



**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF AGRICULTURAL AND DEVELOPMENT STUDIES**

**THE DEMAND FOR MODERN CHILD HEALTH CARE AND ITS
DETERMINANTS IN RURAL OROMIA NATIONAL REGIONAL STATE,
ETHIOPIA**

BY

ABEL MOLLA DEYU

**DECEMBER, 2018
ADDIS ABABA, ETHIOPIA**

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STATE, ETHIOPIA**

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DECLARATION

I declare that this MA thesis is my original work, and has never been presented for the award of any degree in this or any other university and all source of materials used for the thesis have been duly acknowledged.

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Acronyms

ARI- acute respiratory infection

DOGIT- Deeds of Grant in Trust

EAs- Enumeration areas

EDHS- Ethiopian Demographic and Health Survey

GEV- the Generalized Extreme Value

HEP- Health Extension Program

ICCM- Integrated Community Case Management

IIA- Independence of Irrelevant Alternatives

IRS- International Reserve

ITN-INSECTISED TREATED BEDNETS

NEMT-Non Emergence Transportation Medical

ML- Multinomial Logit

NMNL-Nested Multinomial Logit

PCV- Pneumococcal Conjugate Vaccine Medical

RHBs- Regional Hospital Board

UK- united Kingdom

ABSTRACT

The paper tried to estimate the demand for modern health care of child and its determinants in Oromia regional state by using a nested multinomial logit model and full information maximum likelihood technique that estimated both decisions of using modern health care and health care provider choices simultaneously. The study used the Ethiopian socioeconomic survey data which is collected by the World Bank in 2015/16. The estimated result of the upper level model, which is the choice between modern health care and no care, variables such as education of the child's father, access to health care and access to public transport positively and significantly affected the demand for modern health care of children. On the other hand, distance to asphalt road, number of children in the household and availability of mothers in the household negatively and significantly affected the decision of using modern health care. The estimation of the lower level model (i.e, choice of health care provider) indicated that choice of private health care provider significantly decreased for households with large family size but public health care provider significantly increased for household with large family size. Privet health care choices significantly increased for households who live in communities where drug stores are available and households who have access to information. On the other hand, the use of both public and private health care providers generally declines as age of household head increases and male headed households significantly reduced the use of private health care provider. From policy point of view policy makers should focus on improving Access to health care and availability of public transportation and reducing in number of child in the household and distance to the road which are crucial determining factors for health care demand of children's in rural oromia.

Keywords: *Child healthcare, Health care demand, Nested multinomial logit model, Health care provider, Oromia, Ethiopia..*

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Child health is a state of physical, mental, intellectual, social and emotional well-being and not merely the absence of disease or infirmity. Healthy children live in families, environments, and communities that provide them with the opportunity to reach their fullest developmental potential (WHO, 1948). According African research Review (2014) as cited from (Strauss J and Thomas D, 1998, Ajani, 1992). Human capital has been recognized as a major factor that influences poverty besides physical capital. Health is an important component of human capital in the sense that investment in health has important direct effects on productivity and on economic growth. On theoretical ground they relate in important ways with health affecting economic growth and economic growth affecting health .Improved health status is expected to lead to enhanced welfare as well as economic growth. Access to health services consists of at least five components of service provision: availability, affordability, acceptability, appropriateness and quality.

There are different factors that determine health of individuals like individual behavior, environmental factor, social factor, education, income and genetics. Time and money spent on health are important improving activates of health of individuals. and health care's are also the key production inputs of health when we take individuals as producers of health Mawbu (2007) as cited (Claxton, et al., 2006). According to Grossman (1972) the demand for modern health care is the behavior of individuals to seek modern health care or not on the other hand health care provider choice is the probability of choosing one health care provider from different alternatives of provider choices. Both those health care demand and health care provider choices determined by many demand side factors among them community factors like distance or access to health care, distance to road infrastructure, availability of public transportation are crucial factors especially in rural areas, household size, household wealth and access to information are household factors which determine the demand. And other important factors which determine the demand for health care are education, sex and age.

According to CSA (2011) comparing children who have mothers with higher Education and without Education, as the demographic survey shows that, those who were born to mothers with no education have a higher likelihood to die before 5 years old which is 121 deaths per 1000 children's and children's whose mothers have higher education 24 deaths per 1000 live births. On the other hand in terms of vaccination coverage significantly varies 57 % vaccinated children's whose mothers have secondary education compared to only 20 % vaccinated children's whose mothers have no education.

Despite there is improvement in the health condition of the country health is still a major challenge to Ethiopia's development. Half the population lack access to basic health services; health care delivery systems are weak, and the population is largely rural, spread across large regions that often lack roads. These facts, the country's susceptibility to droughts, epidemics, and regional conflicts, and traditionally low government spending on health especially affect the health of women and children (USAID, 2008).

The major health problems of the country are largely preventable communicable diseases and nutritional disorders. More than 90% of child deaths are due to pneumonia, diarrhea, malaria, neonatal problems, malnutrition and HIV/AIDS, and often as a combination of these conditions. Despite major strides to improve the health of the population in the last one and half decades, Ethiopia's population still face a high rate of morbidity and mortality and the health status remains relatively poor. Vital health indicators from the DHS 2005 show a life expectancy of 54 years (53.4 years for male and 55.4 for female), and an IMR of 77/1000. Under-five mortality rate has been reduced to 101/1000 in 2010. Although the rates have declined in the past 15 years, these are still very high levels (EFMH, 2010).

1.2 Statements of the Problem

In the Grossman model, the individual inherits an initial stock of health capital which depreciates over time but which may be augmented by acts of investment. It is important to view health investment as embracing all types of health-promoting behavior (consumption of effective medical care, healthy food, etc.) and to view health-damaging behavior (consumption of cigarettes, alcohol, etc.) as affecting the rate at which health capital depreciates. Health capital can be formed as an individual invests time and money into market goods such as medical care, exercise, diet and recreation. Individuals determine health-related behavior; by determine - at the margin - their stock of health capital and ultimately their length of life. Health is demanded by individuals both because it generates utility directly and because it affects the individual's performance in the labor market according to Adam as cited from (Muurinen , 1982a)

The goal of this National Newborn and Child Survival Strategy (2015-2020) is to reduce under five mortality from 64/1,000 (2013 level) to at least 29 /1,000, infant mortality rate from 44/1000 to 20/1000 and NMR from 28 to 11/1,000 by 2020. The key guiding principles for implementation of the revised strategy focus on: equity and accessibility; community engagement, empowerment and ownership; efficient use of resources; innovation and use of evidence based interventions, provision of quality MNCH services, strong monitoring and dissemination of best practices (EFMH, 2015). Weak infrastructure, limited distribution system, low level of education and limited income complicate and reduce the demand or access of health services in rural areas especially in poor countries like Ethiopia (Chaya, 2007).

Over two-thirds of childhood deaths in Ethiopia are caused by few and easily preventable conditions; mainly infections, neonatal conditions and malnutrition. The major direct causes of under five mortality, based on the 2014 WHO/CHERG estimates are pneumonia (18%), diarrhea (9%), prematurity (11%), newborn infection (9%), asphyxia (14%), injury (6%), measles (2%), malaria (3%), congenital anomalies (4%), HIV (2%), and others (21%). Under nutrition is a major underlying cause contributing to nearly half of childhood deaths. Even though underweight, stunting and wasting has declined by 39%, 31% and 25% respectively during the last 15 years, the 2014 mini EDHS estimates of stunting (40%), underweight (25%) and wasting (9%) are still very high(EFMH,2016).

The levels of infant and child mortality rate are among a vital indicator used as a measurement for socio economic progress of the country. Like other developing countries, significant differentials in mortality levels were observed among rural and urban residents of Ethiopia. As refers from EDHS 2016 report the 10 years report preceding to the survey infant, child and under-five mortality are 13, 54, and 66 per 1000 live births in urban areas while 23, 62, and 83 per 1000 live births in rural areas, respectively. The regional disparity also observed in child, under-five and infant mortality rate because of unevenly distribution of health care and socio economic development between different regional states. The under-five and infant mortality rate of Afar is the highest which is 125 and 81 respectively but Addis Ababa is the lowest which is 39 and 28 respectively. This paper study the child health care demand oromia regional state which is the largest and most populous regional state in Ethiopia the infant, child and under-five mortality rate of the region were 20, 60, and 79 respectively which is not highest as Afar region but not lowest as Addis Ababa city administration it is in between the two extremes (CSA, 2016).

Several studies have done on the demand for health care services in some African and Asian countries but few studies were conducted in this topic in Ethiopia. Belay (2013) discussed that the determinant of demand for health care services in Mekelle city using nested multinomial logit model. Similarly, Tesfaye (2003) discussed the demand for curative health care in Jimma town using nested multinomial logit model. Teferi and Sundara (2013) worked on the demand for traditional health care services in rural Ethiopia. All the above researchers used cross sectional type of data. This study fill the gap of those previous studies because unlike those studies it is representative at country level and differently from those studies it concerns on child health rather than studying the health of all population. Therefore, this study analyzes the demand for child health services in rural oromia. The purpose of this paper was to fill the gap of previous studies. In addition to this, by studying the demand for child care services it adds new course of knowledge in this area of study and also gives policy recommendation based on the finding.

1.3 Research Question

What is the effect of different socio economic factors on the demand for child health care?

How dose accesses to health care affect the demand for child health care?

How distances to road should affect the demand for child health care?

What policy recommendation should be suggested?

1.4 Objectives of the Study

1.4.1 General Objective

The general objective is to analyze the demand for child health care services in Ethiopia.

1.4.2 Specific Objectives

To identify and analyze the factors that affect demand for child health care. .

To estimate how access to health care affect the demand for child health care.

To estimate how distance to road affect the demand for child health care.

1.5 Research Hypothesis

The null hypothesis is there is no significant relationship between dependent variable child health care demand or health care provider choice($\mu\theta_1$) and independent variables Number of child (θ_2), Age of child (θ_3), Education of mother(θ_4), Education of father(θ_5), household size(θ_6), Access to health care(θ_7), distance to road(θ_8), Availability of public transport(θ_9), Access to information(θ_{10}), Wealth index(θ_{11}), Availability of mother in household(θ_{12}), Household head sex(θ_{13}), household head age(θ_{14}), Availability of drug store in the community (θ_{15}) is tested against the alternative hypothesis which is there is significant relationship between dependent variable child health care demand or health care provider choice($\mu\theta_1$) and independent variables Number of child (θ_2), Age of child (θ_3), Education of mother(θ_4), Education of father(θ_5), household size(θ_6), Access to health care(θ_7), distance to road(θ_8), Availability of public transport(θ_9), Access to information(θ_{10}), Wealth index(θ_{11}), Availability of mother in house-

hold(θ_{12}), Household head sex(θ_{13}), household head age(θ_{14}), Availability of drug store in the community (θ_{15}) This specified as ;

Ho: ($\mu_{\theta_1} = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = \theta_8 = \theta_9 = \theta_{10} = \theta_{11} = \theta_{12} = \theta_{13} = \theta_{14} = \theta_{15}$)

H1: ($\mu_{\theta_1} \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq \theta_7 \neq \theta_8 \neq \theta_9 \neq \theta_{10} \neq \theta_{11} \neq \theta_{12} \neq \theta_{13} \neq \theta_{14} \neq \theta_{15}$)

1.6 Significance of the Study.

Since Child health is good indicator of the quality of health in general studying the demand for child is important and the study helps policy makers to implement a right decision making to overcome things that affect demand side barrier to use health care services. The study also give direction and will use as reference for other researcher who wants to undertake further study on this topic. The study will uses as a source of information for all who are interested in this area of study.

1.7 Scope and Limitation of the Study

The study was done on the demand side barriers to use child health care in rural Ethiopia using cross sectional type of data which was collected in the year 2015/2016 by choosing oromia region as case study. The study include only rural oromia for the research not include the urban areas .The time limitation restrict the study only to oromia region.

1.8 Organization of the Thesis

The paper has five chapters. The next chapter is literature review which contains theoretical and empirical literatures, chapter three describe the Research Design and Methodology part. Chapter four contains descriptive and econometric analysis which presented discussion of the result. Lastly in the chapter five summery conclusion and recommendation are presented on the bases of the research finding.

CHAPTER TWO: LITERATURE REVIEWS

2.1 Theoretical Literature Reviews

2.1.1 Health and the Demand for Health Care

Health is a state of complete physical and mental well-being and not merely the absence of disease or infirmity (WHO, 1948). According to Mawbu 2007 as cited from Grossman (1972 a, b) Education and Health increases labor productivity but health has an additional important features in regards to reducing time spent in sickness, increases the time available to produce money earning and commodity as well as the time available for leisure. As the author refers to the ideas of Stratus & Thomas, (1998) Health is produced by households not by doctors or hospitals but this does not deny the importance of hospitals and doctors as an input to health production. Even though many variables often used to summarize health status of households, each captures only some factors on health and ignore others and the measurement also have errors and possible bias.

According to (Kalin, 2011) the Grossman model of demand for health is one of the most important contribution of Grossman to understand the theoretical aspects of individual health behavior. The model constructed within human capital framework, health seen as a durable capital stock which depreciates over the life cycle and can be increased by investing in inputs like healthy lifestyle (diet, exercise, recreation) and medical services. In this model health demanded for two reasons, the first reason is it permits market and non market activities by increasing healthy days, and the second reason is it improves welfare and utility (good health seen as consumption good). The demand for health care in Grossman model derived from demand for health which means factors influence the demand for good also influence the demand for medical services. The other aspect of demand for health which is not included in the Grossman model contributed to later works of Action in 1975 and Christianson in 1976 which gives recognition for the existence of different treatment choices in the health care decisions. These decisions of choice between different alternatives providers including self care and different alternatives based on their costs and the price of the care which includes both monetary outlay and access cost or opportunity cost of travel. Health has a role in facilitating and providing happiness to the

society because of this people demand health. It can be defined in two ways: the length of the life and the quality of the life.

2.1.3 The Theoretical Model

According to Grossman (1972) “good health” is produced by individuals. This “good health” treated as human capital and what individuals can spend on production activities in market and non market sectors can determine by it. In this model individuals use medical care and their own time to produce health .Individuals invest on health production until marginal cost equals marginal benefit of improved health status and also health status assumed to be affected by the value that individuals placed on good health, indirectly through increasing health time and labor income .Individuals born with an initial “stock of health capital” has two important feathers which depreciate over time and it can be increased by acts of investment on health .In this model Grossman explains that it is difficult to measure “ the stock of health ‘ ’ but “healthy time produced health capital could be measured easily” . The result of this model shows holding price and other production activates constant increase in income results more health output. Education increases technical efficacy so that educated people are able to produce a better health outcome for a given use of health inputs or use fewer inputs for producing the same level of health output. On the other hand age and other factors that make health stock to depreciate will decrease the demand for health. In Grossman fame work life style affect health through two Channels the first channel is household technology which captures the effect in the health production process. Good behaviors will make the production of health more efficient in other hand bad behavior will make less efficient. The second channel is the rate of depletion with the good behavior the rate of depletion is slow but with bad behavior it increases.

Following standard model of Grossman (1972, 2000) the utility function as follows.

$$U=U(\Phi_t H_t, Z_t), t=0,1,\dots,n \quad (1)$$

where H_t is the stock of health capital at time t , ϕ_t is benefit produced by one unit of health capital, $h_t = \Phi_t H_t$ is the health consumed at time t , and Z_t is consumption for other goods at time t , and n is the length of life.

The initial stock of health capital H_0 is exogenous. H_t at any other age and the length of life n are endogenous.

The following equation describes the change of health capital;

$$H_{t+1} - H_t = I_t - \delta_t H_t \quad (2)$$

where I_t is the investment in health and δ_t is the rate of depreciation of health capital at time t .

δ_t is changing with age.

I_t and Z_t are produced by the following equations:

$$I_t = I_t(M_t, T_{Ht}; E) \quad (3)$$

$$Z_t = Z_t(X_t, T_t; E) \quad (4)$$

In this equation M_t is a vector of inputs (goods) purchased in the market that contribute to gross investment in health (e.g. Health care services); T_{Ht} is the time allocated to improve health; X_t is similar vector of goods inputs that contribute to the production of Z_t . E is other exogenous component of human capital besides health, such as education. Equation (4) is home-production function for other consumption items Z_t .

Both market goods and own time are scarce resources. The goods budget constraint equates the present value of outlays on goods to the present value of earnings income over the life cycle plus initial assets:

$$\sum \frac{P_t M_t + Q_t X_t}{(1+r)^t} = \sum \frac{W_t T_{Wt}}{(1+r)^t} + A_0 \quad (5)$$

where P_t and Q_t are the prices of M_t and X_t ; W_t is the hourly wage rate; T_{Wt} is hours of work, and A_0 is initial wealth, and r is the market rate of interest. Besides budget constraint, the consumer also needs to meet the time constraint Ω .

$$T_{Wt} + T_{Ht} + T_t + T_{Lt} = \Omega \quad (6)$$

where TW_t is time for working, and TL_t is the time lost from market and nonmarket activities due to illness and injury. The time constraint requires that Ω , the total amount of time

Available in any period, must be exhausted by all possible means. Equations (1) to (6) constitute the Grossman model and they jointly determine the demand for health.

2.1.4 Behavioral Model on Health Care Service Utilization

According to Pokhrel and Sauerborn, (2004) the process of health care service utilization is put into a contextual situation, for example in the context of socio-cultural and economic fundamentals. Economic situations like distances to travel, level of education, individual satisfaction based on previous services utilized and perceived quality of services and determinants that affect decision-making are the bases for the model. It also recognizes other cultural, social, organizational, environmental, geographic and economic aspects that appear to affect peoples' health and at times are seen as the prerogative of the studies. Consideration is given to individual level, household level and health systems level characteristics. Health seeking and health service use are determined by social, cultural, political and economic factors as seen by the individual and as defined by the community. In relation to utilization by pregnant women free maternal health care services shows health care use leading to recognition of the importance of the social determinants of health. Note that social capital has of lately become increasingly important to the general population welfare.

2.2 Empirical Literature Review

2.2.1 Health Service Delivery System in Ethiopia

Ethiopia uses a three-tier public health system the public sector remains an important source for health care and the major recipient of health sector resources. Private providers (for-profit and nonprofit) received only 16 percent of total national expenditure on health. EFMH (2011) envisaged that public–private partnerships would be enhanced through collaborative endeavors on selected health sector priority programs and health system issues. Areas identified for such collaboration include expansion of health infrastructure, local production of pharmaceuticals, provision of health services, training of health professionals, mobilization of resources for the health sector, and partnerships with professional associations on improving quality of health services and reducing professional malpractice to deliver essential health services and ensure referral linkages. At primary-care level, a primary care unit is composed of primary hospital, health center, and health post. The secondary level comprises general hospitals. A general hospital provides inpatient and ambulatory services and serves as a referral center for primary hospitals. The tertiary-care level comprises specialized hospitals and serves as a referral from general hospitals. This health service delivery system corresponds to the administrative structure of the government. Tertiary providers are financed and managed by the federal-level health authority, that is, FMOH; secondary hospitals, mostly regional hospitals, are financed and managed by the regional-level health authority, that is, RHBs; and the primary-level providers are financed and managed by the woreda-level health authority, that is, WHO. Within the woreda level, there are three level of providers: primary hospitals, approximately one planned for each woreda,⁴ serve about 60,000–100,000 people; health centers, one planned for 40,000 people in urban areas and for 15,000–25,000 people in rural areas; and health posts, one planned for 3,000–5,000 people. Hospitals and health centers are staffed by conventional health professionals such as physicians, nurses, and midwives. As part of an innovative human resource initiative, health officers are also trained and deployed to hospitals and health centers, and serve similar functions as physicians. Health posts are expected to be staffed by health extension workers, who will be described in greater detail in later sections (Wang.etal, 2016 pp 15)

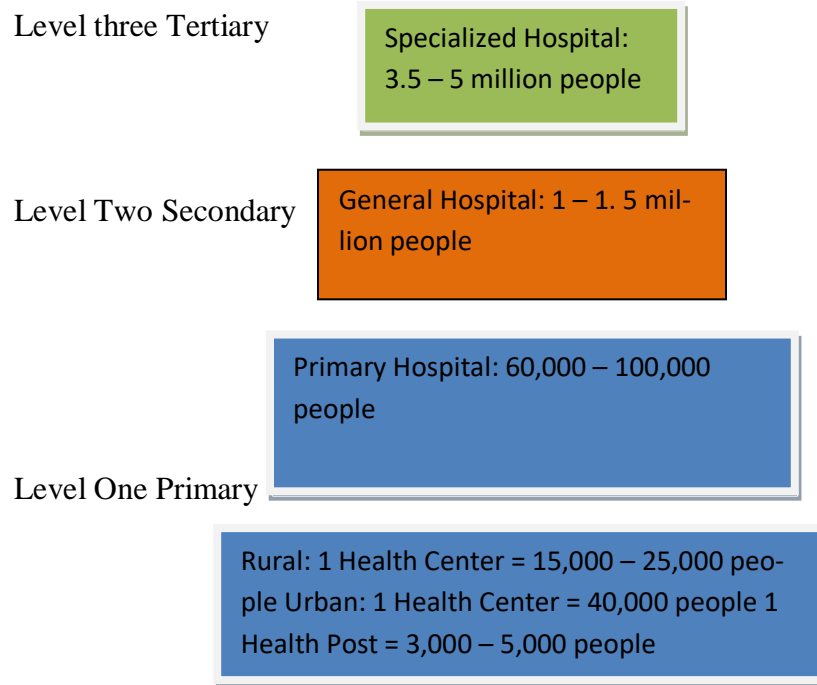


Figure 1 Structure of Ethiopian's three-Tire public health System Source from FMOH 2010c

2.2.2 Determinants of Health Care Utilization

According to Mawbu 2007 as cited (stratus and Tomas 1995, 1998, 2007 and Grossman 2000) Health care utilization highly determined by economic status because people with better ability to pay to use the health care services more but in contrary wealthy individuals negatively affects health care consumption since the opportunity cost of spending time in utilizing health services increases with income. The two way relationship between health and income interested policy makers in developing countries to design polices based on this relationship to improve living standard of the people . Malnutrition and illness during childhood have long-lasting effect on person's life. preventing childhood disease and malnutrition would sustainably increases health and economic growth in low developing countries .Investment on child nutrition in school feeding program support the amount of nutrients children's receive at home .

Another important determinant of health care utilization is cost of access to health care if individuals ill and understands taking treatment will cure the disease ,they might still not seek care if marginal cost of access is too high .the concept of access cost goes beyond billed charges such as facility and physician fees, transportation cost associated with visit as well as the opportunity cost which is the indirect cost of travel time is expected to matter particularly in developing countries , where most of the people lives in rural areas and small villages while good road infrastructure as well as better health care facilities build in cities . Opportunity cost of time to seek health services is another important access variable which is represented by the time spent away from productive activities. Some evidences suggest that this cost produced a barrier to health care use of women's than men's. Even though women's involvement in the cash economy is less, the real social value of women's time might be higher than that of men , by considering diverse responsibility and work load of women's in household kalin (2011) as cited from (Hjortsberg 2003 , Kutzin 1993) .

According to matsson(2010) as cited from (walance etal, 2005,2006,) increasing the accessibility of health care facility to the transportation services increases the utilization of health care services , there could be cost benefit interims reducing need for emergence care and preventable hospitalization .Increasing access to NEMT for those who disadvantaged in transportation benefits individuals by decreasing their cost of transportation and improve quality of life. In order to

get access of goods, services and health care peoples travels from place to place .Access to transportation is a core issue for a community far from transportation services. As individuals far from health care facilities face decrease in the use of health care services.

The age of individuals also another thing that supposed to affect health care utilization. According to Grossman model stock of health affects the marginal effects of health care on health and it depreciate through time, means more the amount of health care needed to sustain the same amount of health (Grossman 1972). As shown in previous research works age of individuals influence the likelihood of illness. There is U-shaped relationship between age and mortality that means the health risks are highest for infant and elderly. However, the shadow price of time expected to vary with age and health costs also affected by it, both by the opportunity cost of time used for health care seeking and the investment benefit. From this we can conclude that the effect of age propensity to use health care is ambiguous kalin (2011) as cited from (Hjortsberg, 2003).

Education is an important correlate to good health which often measured in terms of years of schooling. Better education persons are expected to be more efficient producers of health and have healthier life style and also they are expected to determine different types of treatment at different situations includes practicing self care treatment efficiently when it is appropriate . From above reasons we can highly expect that an educated person achieves good health status than that of less educated persons. In the case of developing countries since the majority of the population poorly educated as compared to developed countries it might make more sense to look the impact of “ some education “ versus “no education “ on health service uses . Under utilization of services is common problem in thus countries especially modern medicine. Improving literacy rate shown increases awareness about health problems, health care problems, health care measures and ability to use the information more efficiently. From this we can expect a positive impact of literacy on health care uses when we refer modern health care .The decision to seek care or not depend on health status of individuals but on his opinion of to what extent health care will improve health status and the utility get after it. There is an Assumption that individuals who suffer from more severe illness have greater incentive to seek health care, *Ceteris paribus* (Gross man, 1972).

2.2.3 Review of Child Health in Ethiopia

In Ethiopia the health and health service have improved significantly since 2000, despite the country remaining in a low income country. Under five mortality in Ethiopia was significantly higher than the sub-Saharan Average in 1990, but now it is significantly lower. Lower rate of death than African countries like Angola, Cameroon and Zambia. Many factors contributed to the improved health of Ethiopians thus factors are improvement in immunization, reduction in stunting, improvement in contraceptive provenance, antenatal care and the proportion of deliveries attended by a skilled health workers. Other than this a huge and rapid increase in the numbers of health facilities and health workers contributed greatly to these improvements in health outcomes and service delivery - a very deliberate decision was made to prioritize improved access to basic services in this enormous country. There was a significant infrastructure building program between 2005 and 2011 which concentrated on rural health facilities. Over 10,000 health posts, 2,000 health centers and 73 hospitals were constructed during this period (EFMH, 2013).

According to 2011 EDHS findings and the 2013 United Nations Inter Group for Mortality Estimation (UN IGME), this rate was reduced to 88 and 64 per 1,000 live births, respectively. Ethiopia has attained MDG4 with an under-five mortality rate of 64. Despite this great achievement, the trend in neonatal mortality remained stagnant and contributes a large proportion of under-five mortality rate. Globally, under-five deaths that occur within the first month of life (the neonatal period) increased from 19% in 1990 to 37% in 2000 and 44% in 2012, because declines in the neonatal mortality rate are slower than those in the mortality rate for older children. Sub-Saharan Africa, with the highest risk of death in the first month of life, is among the regions showing the least progress in reducing the neonatal mortality (EPHI, 2015).

According Ethiopian Federal Ministry of Health (2015) the achievements in child health are mostly attributable to large scale implementation of preventive and curative primary health care interventions alongside a positive trend of socioeconomic changes. Prevention and management of malaria (with 65% of under 5 children sleeping under insecticide treated nets (ITN) with indoor residual spray (IRS) reaching 47% of houses in endemic areas in 2011); community based nutrition programs and establishment of Neonatal Intensive Care Units. Notwithstanding current improvements, coverage of some other essential interventions such as proper case management

of acute respiratory illness (ARI) and diarrhea have been low. The dramatic increase in immunization coverage has also significantly decreased fatalities associated with vaccine preventable diseases. Currently, Ethiopia is providing 10 antigens targeting major killer diseases during childhood. Four new vaccines (PCV 10, Rota and Penta) were introduced since 2007 in addition to the already existing six traditional antigens. The introduction of these new vaccines coupled with ICCM programs and expansion of the Health Extension Program is expected to further lower childhood morbidity and mortality due to pneumonia and diarrhea.

Ethiopia registered marked reduction in child mortality and achieved the MDG4 target in 2012, three years ahead of the timeline. There was no national level evaluation conducted to document factors that contributed to this success. However, a number of factors within and outside the health care system have synergistically contributed towards the success the country has achieved. The government of Ethiopia has brought maternal, newborn and child health as priority political agenda and maintained its commitment to improving the health and survival of women and children in the country. This has been demonstrated by massively expanding access to and utilization of key health care services through HEP, government's flagship program, and the expansion of primary and secondary level health care through accelerated expansion of health centers and hospitals throughout the country. (EFMH, 2015/16).

According to CSA (2016) Under-5 mortality rates for the 5 years preceding the survey declined from 166 deaths per 1,000 live births to 123 deaths per 1,000 live births in 2005, to reach 67 deaths per 1,000 live births in 2016. Similarly, infant mortality decreased from 97 deaths per 1,000 live births, to 77 deaths per 1,000 live births, and to 48 deaths per 1,000 live births in the same period. The infant mortality rate was 48 deaths per 1,000 live births. The child mortality rate was 20 deaths per 1,000 children surviving to age 12 months, while the overall under-5 mortality rate was 67 deaths per 1,000 live births. The neonatal mortality rate was 29 deaths per 1,000 live births, and the post neonatal mortality rate was 19 deaths per 1,000 live births. The 2016 EDHS findings further indicate that all childhood mortality rates have declined over time. For example, the under-5 mortality rate has declined from 116 deaths per 1,000 live births 10-14 years prior to the survey (2002-2006) to 67 deaths per 1,000 live births in the 0-4 years prior to the survey (2012 -2016).

2.2.4 Empirical Evidence

The study done by Ngendo(2016) on determinants of utilization of healthcare services in Kenya which utilized the probit model, shows that Individual gender, household size, cost per visit, area of residence, wealth index which is a proxy of income and employment status significantly affect the utilization of health care in Kenya .The cost significantly increases utilization thus implying that individuals are willing to pay more to receive good quality of health care services.

The study conducted on the topic of child health demand in developing countries by Hallman (1999) examines how quantity, price and access to curative care influence the use of modern public , modern private and traditional providers among 3,000 children at the age of 0-2 years in Cebu Philippines. The result disclose that distance to health care is important for reducing demand, unlike user fees that show no significant effects on the use of modern public or private service. The availability of oral rehydration therapy and child vaccines, as well as the proportion of doctors to staff, are important for increasing the use of public care, while supplies of intravenous diarrhea treatments raise the demand for private services. Parental human capital and household income increase the utilization of private services. Children who are male and younger than 6 months of age are more likely to be taken to private and traditional providers which are the two more expensive types of care.

According to Bolarin .etal (2015) examined healthcare access and utilization among rural households in Ogun state, Southwestern Nigeria using Primary data which was collected through the use of structured questionnaires. Multistage sampling technique was employed for the selection of 200 rural households. The data were analyzed using descriptive statistics and health care accessibility index. The result showed that the higher proportion of male-headed households (30.99%) seek modern health care services than female-headed households (27.59%). Majority of household heads in their active and economic age seek health care from government hospitals with a few of them utilizing self-care and traditional care and Private hospitals are least utilized across the various age groups probably because of the high cost associated with their services. Modern health facilities use decreases with household size, utilization of traditional health care facilities increases with household size, larger percentage (67.69%) of households whose heads have tertiary education utilized modern health care facilities (government and private hospi-

tals) while a higher percentage (68.96%) of households heads with no formal education do not utilize modern healthcare facilities. Majority (35.9%) of the rural households live close (≤ 4 km) to a public health centre seek healthcare services from government hospitals while a higher proportion (41.67%) of rural households living farther than 14 km utilized the traditional health centers.

In study investigated the key factors that determine utilization of outpatient health services and the associated out of pocket spending in Zambia by Masiye and Kaonga (2016) using multi nominal logistic regression model. The study demonstrates that the utilization of formal healthcare is strongly related with a number of socio-economic factors. Factors such as distance, provider type and the patient's socio-economic status represent the major drivers of the magnitude of out of pocket payments. The burden of out of pocket expenditure remains considerably higher among the poorest households. For example, the cost of long distances to facilities hurts the poor more because the poor are more likely to live farther away from health facilities. The importance of household economic capacity in influencing the decision to seek formal healthcare utilization because households with very limited financial means or none at all, are unlikely to seek care because of the perceived or real financial commitment that comes with formal healthcare utilization. Similarly, the level of education of the head of the household was positively associated with a greater demand for formal healthcare since education increases an individual's ability to acquire and utilize health information. The type of perceived illness is also another significant factor in the individual's decision to seek formal care or not.

According to Mahapatro (2012) the socio-economic and demographic variables are highly significant and consistent predictors of health seeking behavior of women in India. Particularly education of the women as well as economic status of household has strong positive association with health-care utilization. Like education, women living in urban area are more likely to use maternal and child health care services particularly institutional delivery as well as antenatal care. The strongest influence is exerted in all indicators except caste and husband's occupation in most of the maternal and child health care services.

This shows women who have some education are more likely to utilize maternal health services than women who have no education. Likewise women belonging to higher wealth are about two

to five times more likely to utilize maternal health care services and it is 11 times in the case of institutional delivery. Residing in urban area enhances the likelihood of using maternity services. However, the lower utilization in rural area can be attributed to lack of availability and accessibility of facilities. Husband's occupational status does not have a relation with health care utilization. Women do not find the need for husband's support for utilizing such services. The reason may be due to ease and adequate availability of health care facilities.

According to Teferi & Sundara (2013) worked on the demand for traditional health care services in rural Ethiopia in Gamo gofa zone, eastern abaya district. The higher the age of the patient, the household size, monetary cost of treatment, distance from health care and the availability of female patients reduce the choice for modern health care but household wealth and severity of illness would be expected to increase the demand for modern health care. Even though their objective is on traditional health care in the way they analyze the demand for modern health care services using multinomial logit model and the type of data used by this researcher is cross sectional type data.

According to Belay (2013) log of consumption, patient's age, patient's education, and perceived quality of treatments are found to be significant factors but patient's age and patient's sex are insignificant factors that affect the choices between health care services providers. Household head education, number of days suffered and number of children in a household significantly affect the decision of consulting modern care. However, number of adult in the household head sex, and household age are found insignificant determinants of demand for health care services.

According to Tesfaye (2003) the level of healthiness, family structure (number of children), consumption level, patient's age and perceived quality of treatment are important factors that determine the demand for curative health care. The study also suggested that the price insensitivity of the demand for curative health care services. However the price insensitivity decreases as prices increase and as income decreases. This implies that the poor are more price sensitive than the rich. Both researchers collected primary data through structured questionnaires and analyzed the data using nested multinomial logit model.

2.3 Conceptual Framework

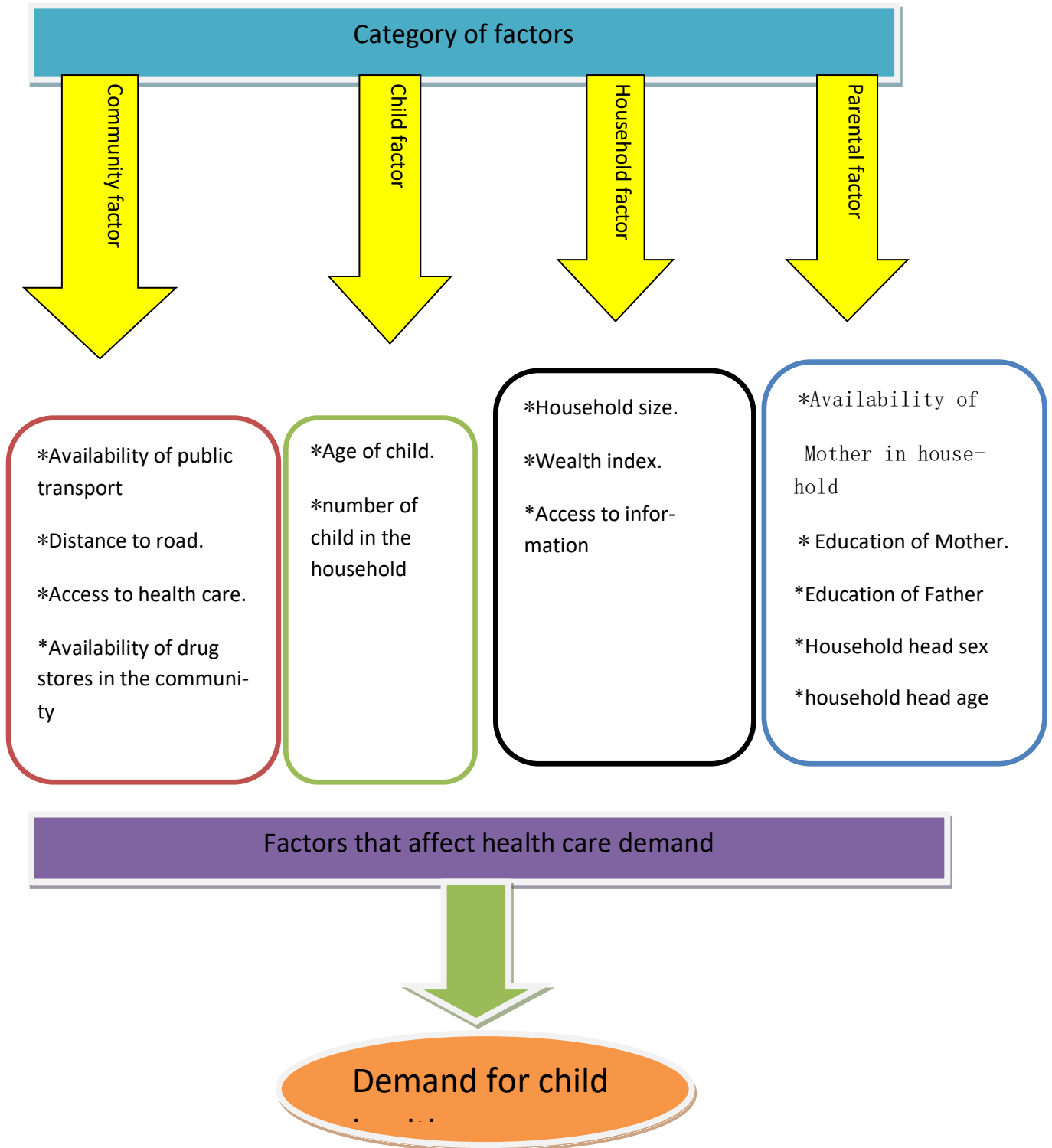


Figure 2 Conceptual framework from own source.

Conceptual framework is products of qualitative processes of theorization. According meskerem 2017 refers Maxwell 2005 conceptual frame work is” the system of concept, assumptions, expectations, beliefs and theories that supports and informs your research. It shows cause and effect relationship between the dependent and the independent variables. The communality factors Availability of public transport, Distance to road, Access to health care and Availability of drug stores in the community are more or less they are geographic and outside factors which affect the demand of child for the health indirectly that means health care users cannot control on it. Education of Mather and father is important parental factor which determines the children demand for health care, children’s whose parents have highest education level can get higher chance of using modern health care. And another parental factor which affects the demand for child health care is household head age the probability of using modern health care is less when the household head is older because of less understanding and less information about modern health care. The household factors are Household size, Wealth index and Access to information those factors affects the health care demand of the child in comparison with other households. Finally child factor which affect the demand are age of child and number of child in the household the later is more strong determinate of health care demand of child because it shows the resource sharing between children’s in the household and the dependence ratio in the household.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design and Approach

The objective of the study was to identify and analyze factors that affect the demand for child health care in rural Ethiopia. To achieve the above objective the researcher employed quantitative approach. The dominant research design used in order to analyze the demand for child health care and to test the research question should be addressed well was casual. In addition descriptive research design was used to explain the variables and to support econometric finding.

3.2 Data Sources and Type

The researcher used Ethiopian Socioeconomic Survey data which done in the country level in all regions and city administration by World Bank and CSA. The type of data was secondary data which collected through stured questioner in the year 2015-16. The total enumeration area was 433 and 5,262 households and the majority of the sample comprises rural areas from the total enumeration area 433 out of which 290 were rural, 43 were small town EAs and 100 were EAs from major urban areas .However from the above total data because of time limitation the researcher used household and community data of rural oromia which comprises 55 enumeration area and 641 households .The data is enough for the analysis because it contains use full information to analyze the study.

3.3 Method of Data Analysis

The study employed both descriptive and econometric method of analysis using the data from Ethiopian Socioeconomic Survey. Descriptive analysis such as percentage mean was used to explain and analyze the variables. The econometric analysis was used nested multinomial logistic regression using full information maximum likelihood technique. Heterosedasticity, Multicollinearity tests are made to assume that the variance of the errors is constant across the observations and to test for the relationship between dependent and independent variables as well as among the independent variables.

3.4 Model Specification

The existence of IIA (Independence of Irrelevant Alternatives) is usually taken to be synonymous with the use of a Logit model in the various literatures. The Logit model has been extended by McFadden (1978) to the Generalized Extreme Value (GEV) model and McFadden (1981) to the Nested Multinomial Logit (NMNL) model. To tackle the problems associated with the IIA property inherent in Logit while retaining computational tractability and also to allow for the testing of the IIA property these extensions are designed. Two alternative tests for IIA are proposed by Hausman and McFadden (1984). The first test is an application of Hausman's (1978) specification error test. The idea is simple: if the IIA property is valid, then the model structure and parameters are unchanged when choice is analyzed conditional on a restricted subset of the full choice set. The second test proposed in Hausman and McFadden (1984) is a classical large sample (i.e. asymptotic) test (namely a Likelihood ratio, Wald or Lagrange multiplier test). While the use of the first specification test requires no specific alternative, the second test specifies an alternative model, the so called NMNL model. The idea of an NMNL model is to make relative probabilities of choosing two alternatives in a choice set dependent on characteristics of not only these two alternatives, but also other alternatives in the choice set. The NMNL is not the only alternative model that we could specify. The sets up the DOGIT model as the alternative to the Multinomial Logit model. Further alternatives could be considered but it must be pointed out that the use of an alternative model specification does not represent a model selection exercise. The alternative used is merely the departure from the null in the direction in which high power of the test is desired according to Silberhorn.etal, (2006).

According to Silberhorn.etal(2006) as cited from (Guadagni and Little, 1998) discrete choice decisions in the context of random utility theory is usually done with the multinomial logit model (MNL). But the MNL assumes proportional substitution patterns (Independence of Irrelevant Alternatives). To overcome this restrictive assumption, the nested logit model can be used for estimation in practical applications. The nested logit model admits more general substitution patterns and nevertheless remains, in contrast to the probit model for example, analytically tractable. The existence of two unequal forms of the nested logit model has been under researched so far. The utility maximization nested logit (UMNL) model and the non-normalized nested logit (NNNL) model have different properties which impact the estimation results. In many publica-

tions, the specification used is not explicitly mentioned. Both in simulation studies and in model estimations with real data, the implemented nested logit model specification within the software needs to be considered. Because of the advantage listed above and it avoid the difficulty of other related models like MNL and logit model the NMNL Model is chosen.

The estimation is based on the fact that from all children their health status can be check whether they are sick or not sick, from those who sick check what is the household decision seek medical care or not and finally from which provider he or she use the health care . According to belay (2003) this the demand for health care modeled based on the previous study of Gertler et al. (1987), Mwabu et al. (1993), Kasirye et al. (2004) and Gertler & Van der Gaag, (1990).

$$U_{ij} = U_{ij}(H_{ij}, C_{ij}; T_j) \text{-----} 1$$

Where: H_{ij} - is expected health improvement of individual i after receiving treatment from provider j .

C_{ij} - consumption of non-health goods possible after meeting health care cost at j th provider and

T_j - represents the indirect individual costs such as travel time incurred by consulting the j th provider.

H_{ij} which is the improvement in the health status is function of community factors (Availability of drug stores , distance to road and Access to health care facility , Access to public transport), child factors (Age of child ,Number of child in the household),household factors (household size ,Access to information ,Wealth index) and parental factors(Education of father ,Education of mother Availability of mother in the household, Household head age, Household head sex).

$$H_{ij} = h(X_i, Q_j) + \epsilon_{ij} \text{-----} (2)$$

X_i ;factors specific to a particular provider such as availability of drugs and qualified health staff, Q_j ; and unobservable heterogeneity characteristics at individuals, household and facility level, ϵ_{ij} , that affect improvement in health, the health status. H_{ij} is equal to zero for those use

self care treatment and no care because of the Assumption of there is no improvement in the health status for those not seeking care.

$$C_{ij} = c(Y_i - P_j) \text{-----} (3)$$

The disposable income held by the i th individual after consulting a health care provider is a function of her/his individual income, Y_i ; and price, p_j , she(he) pays at the j th provider representing both direct costs such as user fees and indirect costs such as travel and waiting time specific as expressed in equation (3). Price equals zero for no care. Substituting equations (3) and (2) in to (1), we get a conditional utility function as expressed in to (4).

$$U_{ij} = h_{ij}(x_i, Q_j) + c(Y_i - P_j) + \varepsilon_{ij} \text{-----} (4)$$

The utility further expressed as follows:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \text{-----} (5)$$

Where $V_{ij} = h_{ij}(x_i, Q_j) + c(Y_i - P_j)$ is the deterministic part of utility. The i th individual chooses the j th provider, which yields the greatest level of satisfaction given all alternatives even the choice of no-care or self-treatment. An individual will choose the no-care option for instance if the utility derived from this op We assume that $h_{ij}(x_i, Q_j)$ is linear in X_i and Q_j . The coefficient

Vectors for the X_i are denoted by β_j while those of Q_j as α_j and these coefficients are allowed to vary across options.

We assume that $h_{ij}(x_i, Q_j)$ is linear in X_i and Q_j . The coefficient vectors for the X_i are denoted by β_j while those of Q_j as α_j and these coefficients are allowed to vary across options. Therefore, β and α are vectors of parameters to be estimated. On the other hand, a non-linear empirical specification of $c(Y_i - P_j)$ is employed to avoid responsiveness of prices being independent of income. This study will adopt the functional form used in Sahn et al. (2003) and Kasirye et al.(2004) as expressed in equation (6). In other words, the empirical specification is based on a semi-quadratic utility function, which is linear in health and quadratic in logs of consumption of non-health goods. Gertler and Van der Gaag (1990) show that if the utility function in Equation

(1) is linear in health status and quadratic in consumption, it is consistent with well-ordered preferences.

$$c(Y_i - P_j) = \alpha_1 \times \ln(Y_i - P_j) + \alpha_2 \times [\ln(Y_i - P_j)]^2 \text{ ----- (6)}$$

where the α s are assumed to be equal across provider options. However, the function $C(Y_i - p_j)$ will be very similar across options as costs are small relative to income. Because this complicates the optimization, the function approximated as:

$$c(Y_i - P_j) \approx \alpha_1 [\ln(Y_i) + \ln(1 - P_j / Y_i)] + \alpha_2 [\ln(Y_i) + \ln(1 - (p_j / Y_i))]^2$$

$$c(Y_i - P_j) \approx \alpha_1 [\ln(Y_i) + \ln(1 - P_j / Y_i)] + \alpha_2 [\ln(Y_i)^2 + 2\ln(Y_i) \ln(1 - (p_j / Y_i)) + \ln(1 - (p_j / Y_i))^2]$$

$$c(Y_i - P_j) \approx \alpha_1 [\ln(Y_i) - P_j / Y_i] + \alpha_2 [\ln(Y_i)^2 - 2 \ln(Y_i)(p_j / Y_i)] \text{ -----(7)}$$

However, $\ln(Y_i)$ and $\ln(Y_i)^2$ are constant across provider options. On the other hand, the logit identifies only the difference in utilities, $V_{ij} - V_{i0}$, where V_{i0} is a reference utility, which in this case refers to no-care and we normalize it to zero. Thus after taking the difference in utilities we get:

$$V_{ij} - V_{i0} = \beta'X + \phi'Q + \alpha_1(-p_j / Y_i) - \alpha_2 [2\ln(Y_i)(P_j / Y_i)] \text{ -----(8)}$$

Where V_{i0} is reference utility (utility of no care), V_{ij} is utility of provider j , Q is quality of provider j and p is cost of treatment at provider J .

3.5 Empirical Specification

According to belay (2013) as cited from (McFadden 1981) it is possible to achieve the objective of determining the probability of choosing a particular health care provider from the alternatives based on empirical specification. From expression (6) the probability of choosing a private health care provider for example, will equal to probability that the utility from private health care is greater than the utility from public health care. Following the health care demand literature, the choice probabilities are expressed a nested multinomial logit. In this case that the jth provider is chosen is expressed as in equation.

$$Pr(\text{provider}=j) = \frac{\exp\left(\frac{v_j}{\sigma}\right) \left[\sum_{k=2}^K \exp\left(\frac{v_k}{\sigma}\right) \right]^{\sigma-1}}{\left[\sum_k \exp\left(\frac{v_k}{\sigma}\right) \right]^\sigma} \text{-----}9$$

Where ; j indexes the lower level nests (provider choice) such as private provider; k indexes the upper level nest (no care or care); V_j is the indirect utility associated with provider j; V_k is the indirect utility associated with upper level nest; and ζ is the measure of the degree of independence in unobserved utility among the alternatives in nest k. $\sigma-1$ is the correlation in the error term for private and public health care providers .

If σ is equal to one it implies that the correlation of the disturbances within the group is zero and the NMNL model will collapse to MNL model. On the other hand, if σ is zero the correlation between the errors terms of the nested groups are one. Therefore, the parameter of the inclusive value should lie within a unit interval to be consistent with a stable utility maximization. Researchers use this parameter to test whether the groping (nesting) structure of the model is appropriate. If for instance σ lies outside the range of 0 and 1, it implies that the nesting structure is inappropriate. The probability of seeking modern medical treatment expresses as

$$p_m = \frac{\exp[V_m + (1-\sigma) I_m]}{\sum_{i=1}^2 \exp V_i + (1-\sigma) I_m} \text{-----}10$$

The inclusive value for the modern treatment category expressed as;

$$I_m = \ln \left(\sum_{i=1}^2 \exp(Z_i) \right) \text{-----11}$$

Where: P_m is the probability of seeking modern medical treatment; V_m is the utility associated with modern treatment; $(1-\zeta)$ measure correlation coefficient within modern care; i is alternatives in modern care; V_i utility associated with alternatives in modern care; value of inclusive value in the modern care; and Z_i are factors that affect the decision of choosing between modern care alternatives according to belay (2013) as cited from (McFadden 1981, Mandela 1983, Greene1997).

3.6 Estimation Issue

The econometric model was used in this study identified as NMNL. This model can be estimated by full information maximum likelihood estimation it is an efficient technique that estimated both upper level and lower level models simultaneously depending on the level of decisions that are dependent on relevant alternatives available to the consumer. The econometric model was used in this study identified as NMNL. This model can be estimated by full information maximum likelihood estimation it is an efficient technique that estimated both upper level and lower level models simultaneously depending on the level of decisions that are dependent on relevant alternatives available to the consumer. The decision of household will analyze in the way that like branches of tree the first step is identifying whether the child is sick or not then if he or she sick the next decision is weather child visit health care or not ,If the Child visits health care facility then which facility they use from different health care providers. The decision after the child sick is the concern of the research which the study estimated in this paper these options are described in the diagram below.

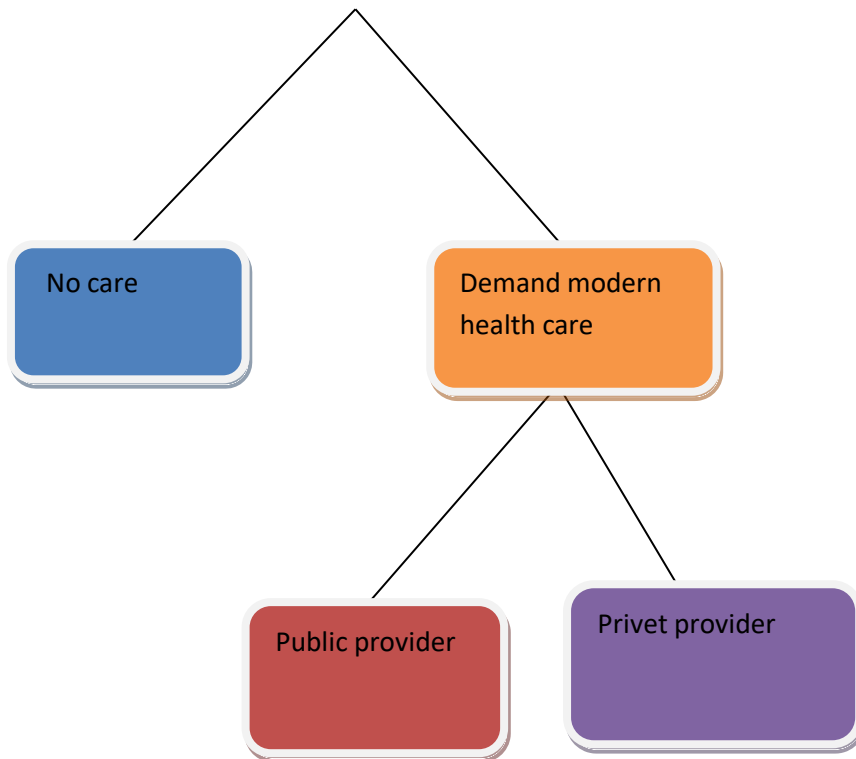


Figure 3 Nested Stature of Demand for Child Health Care source from Belay (2013)

3.6 Variables and Measurements

In this study child factor, household factors, parental factor and community factors that affected the demand for child health care are described .In the table below the dependent variable child health care and various upper level explanatory variables which affected it are described. And in the table 3.2 the dependent variable health care provider choice and lower level explanatory variables which affected the provider choice of sick children's are described

Table 3.1 variable definition of health care demand (upper level model)

0 = no care 1 = modern care (modern care Vs no care)	
Upper level variables	Description of explanatory variables
Father_ grade	Education level of father
Mother_ grade	Education level of mother
Dist_asfalt	distance to asphalt road in kilometer
Hosp_center	Availability of hospital or health center (yes = 1 no = 0)
Accpubtra	Access to public transport (yes =1 no = 0)
Number_child	Number of children in the household
Mother_inhh	Availability of mother in household (yes =1 no = 0)

Dependent Variable

Child Health Care Demand – is health sick behavior of individuals the demand for child health care can be affected by many factors like price ,health information or knowledge , income level , distance and other house hold characteristics. The Demand for health care is unlike the demand for most consumer products and services because while the desire for consumer products and services comes from direct consumption, the desire for health care not derived directly from the consumption of the medical producers themselves; rather, it comes from direct value of improved health that is produced by health care (ERP, 2008)

Explanatory variables

Education of Father'- Greater amount of education may enable a person to recognize early symptoms of illness, resulting in the patient's greater willingness to seek early treatment. The highest education father's spends more for preventive services and less for curative services chang (1992) as cited from (Akin, et al 1981). And educated fathers motivated to seek modern care than other cares other than modern care like traditional and self care.

Education of Mothers' The mother's education is crucial because she usually supervises the also household. . In the Philippines, mother's education was found important in determining whether or not a sick child was taken for treatment In over 50 percent of the cases, the most educated mothers used private modern practitioners, while the least educated mothers chose the same type only 25 percent of the time according to chang(1992) as cited from (Akin, et al 1981). From above evidence I expect that mother's education have positive effect on demand for child health care.

Access to Health Care- According to chang (1992) as cited from Akin, Guilkey, and Popkin (1981) distance has been the most studied hindrance to the use of health facility. The more distant a facility is from potential users, the less likely it is to be visited. Akin, Guilkey, and Popkin (1981) discovered this to be true in the case of child-outpatient visits in the Philippines. However, they argues that the preoccupation of planners with the distance of health facilities may indicate attention to an inappropriate proxy for truer items of interest—travel cost and travel time. He says: There is a one-to-one relationship among these variables only if everyone uses exactly

the same mode of transportation, such as walking at exactly the same speed. Reducing the distance to health facilities is, moreover, not the only way to reduce trip time and transportation costs... the economic 'distance' to facilities can be reduced by improving roads or providing new forms of transportation. Therefore if there is longer distance to facility I expect positive effect on child health care demand.

Distance to the Road- Transport infrastructure and services have significantly improved the livelihoods of poor people living in rural areas. Transport facilitates the timely and affordable delivery of basic health. Lack of transport and cost of transport are important reasons why people do not use healthcare services, especially services requiring a referral. "The most impoverished – usually rural areas have few or no health care facilities, or the means to transport people for medical assistance. About 90 per cent of children dying die at home, often without their families even seeking health care" (WHO/UNICEF ,2010).From this I expect negative effect of distance to road.

Number of Child in the Household with increase in the number of child in the family there is resources sharing with them and this reduce the probability of getting health care.

Table 3.2 Variable definition of health care provider choice (lower level model)

<p>Health care provider choice (dependent variable)</p> <p>0 = no care</p> <p>1 = private health care provider</p> <p>2 = public health care provider</p>	
Upper level variables	Description of explanatory variables
Hh_size	Household size
Child_ageyear	Age of child in year
Accesinfo	Access to information (availability radio in the household)
Hhhead_age	Household head age in year
Hhhead_sex	Household head sex (0 = female 1= male)
Avilbdrugsto	Availability of drug store (yes =1 no = 0)
Wealth index	<p>wealth index (tropical livestock unit = TLU value of cattle, small Ruminates (sheep & goat) and poultry are added to get total livestock Unit and used as wealth index, the conversion factor is 0.7 for cattle, 0.1 For small Ruminates and 0.01 for poultry according to Hans JAHNKE as cited from (FAO production book, 1979).</p>

Access to Public Transport is a critically important aspect of health care utilization. This is especially true in rural areas where individuals often have to travel long distances to access health care services. Previous research has shown that increased distance between residents and health care providers decreases utilization of health care services. The problem becomes compounded when a growing portion of residents in rural areas such as the Upper Great Plains are older adults who need access to health care services but may have limited transportation options. There are an increasing number of senior citizens living in rural areas who would prefer to age in place but may be forced into moving to improve their access to health care. Public transportation could play an important role in providing rural residents access to health care while allowing them to stay where they prefer to live. (Mattson, 2010)

Availability of Mother in the Household the availability of mother may have positive or negative effect on health care use of child depending on mother's choice of modern health care and self care.

Age of Child - The incidence of illness varies with age, so does the need for health care. The presence of children and in the family raises the frequency of illness, which in turn increases the use of health services. This confirms that this is true of households with children 0- 5 years old according to Chang(1992) cited (Paqueo, 1977) so I expect positive effect.

Household Size - The effect of family size on the use of health services is unpredictable. A large family has a higher frequency of illness since it has more potential patients. However, it has less income per capita than a small family belonging to the same income level. This may reduce a large family's actual use of health services because of lower purchasing ability. Moreover, a large family may have enough people at home to care for a sick member. This compensates or substitutes for additional days of hospital care. (Chang, 1992).because of the above argument I expect positive or negative effect of family size child health care demand

Wealth Index - the wealthiest family have higher actual use of health service because they are able to afford the cost (Chang, 1992). This is the so-called double effect it is not a statistically significant determinant in the total demand for health care services. Nevertheless, income greatly increased the demand for modern private health care facilities than for public utilities because of this evidence I expect both positive and negative effect.

Availability of Drug Store in the Community the availability of drug store may negatively affect consulting formal modern health care by using common medicines without consulting health officer or doctor on the other hand it may support the use of modern health care by serving as an ingredient to it.

Household Head Age as age is older the level of understanding health information decline as a result of this there decision to use modern care facilities may also reduce.

Household Head Sex some social, psychological and physical barriers prevent women's from seeking modern health care as that of men's this effect goes to children's with female headed household .

Access to Information basic education and information through mass media improves the use of health care in rural areas by improving their understanding on modern health care uses. Increasing information about the health service quality increases choice of visiting health provider relative to self treatment. It appears that private health facilities benefit more from the information set that households possess about the quality of health care being offered in the study area (Moses K. Muriithi ,2013)

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Descriptive analysis Results

The study was employed cross sectional data which is collected by World Bank and CSA on the Ethiopian socioeconomic survey .In this part of the study general description of some variables and the effect of important variables on the demand for modern health care and health care provider choice were discussed with tables through frequency and percentage.

As shown in the table 4.1 the study covers about 555 children's with the age of 0 to 5 from which about 492(88.65 %) were not sick children's and 63(11.35) were sick children's. The part of children's who are sick were described with table in the later part of the study in terms of their need of using modern medical care and provider choice .

Table 4.1 The Health Status of Child in Rural Oromia

Health status of Child	Frequency	Percentage
Sick	63	11.35
Not sick	492	88.65
Total	555	100

Source: Own Computation from Ethiopian Socioeconomic Survey Data (2015/2016)

Table 4.2 Demand for modern health care & provider choice in terms of sex of child

Demand for modern health care	Child sex			
	Description	Female	Male	Total
Seek modern care	Frequency	19	18	37
	%	59.38	58.06	58.73
Seek no care/self care	Frequency	13	13	26
	%	40.63	41.94	41.27
Total	Frequency	32	31	63
	%	100	100	100
Pearson chi2(1) = 0.0112		pr = 0.91		
Health care choices	Description	Female	Male	Total
Public provider	Frequency	11	13	24
	%	34.38	41.94	38.10
Privet provider	Frequency	8	5	13
	%	25	16,13	20.63
No care/self care	Frequency	13	13	26
	%	40.63	41.94	41.27
Total	Frequency	32	31	63
	%	100	100	100
Pearson chi2(1) = 0.8433		pr = 0.656		

Source: own computation from Ethiopian Socio Economic Survey Data (2015/2016)

The result in the table 4.2 tells us from the total of 63 sick children's 32 were female children's and 31 were male children's there is almost same number of male and female children's. The distribution of seek children's described at the table 4.2 out of 32 children's who are sick 19(59.38%) were sick modern health care but 13(40.63%) were not seek modern health care. And from male children's who are sick 18(58.06%) were seek modern health care but 13(41.94%) were not seek modern health care. This result showed that there is similarity between the demand for male children's and female Children's that means sex of child has not important effect of modern health care demand of children's.

As table 4.2 shows the modern health care provider choice of sick children's in terms of sex of child can be presented as from the total of 63 sick children's who were sick 24(38.10%) were visited public provider care, 13(20.63%) were visited private provider care and 26(41.27%) were seek no care or use self care option. When we look what I discussed before in terms of gender bases out of 32 female children's who were sick 11(34.38%) and 8(25%) were visited public providers, private providers respectively the remaining 13(40.63%) were seek no care or used self care option. on the other hand from 31 male children's who were sick 13(41.94%) and 5(16.13%) were visited private and public providers respectively and the remaining 13(41.94%) were seek no care or used self care option. In literature because of discrimination or favor to male sex I was expected male children's would get more medical treatment than female but the result of the table suggested that there is almost the same percentage of children's got medical treatment in male and female children's who were sick.

Table 4.3 Demand for health care and provider choose in terms of access to health care

Demand for modern health care	Community has hospital or health center			
	Description	Yes	No	Total
Seek modern care	Frequency	17	20	37
	%	77.27	48.78	58.73
Seek no care/self care	Frequency	5	21	26
	%	22.73	51.22	41.27
Total	Frequency	22	41	63
	%	100	100	100
Pearson chi2(1) = 4.7954		pr = 0.029		
Health care choices	Description	Yes	No	Total
Public provider	Frequency	11	13	24
	%	50	31.71	38.10
Privet provider	Frequency	6	7	13
	%	27.27	17,03	20.63
No care/self care	Frequency	5	21	26
	%	22.73	51.22	41.27
Total	Frequency	22	41	63
	%	100	100	100
Pearson chi2(1) = 4.7958		pr = 0.091		

Source: Own computation from Ethiopian socio economic survey data (2015/2016)

As the table 4.3 indicated from the total of 63 who are sick 37(58.73) were seek modern health care and 26(41.27%) were seek no care or use self care option. From those who said yes we have hospitals or health centers in my community out of 22 children's 17(77.27%) were seek modern health care and 5(22.73%) were seek no care or use self care option. On the other hand from those who said there is no hospital or health center in my community 20(48.78%) were seek modern health care but 21 (51.22%) seek no care or use self care option. From this we understand that peoples which have access to hospital or health centers get modern medical treatment in greater proportion than not have access. This result is compatible with I expected in literature part. Since the p- value is less than 0.05 it is 0.029 there is significant relationship between having hospital or health center in the community and seeking modern health care.

When we see choose of providers terms of availability of hospitals and health centers from those who said yes there is hospitals or health centers in my community 11(50%),6(27%) were visited public and privet providers respectively but 5(22.73) of them were seek no care or used self care option. From 41 of them said there is no hospitals or health centers in my community 13(31.71%), 7(17.07%) were visited public and privet providers respectively but 21(51.22. %) of them were seek no care or used self care option. The result of the table shows those who have access to hospital or health center uses public and privet providers in higher proportion than those who have not access to hospital and health center and the p-value is 0.091 it suggests there is significant relationship between access to health care and health care provider choices.

Table 4.4 Demand for modern health care in term of distance to asphalt road

Demand for modern health care	Distance to asphalt road			
	Description	Less than mean distance to asphalt road	Greater than mean distance to asphalt road	Total
Seek modern care	Frequency	28	9	37
	%	67.74	50	58.73
Seek no care/self care	Frequency	17	9	26
	%	32.26	50	41.27
Total	Frequency	45	18	63
	%	100	100	100
Pearson chi2(1) = 0.7924		pr = 0.373		

Source: Own computation from Ethiopian socioeconomic survey data (2015/2016)

As indicated in the table 4.4 out of 45 whom they live in the distance less than mean distance to asphalt road 28(67.74%) were seek modern health care and 17(32.26%) were seek no care or used self care option. On the other hand out of 18 whom they live in the place where the distance is greater than mean distance to the asphalt road 9(50%) were seek modern health care and 9(50%) were seek no care or used self care option.

The above discussion showed that in the distance less than to the mean distance to asphalt road the modern health care use is higher than that of not using modern care or using self care. But in larger distance to the asphalt road children’s visited modern health care equally with the no care or self care option.

Table 4.5 Distribution of demand for modern health care provider choose in terms of fathers education level

Demand for modern health care	Fathers education level						
	Description	No education	Informal education	Primary education	Secondary education	Above secondary	Total
Seek modern care	Frequency	18	1	20	3	3	45
	%	60	100	80	100	75	71.43
Seek no care /self care	Frequency	12	0	5	0	1	18
	%	40	0	20	0	25	28.57
Total	Frequency	30	1	25	3	4	63
	%	100	100	100	100	100	100
Pearson chi2(1) = 4.4450							pr = 0.349

Source: Own computation from Ethiopian socioeconomic survey data (2015/2016)

The cross tabulation result of table 4.5 above suggested that with the increase in the education level of father's the percentage share of children's who get treatment of modern medical care increased. This can be shown by increase of percentage from 60% in no education level to 80%, 100% and 75% in primary, secondary and above secondary education levels respectively and also those not seek medical care decreases with increasing education level it decreases from 40% in no education level to 20%, 0% and 25% in primary, secondary and above secondary education levels respectively.

The result of the table above showed that with the increase in the level of fathers education the percentage share of children's who visited modern health care increased and the percentage share of children's who were not visited modern health care or used self care decreased and the result also similar with what is written in the literature part.

Table 4.6 Demand for health care and provider choose in terms of household head age.

Demand for modern health care	Household head age			
	Description	Less than mean household head age	Greater than mean household head age	Total
Seek modern care	Frequency	24	13	37
	%	66.67	48.78	58.73
Seek no care/self care	Frequency	12	14	26
	%	33.33	51.85	41.27
Total	Frequency	36	27	63
	%	100	100	100
Pearson chi2(1) = 2.1830		pr = 0.140		
Health care choices	Description	Less than mean household head age	Greater than mean household head age	Total
Public provider	Frequency	13	11	24
	%	36.11	40.74	38.10
Privet provider	Frequency	11	2	13
	%	30.56	7.41	20.63
No care/self care	Frequency	12	14	26
	%	33.33	51.85	41.27
Total	Frequency	36	27	63
	%	100	100	100
Pearson chi2(1) = 5.3757		pr = 0.068		

Source: Own computation from Ethiopian socio economic survey data (2015/2016)

In the table 4.6 utilization of modern health care and health care provider choice were discussed in terms of the age of household head .From the total of 36 sick children's whose household head age were less than mean father age about 24(66.67%) were seek modern health care and 12(33.33%) were not seek modern health care or used self care option. But from 27 sick children's whose household head age were greater than mean average age of household heads 13(48.15%) were seek modern health care and 14(51.75%) were not seek modern health care or used self care option.

This showed that utilization of modern health care decreased when the age of household heads were higher and utilization of modern health care increased with lower age of household heads this showed there is inverse relationship between utilization of modern health care and age of household head the result contradict with the theoretical part which suggested that their ambiguous relationship between age and health care uses.

On the other hand when we look health care provider choice by the age of household head out of 36 children's whose household head age were less than mean average household head age 13(36.11) and 11(30.56%) were visited public and privet providers respectively but 12(33.33%) were not visited any provider or used self care option. And also from 27 sick children's whose household head age were greater than mean average household head age 11(40.74%) and 2(7.41%) were visited public and privet providers respectively. Others 14(51.85%) were not visited any provider or used self care option.

The above result showed in the table 4.4 explained that children's whose household head age were lower than mean age used privet providers in greater proportion than whose household head age greater than mean household head age but those children's whose household head age were higher than mean household head age used public provider in higher proportion than those whose household head below mean household head age. This means there were direct relationship between ages of household head public providers use but there were inverse relationship between age of household head and use of privet provider. The p-value is 0.068 therefore there is significant relationship between household head age and health care provider choice.

Table 4.7 Demand for health care in terms Availability of public transport in the community

Demand for modern health care	Availability of public transportation in the community			
	Description	Available public transportation in the community	Not available public transport in the community	Total
Seek modern care	Frequency	30	7	37
	%	68.18	36.84	58.73
Seek no care/self care	Frequency	14	12	26
	%	31.82	63.13	41.27
Total	Frequency	44	19	63
	%	100	100	100
Pearson chi2(1) = 5.3773		pr = 0.020		

Source: Own computation from Ethiopian socioeconomic survey data (2015/2016)

As table 4.7 indicated the availability of transportation and modern health care demand have significant relationship. Out of 44 children's who have access to public transportation 30(68.18%) were seek modern health care and 14(31.82%) were not seek care or used self care option. On the other hand from 19 children's who have no access to public transportation 7(36.84%) were seek modern health care and 12 (63.16%) were not seek modern health care or used self care option. Since the p-vale is less than 0.05 which is 0.02 there is significant relationship between availability of public transportation and modern health care demand of children's the result concede with the literature part.

Table 4.9 choice of health care providers in terms of availability of drug stores in the community

Health care choices	Availability drug store in the community			
	Description	Available drug store in the community	Not available drug store in the community	Total
Public provider	Frequency	8	16	24
	%	33.33	41.03	38.10
Privet provider	Frequency	8	5	13
	%	33.33	12.82	20.63
No care/self care	Frequency	8	18	26
	%	33.33	46.15	41.27
Total	Frequency	24	39	63
	%	100	100	100
Pearson chi2 (1) = 2.7332		Pr = 0.098		

Source: own computation from Ethiopian socioeconomic survey data (2015/2016)

In the table above health care provider choice described in terms of availability of drug stores in the community from 16 there were drug store in their community 8(50%) were visited privet health care providers and 8(50%) were visited privet health care providers. And from 21 of them there was no drug store in their community 16(76.19%) were visited public health care providers and 5(23.81%) were visited privet health care providers.

This table above showed that there was proportional use of public and privet providers in the community there were drug store available. But there were higher proportion of Children's visited public health care providers in the community drug store not available. Since the p-value is 0.098 there is significant relationship between availability of drug store and health care provider choice.

Table 4.10 Demand for modern health care provider's choice of children's by the household head sex.

Health care choices	Household head sex			
	Description	Male	Female	Total
Public provider	Frequency	12	12	24
	%	38.71	37.50	38.10
Privet provider	Frequency	8	5	13
	%	25.81	15.63	20.63
No care/self care	Frequency	11	15	26
	%	35.48	46.88	41.27
Total	Frequency	31	32	63
	%	100	100	100
Pearson chi2 (1) = 1.2921		Pr = 0.524		

Source: Own computation from Ethiopian socioeconomic survey data (2015/2016)

The gender of household head is one of the factors which affected the health care provider choice of children's. Out of 31 children's with male headed household 12(38.71%) and 8(25.81%) were choice public and privet health care providers respectively but 11(35.45%) were choices no care or self care options. Also from those 32 female headed households 12(37.50%) and 5(15.63%) were choices public and privet health care providers respectively but 15(46.88%) were choices no care or self care option.

According to the above result children's with male headed household uses privet health care provider choices than children's with female headed households. On the other hand as compared to male headed household children's with female headed households used no care or self care option.

4.11 Demand for modern health care provider's choice of children's in terms of access to information

Health care choices	Household access to information			
	Description	Household has no access to information	Household has access to information	Total
Public provider	Frequency	19	5	24
	%	40.43	31.25	38.10
Privet provider	Frequency	8	5	13
	%	17.02	31.25	20.63
No care/self care	Frequency	20	6	26
	%	42.55	37.50	41.27
Total	Frequency	47	16	63
	%	100	100	100
Pearson chi2 (1) = 1.5088		Pr = 0.470		

Source: Own computation from Ethiopian socioeconomic survey data (2015/2016)

As shown in the above table from the total 47 children's who have no access to information 19(40.43%) and 8(17.02%) were choice public and privet health care providers respectively, but 20(42.55%) were seek no care or used self care option. From the total of 16 who have access to information 5(31.25%) and 5(31.25%) were choices public and privet health care providers respectively, but 6(37.50%) were seek no care or used self care options.

In the above result having access to information has a positive impact on privet health care provider's use but it have a negative impact on pubic health care providers use. It means the percentage of privet health care provider use is higher in those who have access to information as compared to with those who have no access but in contrast the public health care provider choice is lower in those who have access to information as compared to those who have no access.

4.2 Econometric Result

The econometric analysis discussed in this part was analyzed child health care seeking behavior and health care provider choice which was done by nested multinomial logit model using full information maximum likelihood estimation method. Unlike multi-stage sampling method of estimation this estimation method estimated the entire model in single phase and all parameters estimated simultaneously. This estimation approach is more efficient than that of multi-stage estimation approach. To solve standard error across observation robust test was done in the model and the multicollinearity test result also shown in the appendix part.

4.2.1 Modern Health Care Utilization

The child health care demand of upper level model of nested multinomial model which is choice between seeks no care and seeks for modern health care is showed in the table 4.13 below and the child health care demand of lower level nested multinomial logit model result for provider choice between private and public provider by using no care as base discussed in the table 4.14. The sign and the significance of explanatory variables were discussed in terms how they affected the demand for child health care demand when they are ill or injured. Know the part of the study which analyzed factors which affected the use of modern health care (upper level model) is presented in the table 4.13. No care (self care) were used as base to discuss modern health care use of children's in rural Ethiopia particularly it is case study in oromiya region .

4.2.1.1 Modern Health Care Demand of Children's and its Determinant

Education of father is positive and significant ($p < 0.05$) parental factors which affected the demand for modern health care. The positive sign showed that as the level of education of fathers grows up the demand for modern health care of children's also become higher. This means there is direct relationship between children's demand for modern health care and father's education level because as father's education level become higher and higher the knowhow to use modern health care increased instead of using self care or other option other than modern health care the result is similar to what expected in the theoretical literature review and concedes with the finding of Moses K. Muriithi(2013) .

Distance to asphalt road is significantly ($p < 0.05$) and negatively affected children's demand for modern health care uses. The negative sign showed that as the society far away from infrastructures like asphalt road from their place they lived, the children's demand for modern health care

decreased. But if they near to the asphalt road their demand for modern health care should be increased and this finding is consistent with theoretical literature review.

Availability of health care in the community is one of the important community factors which positively and significantly ($p < 0.05$) affected the demand for modern health care of children's. Especially in the countries like Ethiopia most of their population lives in the rural areas this is crucial factor in determining the demand for modern health care this result concede with the finding of (Mahapatro, 2012)

Access to public transport is also another community factor which significantly ($p < 0.1$) and positively affected children's demand for modern health care. The positive sign indicates availability of public transportation facilitated modern health care visit of the society by increasing their demand the result is similar to what expected in theoretical part and with descriptive analysis.

Table 4.13 the result of nested multinomial logit model (no care Vs modern care) estimation

Variables	Coefficient	standard error	Z- Value	P > Z	(95% conf.interval)	
Health care						
Father_ grade	2.680922	1.266175	2.12	0.034**	0.199264	5.162579
Mother_ grade	.1417104	.8909503	0.16	0.874	-1.60452	1.887941
dist_asfalt	-.0638521	.0297172	-2.15	0.032**	-.1220967	-.0056075
hosp_center	4.139438	1.894427	2.19	0.029**	.4264304	7.852446
Accpubtra	7.156946	3.919745	1.83	0.068*	-.5256122	14.8395
Number_child	-6.931881	2.236515	-3.10	0.002***	-11.31537	-2.548392
Mother_inhh	-6.463616	3.622022	-1.78	0.076*	-13.56265	.6354155

Significant level at ***=1%, **=5% and *=10%

Log pseudo likelihood = -36.360581

Number of observation = 189

Number of cases = 63

Wald chi2(21) = 51.47

Prob > chi2 = 0.0002

As the econometric result indicated, the number of children's in the household is significant ($p < 0.01$) but negatively affecting children's modern health care demand. As the number of children's in the household is higher it is less likely to use modern health care facilities. This factor reduced the demand for modern health care of children's with the large number of children's in their family. This result is coincide with the finding of belay M. (2013).

Availability of mothers in the household is also one of significant ($p < 0.1$) parental factor which affected the children's demand for modern health care negatively. The negative sign is may be due to mother use self care instead of using modern health care option.

Table 4.14 the result of nested multinomial logit model of provider choice estimation

Variables	Coefficient	standard error	Z- Value	P > Z	(95%conf.interval)	
Public provider						
Hh_size	2.401975	1.387335	1.73	0.083*	-3.17151	5.1211
Child_ageyear	.6048136	.6648095	0.91	0.363	-.698189	1.907816
Accesinfo	-20.91868	11.26778	1.86	0.063*	-43.00312	1,165758
Hhhead_age	-.5105193	.2937001	1.74	0.082*	-1.086161	.0651223
Hhhead_sex	2.275952	2.962136	0.77	0.442	-3.529728	8.081632
Avilbdrugsto	-18.74699	10.96605	-1.71	0.087*	-40.24006	2.746069
Wealthindex	8.110396	7.484487	1.08	0.279	-6.558928	22.77972
Privet provider						
Hh_size	- 9.193252	4.001532	-2.30	0.022**	-17.03611	-1.350393
Child_ageyear	- 2.253437	1.787792	-1.32	0.188	-5.857445	1.150571
Accesinfo	53.25928	20.82017	2.56	0.011**	12.45249	94.06607
Hhhead_age	-.2745	.452683	-0.61	0.544	-1.161742	.6127423
Hhhead_sex	-26.36856	11.24802	-2.34	0.019**	-48.41427	-4.322848
Avilbdrugsto	31.68256	17.37546	1.82	0.068*	-2.372715	65.73784
Wealthindex	26.46176	27.8687	0.95	0.342	- 28.15988	81.08341

Log pseudo likelihood = -42.305556 Number of observation = 189 = Prob > chi2 = 0.0002

Significant level at ***=1%, **=5% and *=10% Number of cases = 6 Wald chi2 (21) = 51.47

4.2.1.2 Modern Health Care Provider Choice of Children's and its Determinant

In next part the result of table 10.14 which is the lower level nested multinomial model (health care provider chose) estimation is presented. The effect of different parental ,household, community and child factors on the provider choice between Privet health care providers and public health care providers should discussed by putting no care or self care option as the base category. In both health care provider choices household size is the significant factor that affected the health care provider choices, but it affected the public health care provider choice positively and privet health care providers negatively. The positive sign to the public providers indicated that children's with higher number of family members are more likely visited public health care providers. The negative sign associated with privet health care suggested that children's live with higher number of family members less likely visited privet health care providers and thus result has similar finding with the work of Moses K. Muriithi(2013).

The effect of access to information is significant in public health care provide choices and privet health care provider choices .Although it is significant for both cases it is positively significant privet health care provider choices but negatively significant for public health care provider choices. This result implied that having access to information have a positive effect on the visit of privet health care providers but have negative effect on the visit public heath care provider choice and the result has similar finding with descriptive analysis .

Age of household head have a negative effect on both public and privet health care provider choices. But the effect is significant on public health care provider choices and in significant on the privet health care provider choices. This result reveled that as age of household head is older and older the chances of visiting health care providers become reduced and the result concede with the finding of Bolarin .etal (2015) .

Household sex has significant but negative effect on privet health care provider choices .on the other hand it has insignificant but positive effect on public health care provider choices. This result suggested that children with male headed households more likely to use public providers than privet providers but children's with female headed household more likely to use privet provider than public providers.

From the factors affecting health care provider choices availability of drug store in the community is the community factor which significantly affected both private and public health care health care provider choices. Although it is significantly affected both provider choices it negatively affected the use public provider choice and positively affected the use of private providers. The negative effect on public provider choice may be due to the use of common medicines as self care in relation to availability of drug stores in the community.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDTION

5.1 Summary

Health is one of human capital which depreciates through time and improves with investing on it. Factors like education produce a better health outcome but factors like age depreciate the health stock of individuals by reducing the demand.

Dispute there is improvement in the health sector of Ethiopia the country still face higher health problems in relation to higher morbidity and mortality rate of child and mothers with higher risk of communicable diseases. Health is the major challenge to the county economy half of the population lacks of access to basic health services, the health care delivery system were very weak and most of the population is largely rural which spared in regions with lack of road. This paper employed nested multinomial logit model using full information maximum likelihood technique.

The data source was from Ethiopian socioeconomic survey which is collected by the collaboration of World Bank and CSA in the year 2015/2016. The obtained data analyzed using both descriptive and econometric analysis.

The upper level estimation result of nested multinomial logit model which is choice between seeking modern health care and no care (self care) indicated father's education, Availability of health center in the community and access to public transportation are found to be positive and significant factors that affected the choice between modern health care and no care (self care) on the other hand distance to asphalt road, number of child in the household and availability of mother in the household is found to be negative but significant factor that affected the choice between modern health care and no care (self care).The estimation result of lower level model of nested multinomial logit model indicated household size, access to information and availability of drug store are found significantly affected both public and privet health care provider choices and the effect of household size was positive on public but negative on privet health care providers choice on the other hand the effect access to information and availability of drugstore was negative on public but positive on privet health care providers choices. And some factors like household head age and household head sex are significant in one provider choice and insignificant on the other.

House hold head age was negative but significant in public health care provider choice but negative and insignificant private health care provider choices and household head sex was positive and insignificant in private but negative but significant in private health care provider's choice.

5.2 Conclusion

Health is an important component of human capital which affected directly the productivity, economic growth and welfare of the society as result of this improving the health of children's has a long lasting effect on sustainable productivity and economic growth of the society because children's are feather leaders of the country and economy. But If children's sick or injured their decisions to use modern health care or not and which health care provider they visited is determined by various parental, household, community and child factors. And this study tried to identify which factors significantly affected both health care uses and health care provider choices of children's who were sick.

Child health is good indicator quality of health in general. To improve the health of children's better access to health care like availability of heath care facilities, access to transportation and availability road infrastructure are crucial things especially in rural areas.

Education of father, distance to asphalt road, availability of hospital or health centers in the community, access to public transportation, number of child in the household and availability of mother in the household are important and significant factors which affected health care use of children's. On the other hand household size, household head age, access to information, household head sex and availability of drug store in the community are important and significant factors which affected health care provider choice of children's.

5.3 Recommendation

Availability of hospitals or health centers is important factor which affected the demand for modern health care. Since it is important factor government, NGOs and private investors should participate in constructing health care facilities and upgrading the available health care centers with human resource and materials.

Education has important effect on health care uses in order to increase the demand for modern health care use of children's Government policy should pay attention in spreading education in rural areas of Ethiopia by combining formal and informal ways of education.

Modern health care demand reduced with the long distance to asphalt road policy makers should do their role in spreading construction of asphalt that increases the reduced demand because of distance from asphalt road.

Access to public transportation has positive effect on the health care use of children's in rural oromia. Policy makers should consider increasing the accessibility of public transportation in rural areas.

Number of child in the household has a negative effect on the demand for modern health care. . Teaching households about family planning by the government should reduce this problem.

To improve the private health care provider use of rural society the concerned bodies should do their role in reducing the average number of persons live in the household by increasing the knowhow rural society about family planning .

Finally policy makers need to speed internet connection and different fm radio broadcasting media in order to increase the use of private health care provider in rural areas.

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Appendix

tree structure specified for the nested logit model

healthcare	N	provider	N	k
nocare	63	— no provider	63	26
modern care	126	└ public pro~r	63	24
		└ privat pro~r	63	13
total 189 63				

k = number of times alternative is chosen
 N = number of observations at each level

RUM-consistent nested logit regression	Number of obs	=	189
Case variable: id	Number of cases	=	63
Alternative variable: provider	Alts per case: min	=	3
	avg	=	3.0
	max	=	3
Log pseudolikelihood = -36.360581	Wald chi2(21)	=	51.47
	Prob > chi2	=	0.0002

(Std. Err. adjusted for clustering on id)

chosen	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
healthcare equations						
nocare						
father_grade	0	(base)				
mother_grade	0	(base)				
dist_asfalt	0	(base)				
hosp_center	0	(base)				
accpubtra	0	(base)				
Number_child	0	(base)				
mother_inhh	0	(base)				
healthcare2						
father_grade	2.680922	1.266175	2.12	0.034	.199264	5.162579
mother_grade	.1417104	.8909503	0.16	0.874	-1.60452	1.887941
dist_asfalt	-.0638521	.0297172	-2.15	0.032	-.1220967	-.0056075
hosp_center	4.139438	1.894427	2.19	0.029	.4264304	7.852446
accpubtra	7.156946	3.919745	1.83	0.068	-.5256122	14.8395
Number_child	-6.931881	2.236515	-3.10	0.002	-11.31537	-2.548392
mother_inhh	-6.463616	3.622022	-1.78	0.074	-13.56265	.6354155

provider equations

provider1						
hh_size	0	(base)				
childage_year	0	(base)				
accesinfo	0	(base)				
hhhead_age	0	(base)				
hhhead_sex	0	(base)				
avilbdrugsto	0	(base)				
Wealthindex	0	(base)				
provider2						
hh_size	2.401975	1.387335	1.73	0.083	-.317151	5.1211
childage_year	.6048136	.6648095	0.91	0.363	-.698189	1.907816
accesinfo	-20.91868	11.26778	-1.86	0.063	-43.00312	1.165758
hhhead_age	-.5105193	.2937001	-1.74	0.082	-1.086161	.0651223
hhhead_sex	2.275952	2.962136	0.77	0.442	-3.529728	8.081632
avilbdrugsto	-18.74699	10.96605	-1.71	0.087	-40.24006	2.746069
Wealthindex	8.110396	7.484487	1.08	0.279	-6.558928	22.77972
provider3						
hh_size	-9.193252	4.001532	-2.30	0.022	-17.03611	-1.350393
childage_year	-2.353437	1.787792	-1.32	0.188	-5.857445	1.150571
accesinfo	53.25928	20.82017	2.56	0.011	12.45249	94.06607
hhhead_age	-.2745	.452683	-0.61	0.544	-1.161742	.6127423
hhhead_sex	-26.36856	11.24802	-2.34	0.019	-48.41427	-4.322848
avilbdrugsto	31.68256	17.37546	1.82	0.068	-2.372715	65.73784
Wealthindex	26.46176	27.8687	0.95	0.342	-28.15988	81.08341
dissimilarity parameters						
healthcare						
/nocare_tau	1	.			.	.
/healthcare2_~u	43.67905	16.09327			12.13682	75.22128

. vif

Variable	VIF	1/VIF
Aviladrstore	2.65	0.377313
hosp_center	2.45	0.408929
hhhead_age	2.23	0.449021
mother_inhh	2.11	0.474151
dist_asfalt	1.96	0.509082
hh_size	1.71	0.586144
Tlulivestock	1.69	0.591754
father_grade	1.65	0.606418
mother_grade	1.60	0.623720
accpubtra	1.53	0.655407
accesinfo	1.30	0.770219
childage_y~r	1.20	0.831315
hhhead_sex	1.18	0.845700
childsex	1.15	0.869671
Mean VIF	1.74	