing, selling assets, different types of health insurances and so on. Thus, figure 5 shows the most frequently used modes of payment is income (salary) and saving where as borrowing and saving is not being uses regularly.

However, figure 6 shows the amount paid through out-of-pocket by using this financing mechanism. As it can be seen from the figure, salary and saving are being used to make small payments. Out of the total out-of-pocket healthcare payment made by the respondents and their households, majority of the out-of-pocket healthcare expenditure is financed by using selling of asset followed by borrowing and saving.

Figure 6: Total Annual Out-of-Pocket Healthcare Expenditure by Sources of Household Financing Mechanisms



4.2. Econometrics Results and Discussion

In the previous sub-section, attempt has been made to describe the hospital visitors in Addis Ababa and their household socioeconomic and demographic background. This sub-section presents the econometric results of the determinants of out-of-pocket expenditure of hospital visiting individuals and their households in Addis Ababa. In this regards, the outlier robust regression method of estimation is used to estimate the parameters of the model. This model is preferred because of the difference in the coefficient with the OLS estimates.

Table 10: Econometrics Estimation Result

VARIABLES	(1) Annual OOPHE (log)
Annual income (log)	0.810*** (0.0939)
Family Age Structure	
both under5 and above60	0.422*** (0.152)
no under5 and above60	-0.194* (0.111)
under5	-0.223 (0.135)
Sex	
Male	0.0342 (0.0897)
Education	
Uneducated	-0.103 (0.148)
Primary Education	-0.295** (0.137)
Secondary Education	-0.107 (0.133)
TVET	-0.0242 (0.175)
Diploma	-0.172 (0.149)
Chronic disease	
Chronic disease	0.619*** (0.0900)
inpatient	0.318*** (0.0874)
Household size	-0.0760*** (0.0213)
Constant	-1.403

	(1.071)
Observations	384
F(13, 370)	25.65
Prob > F	0.0000
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	

The result of the estimation shows that logarithm of total income of household, household size, households who have at least one under-five years old child and above 60 years old member, household led by a person who completed primary education, and households with members with chronic disease and households who have hospitalized members are statistically significant.

Keeping other factors constant, when a household's total income increases by 1 percent household's out-of-pocket healthcare expenditure increases by 0.81 percent. This shows income elasticity is less than one thus health is a necessary expenditure. This result is the same as research done in Afghanistan (Steinhardt et al, 2009 and Okunade et al, 2010) as well as You Xuedan et al, (2011) study in China. Higher income elasticity is expected in LMICs as the government investment in health is very low and health insurance is not well developed. It's reasonable to expect that in Ethiopia where the government financial input to healthcare is low and health insurance scheme is underdeveloped compared to other low income countries, the household decision of how much care to use and how much money to spend on healthcare depends mainly on their budget constraint. In some cases, ability to pay is a less important factor that determines health expenditure when the illness is severe. In world's wealthiest countries, households pay a very few out of pocket healthcare expenditure directly because the government invest highly on the health sector as well as there are different insurance options and mechanism are available based on the society's need (You Xuedan et al, 2011).

Ceteris paribus, households with under-five children and above 60 years members spend 42% more than households who have only above 60 years old member. Age structure has a significant impact on healthcare expenditure. A study by Molla et al, 2017 and You X. et al, 2011 indicates a person whose age is above 60 years old is mostly susceptible for non-communicable chronic illnesses. On the other hand, under-five children are mostly vulnerable for communicable diseases and their visit to health facilities is frequent. In this study, households that have at least

one under-five children and members above 60 years incur higher healthcare expense compare to households who have at least have one member that is above 60 years old. This result is compatible with the research in Bangladesh by Molla et al, 2017 and study in India by Rama P., (2010). In Ethiopia, there is no national health financing guideline to protect household that has senior citizens as well as under-five children from financial vulnerability. Moreover, households who have at least one under-five years old member spend 22% less than households with at least one above 60 member this is due to most under-five children are susceptible to communicable infections that can be cured within some specific time. Whereas people who are above 60 are prone to chronic NCDs and age related diseases which cannot be cured once they are caught but treatable with different therapies and medicines. This has huge cost and can lead this group of people to financial vulnerability.

In the education section, only primary education is significant at 5%. Keeping other factors constant, households who are headed by persons who have completed primary education have 29.4% less out of pocket expenditure than households that are headed by persons who have bachelor's degree and above. In studies conducted in less developed country, this holds true. Education mainly connected with predisposing behavioral factor thus less educated people have high probability of neglects health demand (symptoms) until it becomes severe, use home self-treatment and have less awareness on available health facilities. Additionally, in LMIC education in turn is associated with income. When the educational level is low, the income of the household is low. Consequently, the financial resource will be invested in basic needs that sustains life rather than medical bills.

Households who have a member with chronic disease, particularly hypertension, diabetes, CVD, diseases related to the kidney and cancer patients reported significantly higher out of pocket spending. All other things kept constant, families with at least one member who is suffering from chronic disease spent 61.8% more on healthcare than families with no family member who has chronic disease. This result is similar with You Xuedan (2011), Gupta I et al (2016), Molla et al (2017) and the study in Burkina Faso by Idrissa Beogo et al (2016). The six round National Health Account shows chronic NCDs have double from NHA V and the expenditure for this treatment also increase. This is mainly because we don't have a national health promotion and awareness strategy and the health policy still mainly focuses on communicable diseases. Due to

this and other factors like shortage of prescribed drugs households who has at least one chronic disease patient are highly vulnerable to financial burden associated with healthcare utilization. In addition, families who have at least one member who is hospitalized spent 31.8% more on health care than those who do not have members admitted as inpatient.

Centris paribus, when household size increases by one unit the total annual out-of-pocket health expense decreases by 7.6%. Out-of-pocket healthcare expenditure studies conducted previously show contrasting evidences on the association of out-of-pocket healthcare expenditure and household size (Ebaidalla et al, 2017; Minh et al., 2013; Rama P., 2010; Sarah Brown et al, 2012). The first argument is families with larger household size are highly prone for communicable diseases thus they will incur high out-of-pocket payment (Ebaidalla et al, 2017) thus household size and out-of-pocket healthcare expenditure have a positive association. On the other hand, the larger the household size is the more the income is spent on food and non-food items at home thus health is luxury if the condition is not severe (Minh et al., 2013; Rama P., 2010; Sarah Brown et al, 2012). In low and middle-income countries, when household size increases, there is trade-off between basic needs and healthcare expenses. Households above some threshold spend less on health (Oyinpreye et al, 2014). This study shows when household have one additional member their expenditure for health reduces due to allocation of the family's budget to other food or non-food necessity commodities.

Male-headed households spent 3% more on health however; this variable is insignificant in this study, which is compatible with Idrissa Beago et al (2016), Wang et al (2016), You Xuedan et al (2011). Commonly, for individual studies women self-report illness and utilize health facilities mostly in reproductive age (FMoH, 2014; FMoH, 2017), however, since this study is a household based, there is no significant difference between male headed and female headed households.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This study presents snapshot of households' out-of-pocket healthcare expenditure and its determinants in Addis Ababa public hospitals. The main finding of this paper is that patients and their households who are Addis Ababa residents and who visited public hospitals incurred an annual average out of pocket healthcare expenditure of 9576.4 ETB. Even though the sample households attested the use of healthcare by households is normally average, the figure is elevated mainly due to two factors. Primary, most of the medical treatments are not available in the country consequently households were forced to go abroad for medical tourism. The other is, as some medicines are not regularly available in the government hospitals and pharmacies, households are forced to incur additional costs by purchasing the prescribed drug from other sources. Regarding service provision, most households use public and private health facilities interchangeably which has also been observed in the consecutive NHAs. Income, household size, chronic disease, education, hospitalization (inpatient admission) and family age structure are the principal determinants of purchasing of good health in public hospital visiting Addis Ababa residents. This result shows the determinant of healthcare expenditure is influenced by predisposing, enabling and need factors together.

Among predisposing variables, household size, family age structure and education significantly affected household's out-of-pocket expenditure. Whenever household size increases, out-of-pocket healthcare expenditure declines owing the reason to shift in focus for fulfilling basic needs rather than healthcare utilization. Moreover, the household size is slightly higher than the EDHS 2016 report thus the Ministry of Health needs to develop strategic guideline on family planning. Secondly, family age structure is another important variable that affects out-of-pocket healthcare expenditure. Households who has at least one under-five child and above-60 years old member spend significantly on health compare to households with at least one above 60 member. There is no guideline in the government health hospital to address these special age groups. This shows the ministry need to constantly monitor and evaluate guidelines and strategies to mitigate financial burden of households.

Regarding the enabling and need factors, income as one of the enabling factor has a positive association with the out-of-pocket healthcare expenditure. The government needs to show commitment in planning and investing in health sector to protect it's citizen from unanticipated health expenditure. Besides, even with the existence of predisposing and enabling factor, the individual seeking health care services must still perceive the need for health care before seeking it (need factor). Hospitalization (inpatient admission) and chronic disease are the main need factors to visit health facilities thus, out-of-pocket healthcare expenditure. These two need factors show a significant and positive association with out-of-pocket healthcare expenditure. The health sector transformation plan as well as the previous subsequent health sector development plans neglects chronic non-communicable diseases and it's primary focus is on communicable disease thus the country is on triple health burden without any intervention.

5.2. Recommendations

This study has attempted to assess what determines out-of-pocket healthcare expenditure of Addis Ababa residents who have visited public hospitals for the month of Yekatit 2011. Based on the results of the study the following recommendations are forwarded.

- Implement universal health insurance system by increasing or mix of prepayment mechanisms.
- As healthcare behaves as a necessity good, Government's real commitment is very crucial in planning and investing in health sector.
- developing appropriate cost exemption or reduction policy as well as social assistance mechanism for financially vulnerable groups to health them access to essential health service
- As chronic NCDs patients are large in number along with their expenditure, it is important for the government to chart out a health promotion and protection policy as to prevent chronic NCDs.
- As high amount of average out-of-pocket expenditure is mainly due to medical tourism, the FMOH can reduce this cost by collaborating with private hospitals and medical associations in bringing doctors and equipments from oversee hospitals.

5.3. Limitation of the study and Areas for Further Research

Due to time and resource constraints, this study only takes 384 samples from 3 hospitals located in Addis Ababa to identify the determinants of out-of-pocket healthcare expenditure. Additionally, indirect cost such as loss of income and loss of working time of a person who is sick were not calculated and incorporated in this study. Furthermore, institutional based studies needs to be conducted focusing on impact of out-of-pocket healthcare expenditure.

REFERENCE

1. Alebachew A, Hatt L, Kukla M, Nakhimovsky S (2014) Universal Health Coverage Measurement in a Low-Income Context: An Ethiopian Case Study. Bethesda, MD: Health Finance & Governance Project, Abt Associates Inc.
2. Alemayehu Geda and Abebe Shimeles (2009), demand for health Ethiopia, explanatory analysis from welfare monitoring survey, AERC
3. Ali Hussein S. and Enayatollah H. (2013), Determinants of health care expenditure in economic cooperation organization countries: evidence from panel co-integration tests. *International journal of health policy and management* 1(1): 63-68
4. Alice Sanwald Engelbert Theurl (2014), what drives out-of-pocket health expenditures of private households? Empirical evidence from Austrian household survey. University of Innsbruck
5. Andersen R. and Newman JF (1973), societal and individual determinants of medical care utilization in US. *Health policy and planning*
6. Anyanwu, John C. and Andrew E. (2007), Health expenditure and health outcomes in Africa, *African Development Review* 21(2), 400-33
7. Arrow KJ (1963), Uncertainty and the welfare economics of medical care, *American Economic Review* 53:5
8. Aregawi Gebremedhin Gebremariam. 2013. Utilization of Healthcare Services in Ethiopia with Special Emphasis on Pre-natal, Immunization and Family Planning Healthcare Services. Addis Ababa University, Addis Ababa, Ethiopia.
9. Asante AD, Price J, Hayen A, Irava W, and Martins J. 2016. Assessment of equity in healthcare financing in Fiji and Timor-Leste: A study protocol. *BMJ Global Health*, 4: 12.
10. Azaher Ali Molla, Chunhuei Chi and Alicia Lorena Núñez Mondaca . 2017. Predictors of high out-of-pocket healthcare expenditure: an analysis using Bangladesh household income and expenditure survey, 2010. *BMC Health Services Research*, 17.
11. Becker G. (1965) the theory of the allocation of time. *economic journal* 75: 493-517
12. Bedane, S.N. 2018. Out of Pocket Expenditures among Hypertensive Patients and their Households who Visit Public Hospitals in Addis Ababa, Ethiopia, 2016. *Health Economics and Outcome Research*, 4.
13. Berk, R. A. 1990. A primer on robust regression. In *Modern Methods of Data Analysis*, ed. J. Fox and J. S. Long, 292–324. Newbury Park, CA
14. Bolaji Samson Aregbeshola, and Samina Mohsin Khan . 2017. Determinants of Impoverishment Due To Out Of Pocket Payments In Nigeria. *J Ayub Med Coll Abbottabad*, 29(2), 194-99.
15. Bolin K., Lindgen B., Lindstrom M., Nystedt P. (2003), Investments in social capital implications of social interactions for the production of health. *Soc sci med*; 56: 2379-90
16. Central Statistical Agency and ORC Macro. 2005. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia, and Calverton, Maryland, USA: Central Statistical Agency and ORC Macro
17. Central Statistical Agency and ICF. 2011. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF

18. Central Statistics Agency (2012). Ethiopian Welfare Monitoring Survey: Analytical Report. Addis Ababa, Ethiopia
19. Central Statistical Agency (CSA) and ICF. 2016. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF.
20. Central Statistical Agency (CSA). March/2018. THE 2015/16 ETHIOPIAN HOUSEHOLD CONSUMPTION – EXPENDITURE (HCE) SURVEY.
21. Cheng-kun Wang 2014. Out-of-Pocket Payments (OOP) of Poor Households in Health Care Finance. *Wseas Transactions On Business And Economics*, 13.
22. Cowell A. (2006), the relationship between education and health behavior: some empirical evidence. *Health economics* 15:125-46
23. Deaton, A.S, and Muellbauer J. (1980). An almost ideal demand system. *American Economic Review*, 70, 312-26.
24. Dibaba Amanuel, Mamuye Hadis, Sabit Ababor, and Yibeltal Assefa. 2014. Improving Health Care Financing In Ethiopia (SURE policy brief). Addis Ababa Ethiopia: Ethiopian Public Health Institute
25. Ebaidalla Mahjoub Ebaidalla, and Mohammed Elhaj Mustafa Ali. 2017. Determinants And Impact Of Household's Out-Of-Pocket Health Care Expenditure In Sudan: Evidence From Urban And Rural Population. The Economic Research Forum (ERF).- Working Paper
26. Emmett B. (2004), Abolishing cost recovery in basic health care: A critical reform for Africa. OXFAM
27. Ethiopian Public Health Association (EPHA) (2014), History of EPHA from 1989-2014, Addis Ababa; EPHA
28. Eskinder Eshetu (2014), Health Care Financing in Ethiopia: Implications on Access to Essential Medicines. *International Society for Pharmacoeconomics and Outcomes Research (ISPOR)*, 4c, 37-40.
29. Federal Ministry of Health. 2010. Health Sector Development Program (HSDP) IV, 2010/11-2014/15).
http://www.nationalplanningcycles.org/sites/default/files/country_docs/Ethiopia/ethiopia_hsdp_iv_final_draft_2010_-2015.pdf
30. Federal Ministry of Health (2012), Health Sector Development Program IV Annual Performance Report 2011/12, Version I. Addis Ababa: FMoH
31. Federal Ministry of Health (2014), National Health Account V: household health service utilization. Addis Ababa, FMoH
32. Federal Ministry of Health (2015), Health Sector Transformation Program. Addis Ababa, FMoH
33. Federal Ministry of Health. 2017. Ethiopian Health Accounts Household Health Service Utilization and Expenditure Survey 2015/16. *Ethiopian Health Accounts*. Addis Ababa: Federal Ministry of Health.
34. Felix Masiye, and Oliver Kaonga, 2016. Determinants of Healthcare Utilisation and Out-of- Pocket Payments in the Context of Free Public Primary Healthcare in Zambia. *International Journal of Health Policy Management* 5(12), 693–703.
35. Grossman M. (1972), the demand for health: A theoretical and empirical investigation. Columbia University press for the national bureau of economic research, New York
36. Grossman M. (2000), the human capital model of the demand for health. National bureau of economic research working paper no 7078

37. Health financing reform (2015). Ethiopia's Experience. Technical Brief Prepared for USAID
38. Heller P. (1982), A model of demand for medical and health services in peninsular Malaysia, *social science and medicine* 16:267-84
39. Heller Peter (1982), A model of demand for medical and health services in peninsular Malaysia: *social science and medicine J.* (16) 267-84
40. Hoang Van Minh, Nguyen Thi Kim Phuong, Priyanka Saksena, Chris D. James, and Ke Xu. 2013. Financial Burden Of Household Out-Of Pocket Health Expenditure In Viet Nam: Findings From The National Living Standard Survey 2002-2010. *Social Science & Medicine*, 96, 258-263.
41. Idrissa Beogo, N. H., Marie-Pierre Gagnon, And Djesika D. Amendah 2016. Out-of-Pocket Expenditure and its Determinants in the Context of Private Healthcare Sector Expansion in Sub-Saharan Africa Urban Cities: Evidence from Household Survey in Ouagadougou, Burkina Faso. *BMC Research Notes*, 9(34)
42. Indrani Gupta, Samik Chowdhury, Shankar Prinja, and Mayur Trivedi. 2016. Out-of-Pocket Spending on Out-Patient Care in India: Assessment and Options Based on Results from a District Level Survey. *PLoS ONE* 11, 12.
43. Jonathan G. 2000. Handbook of health economics. USA, Elsevier
44. Mieraf Taddesse Tolla, Ole Frithjof Norheim, Stéphane Verguet, Abebe Bekele, Kassahun Amenu, Senbeta Guteta Abdisa, and Kjell Arne Johansson 2017. Out-of-pocket Expenditures for Prevention and Treatment Of Cardiovascular Disease In General And Specialised Cardiac Hospitals In Addis Ababa, Ethiopia: A Cross-Sectional Cohort Study. *BMJ Global Health*, 2.
45. Molla A. A., Chunhuei Chi and Alicia Lorena Núñez Mondaca. 2017. Predictors of high out-of-pocket healthcare expenditure: an analysis using Bangladesh household income and expenditure survey, 2010. *BMC Health Services Research*, 17.
46. Moscone F., Baltagi BH (2010), Health expenditure and income in US, *Health Econ.* 198: 1385-1403
47. Muhammad M. and Azam S. (2012) socio-economic determinants of household out-of-pocket payments on healthcare in Pakistan. *International Journal for Equity in Health* 11:51 <http://www.equityhealthj.com/content/11/1/51>
48. Mwabu GM (1984), A model of household choice among medical treatment alternatives in rural Kenya, unpublished PHD dissertation Boston University
49. NIDI RESOURCE FLOWS (RF) PROJECT/ UNFPA. NIDI, 2011. *Tracking Out-of-Pocket Expenditures for Sexual and Reproductive Health*. NIDI, The Hague: UNFPA.
50. Nicholas Otieno Okello, and Dr. Agnes Njeru. 2015. Factors Affecting Out-Of-Pocket Medical Expenditure Among OutPatients in Hospitals in Nairobi County. *International Journal of Scientific and Research Publications*, 5, 21.
51. Njuguna K. David, Diana N. Kimani, and Bethuel Kinyanjui. 2017. Determinants and Distribution of Catastrophic Health Expenditures and Impoverishment in Kenya. *Public Health Research*, 7, 55-61.
52. Obinna E Onwujekwe, Benjamin SC Uzochukwu, Eric N Obikeze, Ijeoma Okoronkwo, Ogonnia G Ochonma, Chima A Onoka, Grace Madubuko, and Chijioke Okoli. 2010. Investigating Determinants of Out-of-Pocket Spending and Strategies for Coping with Payments for Healthcare in Southeast Nigeria. *BMC Health Services Research*, 10:67

53. Okunade A., Surarattecha G., Benson DA (2010), Determinants of Thailand household health care expenditure: the relevance of permanent resource and other correlates. *Health Econ letters* 19:3, 365-76
54. Orem JN, F. Mugisha, AP Okui, L. Musango, and JN Kirigia (2013), Health care seeking patterns and determinants of out-of-pocket expenditure for malaria for children under-five in Uganda. *Malar Journal* 12:175
55. Oyinpreye A., and Karimo Tamarauntari Moses. 2014. Determinants of Out-Of-Pocket Healthcare Expenditure in the South-South Geopolitical Zone of Nigeria. *International Journal of Economics, Finance and Management*, 3, 296-300.
56. Phipps S. and Burton P. (1992), what's mine is yours? The influence of male and female income on patterns of household expenditure, working paper, Department of Economics, Dalhousie University
57. Rama Pal (2010), Analyzing catastrophic out-of-pocket health expenditure in India: concepts, determinants and policy implications. Indira Gandhi Institute of Development Research (IGIDR). Mumbai, India.
58. Rannan Eliya and Ravi P. (2008), National Health Accounts Estimation Methods: Household Out-of-pocket Spending in Private Expenditure. Asia-Pacific NHA Network., Halong Bay, Vietnam
59. Rashidul Alam Mahumud, Abdur Razzaque Sarker, Marufa Sultana, Ziaul Islam, Jahangir Khan, and Alec Morton. 2017. Distribution and Determinants of Out-of-pocket Healthcare Expenditures in Bangladesh. *Journal of Preventive Medicine and Public Health*, 50, 91–99.
60. Reeves A, McKee M, Basu S, Stuckler D. (2014), The political economy of austerity and healthcare: Cross-national analysis of expenditure changes in 27 European nations 1995-2011. *Health Policy*; 115:1-8.
61. Rous J. and Hotchkiss D. (2003), Estimation of the determinants of household health care expenditure in Nepal with control for endogenous illness and provider choice. *Health Econ* 12:431-51
62. Russell S. (2004), the economic burden of illness for household in developing countries: A review of studies focusing on malaria, TB, and human immunodeficiency virus/acquired immunodeficiency syndrome. The American Journal of Tropical Medicine and hygiene, Connecticut, JAI press
63. S. Buigut, R. Ettarh, D. Amendah (2015), catastrophic health expenditure and its determinants in Kenya slum communities. *International Journal for Equity in Health* 14:46
64. Sarah Brown, Arne Risa Hole, Dilek Basar (2012). Out-of-pocket health care expenditure in Turkey: Analysis of household budget 2002-2008. Sheffield, UK; Sheffield Economic Research Paper Series
65. Steinhardt LC, Waters H., Rao KD et al (2009), the effect of wealth status on care seeking and health expenditures in Afghanistan. *Health Policy and Planning* 24(1):1-17
66. Thuan, Nguyen Thi Bich, Curt Lotgren et al (2008), choice of health care provider following reform in Vietnam. *BMC Health Services Research* 8:162
67. Tibebe Akalu, Amarech Guda, Melesse Tamiru, Damen Haile Mariam 2012. Examining Out Of Pocket Payments For Maternal Health In Rural Ethiopia: Paradox Of Free Health Care Un-Affordability. *Ethiopian Journal of Health Development*, 26, 251-257.

68. Tin Tin Su, Pokhel S., Gbangou A., Flessa S. (2006), determinants of household health expenditure on western institutional health care. *European Journal of Health Economics* 7:199-207.
69. USAID (2010) Health Care Financing Reform in Ethiopia: Improving Quality and Equity. Health Systems 20/20, Abt Associates Inc., USAID.
<https://www.healthsystems2020.org/content/resource/detail/85865/>
70. UN-Habitat. 2016. City Prosperity Index - Ethiopian City Addis Ababa.
71. Wagstaff and E. Van Doorslaer (2003), Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993-1998, *Health Economics*, 12: 921-34
72. Wamai R. (2009), reviewing Ethiopia's health system development. *Japanese Medical Association Journal* 62:4, 279-86
73. Wang H. and Ramana GNV (2014), Universal Health Coverage for Inclusive and Sustainable Development: country summary report for Ethiopia. World Bank Group
74. Weil DN (2006), Accounting for the effect of health on economic growth, *quarterly journal of economics* 122(3), 1265-1306
75. Witter (2005), An unnecessary evil? User fees for health care in low-income countries. London: Save the Children
76. Witter S. and Babiker M. (2005), Ability to pay for health care in Khartoum state: results of a household survey, London: Save the Children
77. World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR). July. 2015. Enhancing Urban Resilience. Addis Ababa, Ethiopia: World Bank.
78. World Health Organization (2012), Health System Financing: The Path to Universal Health Coverage Plan of Action. World Health Organization: Geneva, Switzerland
79. World Health Organization (2014), WHO Global Health Expenditure Atlas, Geneva, WHO
80. World Health Organization (2015), WHO country cooperation strategy Ethiopia (2012-15), Kinshasa; WHO African Off.
81. World Health Organization (2016), international comparison program-ppps and exchange rates
82. www.healthsystems2020.org
83. www.who.int/healthsystems/publications/abuja_declaration/en
84. Xu Ke, Heijink R., Saksena P., Evans D. (2011), Validity and comparability of out-of-pocket health expenditure from household surveys: a review of literature and current survey instruments, discussion paper, department health systems financing, world health organization
85. Xu ke, Priyanka Saksena., and Alberto Holly 2011. The Determinants of Health Expenditure: A Country-Level Panel Data Analysis. Results for Development Institute (R4D).
86. You Xuedan and Yasuki Kobayoshi (2011), Determinants of out-of-pocket health expenditure in China, *Applied Health Economics and Health Policy* 9(1): 39-49

APPENDIX

English Consent Form and Questionnaire

Statement of consent

Study title: The Determinants of Household's Out of Pocket Healthcare Expenditure Among Public Hospital Visiting Addis Ababa Residents

Household out of pocket studies usually neglects hospitalized people. This study is believed to be useful in learning more about what determines out of pocket expenditure in hospital setting. Thus, the study incorporates residents of Addis Ababa who are being treated in public hospitals.

Participation in this study is fully voluntarily and if you agree to participate, I will;

- Ask about you and your family health and financial profile
- Read the questions aloud and fill out the form.

There is no right and wrong answer to these questions. What is required from you is to remember as much as you can and answer the questions. In addition, this study will take a maximum of 15 minutes of your time.

Lastly, the only person who is allowed to see your answer is the researcher. Any of your answers will not be putted to your medical records and are not going to be exposed to anyone.

I have received, read (listen) and understood the importance of the study thus, I hereby freely and voluntarily consent to take part in this research study.

I have the option to decline to take part in this study as well as to ask question at any time without incurring any penalty.

Your name

Signature

Date

Name of Enumerator

Signature

Date

Questionnaire: A Survey on Households Out Of Pocket Healthcare Expenditure

Introduction: Hello there! This healthcare expenditure questionnaire is designed by a postgraduate economics student for masters thesis (research) purpose. Please be precise on giving the answer as it's really helpful for analysis purpose. All information provided will be treated with strict confidentiality and will be exclusively used for this research paper only.

You are also allowed to do not answer partial or all questions if it's not convenient for you to answer.

⊖ Sub-city _____
Household's identification _____
The hospital this interview conducted _____ Date: _____

Section I: Households Profile

***HOUSEHOLD=** all members of the house sharing a meal together or/and living under the same roof

1. Household size

Age	Male	Female	Total
Below 5			
5-18			
19-59			
60 and above			
total households size			

2. Gender of household head

- Male
- Female

3. Marital status

- Single
- Married
- Divorced
- Widowed

Other: _____

4. Education status of the household head

Highest level of educational attainment		✓	How long does it take
1	uneducated (including kindergarten)		
2	Completed primary education		
3	Completed secondary education		
4	Completed vocational school		
5	Completed university/college diploma		
6	Completed university/college degree		
8	Other i. Specify _____ ii. Specify _____		

5. Occupational status of household head

Occupational status		✓	What is their job
1	Currently unemployed		
2	Unpaid family worker/freelancer		
3	Self employed		
4	Civil Servant		
5	Working in private organization		
6	Working in NGOs and international organizations		
7	Other: i. Specify _____ ii. Specify _____		

6. How many member of your household earns salary, pension, rent or any other income _____

Section II: Households health profile

1. Do any of your family member(s) have diagnosis with chronic illnesses?

- Yes
- No

2. Has any member of your household ever been diagnosed with any of the following diseases

Disease	✓	State the number of member(s)
Diabetes and related condition		
Hypertension and related condition		
Heart related condition		
Asthma/ chronic respiratory diseases		
Cancer/ tumor		
Chronic gastric disease		
ENT problem		
Alzheimer, Epilepsy		
Kidney and related diseases		
Injuries related with orthopedics		
Other (Specify) i. ii.		

3. Is there any member of your household in need of constant care due to old age, chronic disease, disability, injury, or any other problems?

Yes

No (go to #6)

4. How many member/s of your household are in need of constant care? _____

5. How much do you incur every month for this service? _____

6. Is there any member of your household taking any medicine regularly?

- Yes
- No (go to #10)

7. How many member/s of your household are taking medicine regularly? _____
8. Do you find the medicine in the prescribed health center (including Kenema)? _____
9. How much do you incur to buy the drug? _____
10. In the period Jan.2017-Jan.2018, how many times the household member were admitted or seen by a health practitioner

Service	traditional	Public	Private	Total
Outpatient Care (N ^o of attendance)				
Inpatient Care (N ^o of admission)				
Total Number of Visit				
<u>Outpatient Care</u>		<u>Inpatient Care</u>		
How much did you incurred while having this service?		How much did you incurred while having this service?		
<input checked="" type="checkbox"/> For transportation: _____ <input checked="" type="checkbox"/> For patient card/chart: _____ <input checked="" type="checkbox"/> For Laboratory (without including #5): _____ <input checked="" type="checkbox"/> For medicine (without including #9): _____ <input checked="" type="checkbox"/> Other: _____		<input checked="" type="checkbox"/> For transportation: _____ <input checked="" type="checkbox"/> For patient card/chart: _____ <input checked="" type="checkbox"/> For Laboratory (without including #5): _____ <input checked="" type="checkbox"/> For medicine (without including #9): _____ <input checked="" type="checkbox"/> Other: _____		

11. How much do you incur for transport during these visit? _____
12. How much is incurred by the household during the health center visit (including drugs) (refer #10) _____
13. For the period Jan.2018-Jan.2019 have you or any member of your household travelled abroad for medical treatment
 - Yes
 - No ; (please go to question # 15)

14. How much did you spend on the following:

Oversea treatment expense	In birr
Medical treatment including admission and clinical services	
Airfare for patient and accompanying relative(s)	
Accommodation and other expenses	
Total oversea expense	

15. For the period Jan2018-Jan2019, what is the total estimated households health expense

Section III: Financial sources

1. In the period Jan. 2018- Jan.2019, which of the following financial sources did your household use to pay for the healthcare expenditure

Source		(Tick the correct answer)
1	Current income	
2	Saving	
3	Borrowing from relatives and friends	
4	Sold assets such as Land, Building, Vehicles	
5	Community based health insurance	
	Other means:	
	i. Specify _____	
	ii. Specify _____	

2. Household's average monthly food and non-food expenditure in the last twelve months

Types of expenditure		Amount of expenditure (in Birr)
1	Food and drink	
2	Cloth and shoes	
3	Electricity, water and phone bills	
4	Home accessories	
5	Transportation (including benzene/diesel for car)	
6	School	
7	House rent	
8	Social Affairs (Wedding/Funerals...)	
9	Recreational activities	
10	Other	
	i. Specify _____	
	ii. Specify _____	

3. What was the household's average monthly total revenue in the last twelve month?

Total Revenue		Amount (in Birr)
1	Formal salary/pension	
2	Share dividend	
3	Rent	
4	Remittance	
5	Other:	
	i. Specify _____	
	ii. Specify _____	

Table 11: Stata Estimation Result (Stata Table)

```
. rreg lnop lninc i.fas i.sex i.education i.chronic_disease i.inpatient householdsize, genwt (w)

Huber iteration 1: maximum difference in weights = .77715014
Huber iteration 2: maximum difference in weights = .1780465
Huber iteration 3: maximum difference in weights = .0254342
Biweight iteration 4: maximum difference in weights = .29398575
Biweight iteration 5: maximum difference in weights = .08348664
Biweight iteration 6: maximum difference in weights = .0251118
Biweight iteration 7: maximum difference in weights = .01410866
Biweight iteration 8: maximum difference in weights = .00366588
```

```
Robust regression                                Number of obs =    384
                                                F( 13,   370) =   25.65
                                                Prob > F       =    0.0000
```

	lnoop	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	lninc	.8100382	.0939178	8.62	0.000	.6253585 .9947179
	fas					
both under5 and above60		.4219784	.1524494	2.77	0.006	.1222025 .7217542
no under5 and above60		-.194395	.1111072	-1.75	0.081	-.4128758 .0240858
under5		-.2226865	.1352931	-1.65	0.101	-.4887264 .0433534
	sex					
Male		.0342464	.0896827	0.38	0.703	-.1421053 .2105982
	education					
Diploma		-.1724299	.1489332	-1.16	0.248	-.4652916 .1204317
Primary Education		-.2947328	.1366901	-2.16	0.032	-.5635197 -.0259459
Secondary Education		-.1068399	.1332331	-0.80	0.423	-.3688289 .1551491
TVER		-.0242372	.175486	-0.14	0.890	-.3693121 .3208378
Uneducated		-.103019	.1478561	-0.70	0.486	-.3937628 .1877247
	chronic_disease					
yes		.6187871	.0899626	6.88	0.000	.441885 .7956893
	inpatient					
yes		.3179162	.0874226	3.64	0.000	.1460088 .4898236
householdsize		-.0760238	.021271	-3.57	0.000	-.117851 -.0341967
_cons		-1.402645	1.071079	-1.31	0.191	-3.508811 .7035204

Post-Estimation Tests

Table 12: Predictive Margins

```
Predictive margins                                Number of obs =    384
Expression   : Fitted values, predict()
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
_cons	7.391135	.0414628	178.26	0.000	7.309869 7.4724

Table 13: Covariance Matrix of Robust Regression Model (STATA Result)

. estat vce

Covariance matrix of coefficients of rreg model

e (V)	lninc	2. fas	3. fas	4. fas	2. sex	2. education	3. education	4. education	5. education	educati
lninc	.00882056									
2. fas	-.00078933	.02324081								
3. fas	.00065297	.00694578	.01234481							
4. fas	.00096841	.00706044	.00849476	.01830423						
2. sex	-.00008986	-.00036704	.00122572	8.474e-06	.00804299					
2. education	.00220385	.00106871	.00085578	.00080037	.00115811	.02218109				
3. education	.00462581	-.00058341	.00024598	.00035599	.00180519	.00884819	.01868419			
4. education	.00346947	-.00067049	-.00031269	-.00074757	.00050469	.00846038	.00940607	.01775105		
5. education	.00143652	-.00049249	-.0009791	-.00086926	.00028904	.00750438	.00814261	.00802763	.03079532	
6. education	.00516369	.00032534	.00186722	.00196362	.00145477	.00917507	.01044338	.00957693	.00792995	.021861
2. chronic~e	-.00111129	-.00088403	.00200054	.00203365	.00007096	-.00049344	-.00036172	-.0001484	.00124617	-.000599
2. inpatient	-.00080796	-.00067586	.00044003	.00055924	-.00069013	.00075296	.00022483	.00092849	.00016994	.000662
households~e	.00001197	-.00023161	.00033913	.00012867	-.00002438	-.00033292	-.00014262	-.00017219	.00012495	-.000237
_cons	-.09898483	.0037026	-.01925467	-.02087041	-.00514123	-.03236111	-.06026273	-.04616	-.02432394	-.066933

e (V)	2. chronic~e	2. inpatient	househol~e	_cons
2. chronic~e	.00809327			
2. inpatient	-.00095377	.0076427		
households~e	.00018418	.00023547	.00045245	
_cons	.00664108	.00428823	-.00251319	1.1472105

Table 14: Run Test: Test for Random Order

. runtest resid

N(resid <= -.0519395917654037) = 192

N(resid > -.0519395917654037) = 192

obs = 384

N(runs) = 168

z = -2.55

Prob>|z| = .01