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Choosing Between HealthCare Providers

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Abstracts

This paper tried to estimate the demand for curative health care in Jimma town. Based on economic theory and past studies, NMNL (Nested Multinomial Logit) model is identified and estimated using sequential estimation procedure. For the estimation of the model the study used primary data which were collected from Jimma town through sample survey during the month of February 2003. The estimated model shows that 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. Furthermore, the study indicates the price insensitiveness of the demand for curative health care services. However, the price insensitiveness decreases as prices increases and as income decreases implying that the poor are more price sensitive than the rich.

The policy implication of the result is that the modest differentiated increase in price of public hospital results in substantial increase in revenue. The differentiated increase in price helps the poor section of the society and children by decreasing the free riding by the rich. Moreover, the study result implies that the introduction of higher user fees should also be accompanied by increase in quality of hospital services in order to offset the negative effects of higher price. Taking the two measures together, increasing user fees and increasing quality of services, helps to achieve dual benefit in health care system by increasing revenue and health service utilization simultaneously.

Key words: demand for curative health care, mode of treatment, self-care, modern medical care, NMNL, user fees, price sensitiveness.

Chapter One: Introduction

1.1 General Background

How to finance and provide health care services for a society is a challenging problem especially in low income countries. In these countries government is the sole provider of health care services under the objective of ensuring equity in health service provision. It seems that it is partly due to this reason and the legacy of the past regime that the number of public health care providers outnumbers other type of providers in Ethiopia.

According to the Ministry of Health data, almost 90% of hospitals, health centers, health stations and all health posts belong to the government (Ministry of Health, 2001/2:24). To run these health care facilities, the country has been allocating on average 5.4% of the total National recurrent budget to health sector over the last decade(Ministry of Health,2001/2:32). However, the allocated budget is not sufficient compared to many health problems in the country.

The health status of Ethiopia's population is extremely low, even in comparison to other Sub-Saharan Africa countries. As can be seen from Table 1 below, infant, child and maternal mortality rates are high in Ethiopia reflecting the poor health status of the population. However, most of these mortalities are avoidable, since the causes of these mortalities are preventable infectious diseases and nutritional deficiencies. But the low level of preventive health care services, may not allow this situation. In addition to this, the within health sector budget allocation favors the curative service than the preventive service which might make the preventive services more difficult.

Table 1: Health Status Indicators

Health Status	Country				
	Ethiopia	Eritrea	Kenya	Tanzania	Uganda
Crude death rate (per 1,000)	18	15	9	14	19
Life Expectancy (in years)	49	46	59	51	42
Infant mortality (per 1,000)	120	135	59	84	122
Child mortality (per 1,000)	204	204	94	167	185
Maternal Mortality (per 100,000)	452-1528	-	510-646	200-748	580-
Access to proper sanitation in %	10	-	49	86	67
Access to Safe water in %	18-26	-	-	52	-
Access to health care in %	55	-	-	93	-
Immunization coverage in %					
Diphtheria pertussis and Tetanus	28	-	85	82	73
Polio	28	-	85	81	74
Measles	22	-	76	79	73

Source: World Bank (1998:23)-Ethiopian Social Sector Report

According to the World Bank (1998:46) Ethiopia Social Sector Report, 79% of the total recurrent health budget has been financing hospital based curative services leaving only 16% and 5% for prevention and promotion services respectively, until 1997. In addition to this, the high level of population growth in comparison to the slow growing economy aggravates the health problem of the society by worsening the living standard of the population.

Thus, the limitation of resources on the one hand and the existing low level of health status in the county on the other hand forced the government to rethink the whole concept of free health care service provision. The government has been undertaking the Health Sector Development Program (HSDP) since 1998, to ease the resource constraint and to improve the health care system of the country. The program is supposed to last for twenty years and will be implemented through a series of five-year plans. This program has the objectives of

increasing access of health care, improving service quality, improving health service management and increasing the participation of private and NGO sectors in health service provision. In this program, the government has set changes in health care financing as a strategy to ease the resource constraint. This strategy includes increasing cost recovery, developing revolving drug funds and increasing involvement of the private and NGO sectors in health service provision. Moreover, decentralization of the health care delivery system is also considered as a measure to improve health service management and resource mobilization (Ministry of Health, 1998:13). Despite this effort, there is no significant improvement in health service utilization and health care financing aspects as compared to a significant increase in health facility construction. In addition, the participation of the private and NGO sectors has been below expectations as they are concentrated in urban areas (Ministry of Health, 2001:10).

1.2 Health Care System and Health Service Utilization in Ethiopia

Before the introduction of HSDP Ethiopia's health care system was a six-tier pyramidal structure, which was criticized for its managerial inefficiency. Currently the health care system of the country is a four-tier system, characterized by primary health care unit (PHCU), district hospitals, zonal hospitals, and specialized hospitals. Each PHCU consists of one health center and five satellite health posts (designed to serve 25,000 people). The PHCU is planned to focus on preventive services like immunization, maternal and child health care services. In addition to the preventive services, they are also expected to give basic curative services even though more serious curative services are handled by higher hospitals through a referral system, where the lower unit refers patients to the immediate higher unit. However, the

referral system is not strictly followed and patients have the right to visit any higher health care facilities without being referred to the facilities by medical personnel.

The health care system of the country emphasizes the preventive health care services than curative health care services as a strategy to promote good health. The preventive services are individual related and non- individual related. Individual related preventive services are child and mother care related. The non-individual related preventive services are mainly concerned with the control of communicable diseases and vector born diseases.

Even though the health care strategy emphasizes the preventive service, the practical budget allocation is in favor of curative services, which is in contradiction with the strategy. Moreover, health personnel are trained with a focus on disease treatment rather than prevention. As a result, the immunization coverage is steadily declining and there is no improvement in the control of communicable and vector born diseases (Ministry of Health, 2001:12).

The health care system of the country is also decentralized into nine National Regional States and two Administrative Councils. The regions and councils are dependent on federal subsidies or grants to finance their health sector. The health budget has shown the tendency of increasing especially since the introduction of HSDP. For instance, the recurrent health budget that was 133.16 million Ethiopian Birr (ETB) in 1988, increased to 406.80 million ETB in 2001/2(Ministry of Health 2001/2:36). However, despite this nominal increase of recurrent budget allocation, the health expenditure per capita of the country is significantly lower than that of other the Sub-Saharan Africa countries. On average the health expenditure per capita was about 0.90 US dollar over the past ten years (Ministry of Health, 1998:7).

Table 2: Allocation of National Health Budget of Year 2001/2 by Region in Millions of ETB

Region	Recurrent budget	Capital budget	Recurrent Expenditure	Capital Expenditure
Tigray	38680	35660	54640	16580
Afar	10000	10650	31830	12060
Amahara	73080	69570	120220	12330
Oromia	115700	113000	182490	20870
Somali	17140	9070	52040	8910
B/Gumiz	11880	10430	21610	1700
SNNP	58500	51630	161060	18200
Gambella	6800	8570	20270	1220
Hareri	8280	7250	8950	190
Addis Ababa	63300	53790	52360	2760
Dire Dewa	7030	5760	9060	350
MOH	55720	69000	41690	210180
National	466110	444380	756220	305350

Source: Ministry of Health (2001/2)-Health and Health Related Indicators

In addition to the low level of health expenditure per capita, the health service coverage and utilization of the country are very low. As can be seen from Table 3 below, the National Health Service coverage is around 50% and the total outpatient utilization of public health facility is around 0.27 visits per person per year.

Table 3: Distributions of Health Facilities and Health Service Coverage of Year 2001/2 by Region

Region	Health Center	Health Station	Health Post	Private Clinic	Health Service Coverage	Out patient visit per capita
Tigray	29	182	112	21	64.6	0.54
Afar	8	50	49	2	55.03	0.44
Amahara	82	527	385	206	42.55	0.15
Oromia	115	952	244	435	52.29	0.10
Somali	17	95	82	2	35.27	0.04
B/Gumiz	7	74	44	6	161.95	0.65
SNNP	114	357	306	183	48.3	0.16
Gambella	8	33	18	9	238.74	0.13
Hareri	6	10	7	11	145.35	0.81
Addis Ababa	24	150	47	340	79.37	0.73
Dire Dewa	3	22	17	20	86.26	0.33
National	412	2452	1311	1235	51.8	0.27

Source: Ministry of Health (2001/2: 24) –Health and Health Relate Indicators

Even though the health service coverage is almost uniform throughout the regions, except for few irregularities, there is great difference between outpatient visits per capital across regions. The national outpatient visit per capita is low and for some regions like Somali, Oromia and Gambella the situation is even worse. In general, the low level of outpatient visit per capita indicates the low level of health service utilization.

1.3 Health Service Utilization in Jimma Town

Jimma zone has 13 "woredas" with a population of around 2.4 million. The zonal health service coverage is 36%, which is by far below the Regional as well as the National Health Service coverage (Jimma Zonal Health Department,2000:102).The town has 3 "kefatanya", 19 " kebeles" and around 100 thousand population. The town has one teaching medical hospital, one public health center, 20 private health stations, one Red Cross Pharmacy, one public drug shop and 15 private rural drug vendors (Jimma Zonal Health Department, 2000:98). Although the town has such pattern of health facilities, it demonstrates a different pattern of health service utilization form other parts of Oromia. The potential health service coverage is 50%, which is close to the Regional and the National Health Service coverage. However, the health service utilization is 0.16 visits per person per year, which is below the National and Regional, outpatient visit per capita (Jimma Zonal Health Department, 2000:101-103).

Despite the low level of health service utilization of the population, the town has still many health problems. The top four causes of outpatient visit at health centers in Jimma zone are upper respiratory infection, helminthiasis, malaria and gastro intestinal problem and colitis. In hospital, helminthiasis, upper respiratory infection, inflammatory eye diseases and TB are the top four causes of outpatient visits. The top four causes of death at Jimma hospital are TB, bronchopneumonia, hypertension without heart disease, and intestinal obstruction without hernia (Jimma Zonal Health Department, 2000:110-115)

1.4 The Statement of the Problem

Many studies indicate that health service interventions are important in the development of human resources and healthy society that contribute positively to the development of the economy. Hammer and Berman(1995:20) state that productive investment in equitable, efficient and high quality health service has positive effect on economic activity since it raises the quality of human capital, improves productivity, creates jobs, encourage scientific research and stimulates technological innovation. Moreover, the authors state that good health services contributes positively to poverty reduction strategies by reducing poverty producing factors such as job and income losses due to illness. Thus, the major objective of health service is to provide curative and preventive health care service to enhance human development.

In order to achieve this objective, the Ethiopian Government has issued health care policy. The major element of this policy is to design a health care system that emphasizes the preventive and promotion aspects of health care with little consideration to curative health care services. However, the implementation of the strategy is challenged by two main problems. The first problem is the high morbidity and mortality rates in the country. This might have made the government allocate more resources towards curative services than preventive and promotion services. This may be due to the fact that it is difficult to stop giving curative service once an individual is sick. For example, in hospital 30-70% of the adult medical ward is occupied by AIDS cases even though the disease is not curable (Ministry of Health, 2001:6). The second challenge is the health care seeking behavior of the society, i.e. the community demands curative services more than preventive services. For instance, according to Ministry of Health (2001:5), the community looks for clinical services even at a health post, which is totally designed for preventive services.

In addition to the challenges mentioned above, the low level of health care utilization in contrast to the low level of health status and health problems indicates the need to assess factors like quality of health care, availability of drugs and other consumer behaviors, that may affect the demand for health care besides the availability of low or free provision of health care services. The quality of publicly provided health services are often supposed to be poor for several reasons. These reasons may include the inability of the government to maintain or improve the quality of the services due to resource constraints and sluggish economic growth in face of the fast growing population and the rising cost of providing the services. Moreover, the subsidized or free health care service seems to benefit the better-off, since relatively high quality public providers are concentrated in urban areas.

To ease the resource constraint and to decrease the free riding problem in urban areas, the government is planning to put full cost recovery scheme through user fees as an alternative. However, before implementing the user fees scheme, the welfare consequences of the plan should be known in advance. In view of this, the following questions deserve due attention. Do patients consider costs in seeking treatment or not? Will patients continue to use public health care service if the government raises the price of treatment? Which group of people, the rich or the poor, are more price sensitive? How does pattern of demand change due to the introduction of user fee? Who will drop out of the utilization of Public health care service either by opting for private or by substitution? Who benefits more from the change in user fees?

The answer to all these questions depends on consumers' reactions to the change in policy and this can be analyzed through demand study, especially price elasticities and other non-monetary costs. The analysis of the welfare effect of health care financing is essential in evaluating health care financing policy based on the estimation of the demand for health care.

This analysis helps to see the tradeoff between cost recovery and consequences of health service utilization. Furthermore, the analysis can help to identify the group of population that can be negatively affected and those who are positively affected. Thus, the study of the demand for curative health care helps in the analysis of health care financing policy.

1.5 Objectives of the Study

The general objective of the study is to analyze the factors that determine the demand for curative health care in Jimma town. The study has also the following specific objectives.

- To find the level of health service utilization under different methods of financing.
- To find determinants of consumer choices of health care providers
- To find the welfare consequences of various user fees

Based on the above general and specific objectives attempt will be made to make policy recommendation for healthcare utilization and health care financing.

1.6 Significance of the study

This study, by estimating the demand for curative health care, can indicate a tradeoff between cost recovery and its consequences for health service utilization. The study may also give some clue as to whether the government should restrict itself to preventive and promotive health care and let the private sector take charge of the curative health care aspects. In general, the study can contribute some findings that may help policy makers to formulate effective policy for health care financing that brings better health service utilizations.

1.7 The Scope and Limitation of the Study

The study is based on a medium zonal town. Thus, it may be impossible to generalize to the national level based on its findings. In addition to this, due to, among others, cultural and religious reasons respondents may give inaccurate information on variables such as income, severity of illness, etc. This may result in under or over reporting bias and may reduce the validity of the empirical results. Moreover, the study uses perceived quality of care (subjective quality), i.e. consumer's assessment of the relative quality of different health care providers as a proxy for provider's quality of treatment. But consumers may not be able to evaluate the biomedical and technical aspects of modern treatment. Thus, it may not be a correct proxy for quality of treatment. Furthermore, subjective quality is a demand side issue and may not be under the direct control of policy makers.

The rest of the paper is organized as follows: the second chapter presents literature reviews, followed by chapters that deal with methodology and empirical model specification. The fourth chapter presents data analysis and the last chapter discusses the major findings of the study and its policy implications.

Chapter Two: Literature Review

2.1 Literatures Related to the Study of Health Care Demand.

There are relatively few studies on health care demand as compared to studies on health production function. Moreover, since most of the demand studies are based on cross sectional data, few of them explicitly include market price as explanatory variables. For most part, they include household characteristics, income and availability of heath care, the latter being interpreted as the price of health care services. However, there are several factors that are assumed to affect the demand for health care. In most studies these variables are reviewed as economic, demographic and perception of health care need. These variables are discussed below before a full demand model is presented in the second part of this chapter.

Economic Variables

The economic variables include the cost of getting medical care and household income. The cost of medical service includes direct and indirect costs. The direct costs are the cash paid for medical examination, drugs and transport. The indirect costs are the opportunity cost of travel and waiting time (usually referred to as barrier to access) to get the required service. The first and perhaps the most important cost factor is the price of medical service. Theoretically, other things being equal, the actual cash outlay for using a health service should act as a determinant of usage of health care services. However, the empirical studies present conflicting results regarding the significance of price effect. One camp suggests that prices are not important determinants of medical care utilization. Akin et al (1985), Schwartz, Akin and Popkin (1988), Birdsall and Chuhan (1986), and Heller (1982) report very small and sometimes positive price effects most of which are statistically insignificant. Other studies like Alderman and Gertler (1988), and Mariko (2003) conclude that prices are important

determinant of the demand for health care. According to Gartler, Locy and Sanderson (1987), most of the studies, which conclude price as an unimportant determinant of health care utilization, specify price as being independent of income. However, the authors argue that such models are inconsistent with utility maximization, when health is treated as normal good and they derived a discrete choice specification from a theoretical model in which income can affect the choice of providers. Applying Gartler, Locy and Sanderson (1987) model, which is consistent with utility maximization, Sahn et al (2002) in the study of demand for health care service in Tanzania, found price of medical treatment as an important factor that determines the demand for health care. Similarly, Getler and van der Gaag (1990:60) also found similar result for Cote D'Ivoire and Peru.

The second cost factor is the cost associated with distance traveled to get the service. Theoretically, the physical availability of healthcare providers is one unique factor that characterizes the medical market. As a result, the consumer of medical services usually gives value to the time spent on traveling to and from health facilities. Beharman and Deolalikar (1991) present distance (and the cost associated with distance) as important factor that determines the demand for medial care and the choice of health care providers. Similarly, Mwabu et al (1993:852) report distance as a factor that has negative impact on choice of health care provider even though the effect is statistically insignificant. Moreover, Acton (1975:595-613) also indicates that distance to health care facility functions as a price in determining the demand for health care. In a similar fashion, Lavy and Germain (1994:14), using transportation cost and opportunity cost of traveling time as proxies for distance, conclude that distance has strong negative significant impact on the demand for health care.

The third cost factor is the opportunity cost of waiting time for the service. Akin et al (1985) show that waiting time is not an important factor that determines the demand for health care. However, they qualify their findings by pointing out that lack of service quality variable in the estimation could have lead to this conclusion. In contrast, Acton (1975:559-61), in a study of the demand for health care using data from New York City Municipal Hospital, indicates that waiting time and travel time function as price and have negative coefficients in the demand equation. In addition, the study shows that working people and those with higher opportunity cost of time demand less time intensive medical care. Bitran and McInnes (1993:20) also conclude that people prefer private providers to public providers due to shorter waiting time at private provides. Gertler and van der Gaag (1990:80-82) used the opportunity cost of time spent on obtaining health care as a price of care and found that the relative prices are relevant factors in choosing health care providers. Akin et al (1995), and Marc and Eshter (2002) found income and price as important determinants of the demand for health care.

Another important economic variable that may affect the demand for health care is household income. Bitrana and McInnes (1993:21) show that household income is an important variable in determining the demand for health services. The study reported that people in poor income group go to public health care providers while the rich avoid the public health care providers. Mwabu et al (1993:852) and Peter et al (2000) also show that income of the household plays an important role in choosing health care providers. Puig-Junoy,Saez and Martinez-Garcia(2002) conclude that the income of individual is a major significant factor that affects the demand for health care services.

Demographic Factors

Demographic factors such as age, sex, family size and family structure of the household are also expected to play a major role in the demand for health care service. Levinson (1974) concludes that households allocate scarce food and medical resources away from females in order to ensure an adequate diet and good health for males. Gertler and van der Gaag (1990:84) show that men who experience an accident or illness are more likely to seek modern health care and in particular hospital care, than women. According to the authors, this is consistent with the theory of household, which states that households will invest in their more productive members or who are considered to be more productive (a sign of gender bias). Jaume, Marc and Eshter (2002) also found that male patients are more likely to seek formal treatment than female. However, there are some studies, which show contrary results. For instance, Heller (1976) shows that Malaysian household provide less outpatient care for boys up to age four than girls. Similarly, Akin et al (1985:75) and Mariko (2003) report sex does not significantly affect the demand for health care.

In addition to sex, age of individual may also play an important role in the demand for health care services. Theoretically, there is a U-shaped relationship between age and health care demand (Akin et al, 1985:92). That is, infants, and the aged would be expected to have a high level of health care demand because children are susceptible to infectious diseases (due to immature immunological system) and degenerative diseases which are common in old age. But this kind of relationship between age and health care demand carries with it no economic significance except to the extent that the very young and the very old are dependent on other people and demand more medical care than other group due to biological factors. Despite this theoretical background, Gertler and van der Gaag (1990) found that adults in rural Cote D'Ivoire, unlike those in the industrial countries, reduce utilization of medical care over the

life span. The authors explain the unexpected result using human capital theory and the Cote D'Ivoire health care system. The human capital theory states that families may prefer to invest scarce resource in the health of members for whom the return is higher (investing on the younger and more productive members than on the elderly). The Cote D'Ivoire health care system on the other hand is less productive in treating the elderly than the young. Other studies like, Peter et al (2000), Puig-Junoy, Saez and Martinez-Garcia (2002), and Jaume, Marc and Eshter (2002) report age does not significantly influence the demand for health care.

Household size is another demographic characteristic that may explain the demand for health service. Theoretically, it may not be possible to tell the effect of household size on the demand for health care or on the choice of health care providers. That is, since on the one hand in larger household, resources are shared with more people and this may lower the level of nutrition for each member and lower consumption of health care per person. On the other hand, larger families could supply more adults and older children who can supplement household income that will ease the resource constraint and may increase the demand for medical services. However, Kelley (1976) using USA data, found that the income effects tend to outweigh the cost effects and hence per capita family income tend to rise with household size. In this case, larger households may be expected to behave as if they have higher incomes in the health care demand analysis and thus are expected to have higher demand for health care. In contrast to this study, Gertler and van der Gaag (1990:84) found that households with fewer adults and more children are more likely to seek modern health care treatment. The author explains this result further by stating that more adults in the household allow more time to better care for sick individual at home and having more children results in having less time to take care of the ill.

Household structure as a demographic variable may also have an important role in health care demand. The relative degree of authority of the mother may affect the amount of attention paid to maternal and child care as well as the amount of health care expenditure as compared to mother's opportunity cost of using health care services. Very little evidence is available on the effect of family structure on the health care demand. Akin et al (1985) found out that family structure has little effect on the demand for health care.

Perception of Need

The perception of health care need includes the individual's perception of the usefulness of modern medical treatment, the severity of illness, and the quality of health care providers. Perceptions of the need for health care may be influenced by the education and cultural belief of individuals and households. With regard to quality of health care providers, the quality of health care that is perceived by individual and that is defined by health personnel is quite different. In accordance with the definition of medical personnel, Lavy and Germain (1994:11) propose five groups of quality measures namely, number of medical staff, the availability of essential drugs, functioning laboratory, electricity, and running water. Using these factors as quality variables, they found that availability of drug, infrastructure, operating room and medical personnel as factors that have strong positive impact on the demand for medical service and choice of health care providers. Akin et (1995),using operational cost per capita of the health facility, the observed physical condition of the facility and percentage of the year drug available as proxy for quality of treatment, report significant impact of quality on the demand for health care. Mariko (2003) using availability of drugs, qualified personnel, process of treatment and availability of functioning laboratory as a proxy for quality of treatment reports positive impact of these variables on the demand of health care, and in particular the availability of drug and process of treatment as the two main significant factors.

However, there are other studies like, Mwabu et al (1993:839-840) who used availability of some basic drugs in the health facilities as proxy for quality of health services, and report positive but insignificant effect of those variables on the demand for health care. Other studies, which are based on individual's perception of quality of health care, indicate positive impact of these variables on the demand for health care services. Among these studies Sahn et al (2002) indicate that the perceived quality of treatment is an important factor that determines the choice of health care providers. Puig-Junoy, Saez and Martinez-Garcia (2002) also show that perceived quality of care as an important determinant of the demand for modern health care services.

With regard to the perception of the usefulness of the medical treatment, it may depend on individual's psychological, cultural and information processing ability. Due to such factors little attention may be paid to illness in many developing countries because almost everyone is suffering from some sort of disorder. Moreover, the majority of the population suffers from malnutrition and exposure to parasitic diseases, and it may be difficult to determine when a person is sick enough to be labeled as "sick". Messing (1970) describes this situation in relation to Ethiopia as follows: "In rural Ethiopia, the common definition of "sick" is when a person is to lie down and rest during the day time." Gesler (1979) states that, the perceived severity of an illness, as measured by reported length of disorder varies by ethnic group and socioeconomic class. That is, mothers within high socioeconomic status report longer period of illness for their children than mothers from poor households. Gesler's study further reports that the reported number of sick children was positively related to the household's income where the highest income quartile accounts for approximately 30% of the children reported to be ill and the lowest for 15%. Similarly, Uyanga (1979) found out that the perception of type of illness determines the choice of health care providers. Peter, et al (2000) and Jaume, Marc

and Eshter (2002) found the severity of illness, as measured by duration of illness, as a significant factor that increases the probability of seeking modern medical treatment and choosing health care providers. In contrast to these, Gertler and van der Gaag (1990:84) show that the reduction in severity of illness, as indicated by the number of healthy days, substantially reduces the probability of seeking medical care, but does not affect the choice of alternatives. However, the difference in these findings may be due to the methodological differences of the studies. The severity of illness in Gertler and van der Gaag (1990) is measured by the number of healthy days whereas; in Akin et al (1985) and Mariko (2003) it was reported ill days.

Education of the individual may also affect the demand for health care and the choice of health care providers by influencing the perception of the individual towards health care. According to Cochrane, and Leslie (1980), education has significant positive effect on health status and life expectancy. In addition to this the theory of household production treats education as microeconomic theory treats technical change. It is viewed as allowing more output to be produced from a given set of inputs. Welch (1970) states educated households have good knowledge of the importance of sanitation, clean water, balanced diet and are more efficient in performing household activities. Thus, they are more efficient in producing health and are more likely to avoid modern medical treatment than illiterate households. However, there is another argument which states that educated household will not only be healthier but also will have time and desire to use health service due to awareness of modern treatment and its benefit. Lavy and Germain (1994:15) report that better educated household heads favor services of private health care providers.

However, Peter et al (2000) found no relation between years of schooling and health care seeking behavior, in their health care demand study for Madagascar. Moreover, Jaume, Marc and Eshter (2002) also found insignificant impact of education on the demand for health care services from modern health care providers. Similarly, Mariko (2003) reports insignificant impact of education level of household on the demand for health care in Bamako. However, the author attributes the lack of significance to the high illiteracy rate in the country.

2.2 Literatures Related to Health Care Demand Model and Methodology

Medical markets are distinguished from other types of markets and consumption activities primarily on the basis the role of physical need plays in determining demand for medical services. Moreover, circumstances, such as accidents, pregnancies and infection tend to dictate consumer decision in medical markets. In addition, an information gap often exists between suppliers and consumers of medical services, the subsidy of medical service and the life cycle pattern of health need can affect the consumption of medical services. Modeling the effects of these variables on the demand for health care has been developed over the years and this section tries to review some selected models of demand for health care.

Grossman (1972) developed a human capital model, using household production theory that treats demand for medical services as both an investment and consumption activity. In this model, the consumer is assumed to maximize utility over the lifetime from commodities (homemade) and from the flow of services attributed to the stock of the individual's health. That is, the individual enjoys a flow of healthy days, which accrue from his stock of good health .The Grossman model is given by:

$$\text{Max } U = U(\Phi_o H_o, \ldots, \Phi_n H_n, Z_o, \ldots, Z_n)$$

$$\text{s.t} \quad \Sigma_i [P_i M_i + F_i X_i + W_i(TH_i + T_i + TL_i)] = \Sigma[W_i \Omega \quad (1 + r)_i^{-1}] + A_o$$

Given the household production relationships:

a) $H_{i+1} - H_i = I_i - \delta_i H_i$

b) $I_i = I_i(M_i, TH_i, E_i)$

c) $Z_i = Z_i(X_i, T_i, E_i)$

Where:

H_o - Initial stock of health capital

H_i - Stock of health in the i^{th} time period

Φ_i- Service flow per unit of health capital in the i^{th} time period (healthy days)

Z_i -Total consumption of other commodity in the i^{th} time period

P_i -Price of medical care

M_i -Quantity of medical care

F_i- Price of market goods used in producing Z_i

X_i – Market goods used in producing Z_i

W_i - Wage rate

T_i -Time used in producing other commodities

r- Interest rate

$\Omega = TW_i + TH_i + T_i + TL_i$ -total time available in period i

Tw_i- hours of work

TH_i -Time used in producing health

TL_i- Time lost due to illness

A_o – Discounted property income or initial asset

I_i - Gross investment in health

δ_i - The rate of depreciation of stock of health

E_i -Stock of human capital

According to this model the choice for the individual is whether to produce additional investment in health using his own time, human capital and market purchased medical care and other pleasure giving commodities. Moreover, choice is also affected by the depreciating

stock of health. For this reason, the stock of health expands from period to period only if annual investments exceed annual depreciation.

From the model, Grossman derived the following relationships: The marginal cost of investment in health, which must equal the marginal rate of return to investments, i.e.

$\xi_i + \alpha_i = r - \pi_{i-1} + \delta_i$

Where:

ξ_i – Marginal money rate of return to an investment in health (pecuniary return)

α_i – Marginal psychic return of improved health (consumption return)

r - Interest rate foregone by investing in health capital instead of other assets

π_{i-1} – Percentage change in the marginal cost of health investment from the last period to the current period

δ_i – Rate of depreciation of health stock

$\xi_i + \alpha_i$ – Total rate of return to investments in health

$r - \pi_{i-1} + \delta_i$ – the user cost of health capital in terms of the price of gross investment.

If $\alpha_i=0$ no utility is derived from medical care and it can be treated as investment good. Using this condition Grossman treats the consumption and investment aspect of medical care separately.

Under the investment model ,when $\alpha_i=0$, all returns to health come from the pecuniary return caused by more healthy days; there is no psychic return to better health. However, under the consumption model, when $\xi_i=0$, the marginal return to healthy days is due to psychic benefits alone. Investments in health capital under this model, depends on the preference for present versus future health.

Grossman investigated the effect of age, income, and education on both the demand for health capital and the derived demand for medical care. He hypothesizes that the demand for health capital is negatively related to age, positively related to wage rates, and education. Whereas, the demand for market produced medical services is positively related to age, wage rate and education.

The advantages of the Grossman's model is that it enables us to study the effect of demographic variables like age and education without assuming that these variables are positively or negatively correlated with consumer's tastes for health. It also gives an idea that the demand for medical care is derived from the demand for good health. The model has also its own disadvantage in that it assumes complete certainty. However, people do not generally know how their stock of health can be affected by what they consume and practice. In addition to this, the author measures the need (illness) by the level of the rate of depreciation, which increases with age. But this contradicts the common sense notation that health status fluctuates widely through a lifetime.

Acton (1975) derived demand from maximization of individual's utility function which depends on the consumption of medical service and other consumption goods subject to time and budget constraint. The Acton model has the following form:

Max $U=U(m, x)$ subject to $(p + wt)m + (q + ws)x \leq Y = y + wT$

Where:

p- Money price per unit of medical services

m - Medical services

x- Composite goods

t- Time price per unit of medical services

q- Money price per unit of other goods

s- Time price per unit of other goods

w- Wage rate per hour

Y-Full income (earned, unearned and opportunity cost of home production)

y- Unearned income

T-Total time available for market work and own production

Acton's model focuses on the role of time costs as a rationing device when insurance or subsidies derive the out-of-pocket costs of medical care to zero. The author derived comparative statistics for time and money cost. The comparative statistics shows that users of free medical services will be more sensitive to the time requirement (waiting and traveling time) than users who pay for medical services. In addition to this, the analysis shows that when consumers consider medical services as normal good, the effect of unearned income has positive effect whereas, the earned income has negative impact on the demand for medical services. This is because in the case of unearned income, people with higher incomes buy more of normal goods. In the case of earned income however the increase in wages raise income and the opportunity cost of time, which increases the time cost component of consumption activities. As a result, goods or services which require relatively large commitments of time in order to be consumed become more expensive and thus substituted by other goods and services which require little time.

The advantage of the Acton's model is that of its simplicity, where as its disadvantage lies in its ignoring role of health need and demographic variables. In addition to this, the inclusion of time is not logical, since it is not in accordance with household production theory, where time enters the budget constraint since the household is viewed as a production unit, which combines its own time with market, purchased goods to produce pleasure giving commodities. However, in Acton's model where the individual (not the household) derives pleasure directly from the consumption of medical services, consumption has to be a leisure activity and thus time should have zero cost.

Despite these weaknesses, Acton applied this model in his study of the demand for medical service using a 1965 survey data of users of the outpatient department of New York City Municipal Hospitals. The author concludes that the role of time, earned and unearned income are consistent with the prediction of the model.

Holtmann and Olsen (1976) applied Becker's time allocation model to the demand for medical service. In this model an individual is assumed to maximize utility over two commodities produced in home using market goods and the individual's time. That is,

Max U = U (D, C)

s.t $(p_d b_d + t_d w)D + (p_c b_c + t_c w)C = wT + B = Y$ (budget constraint)

And the production relation

$T_d = t_d D$

$T_c = t_c C$

$X_d = b_d D$

$X_c = b_c C$

Where;

U - Utility

D - The commodity “dental hygiene”

C - Composite of all other commodities

P_d - Fixed price of dental services (X_d)

b_d - Fixed coefficient of production relating the market purchased input, dental services (X_d) ,to the output of home production ,dental hygiene(D)

T_d - the coefficient relating the time input to the production of dental hygiene

w- Fixed wage

b_c -The coefficient relating the production of other commodities to the input of a specific market goods or bundle of market goods (Xc)

P_c-Fixed price of Xc

T- Total time available

B-Other income

Y- Full income

The model suggests that individuals derive utility indirectly from the consumption of dental services, with the assumption that the source of the utility is the valuable characteristics produced by these services, i.e. dental hygiene. In other words, goods are not purchased for their direct pleasure they may give but they are considered as inputs in the production of commodities that gives pleasure. The model also suggests that the cost of commodities is given by a shadow price of input used and the efficiency of the household’s production function.

The potential advantage of this model is that it indicates the possibility of modeling the sources of differences in household efficiency or the economic effects of demographic variables, but the author doesn't investigate this fact thoroughly

The works cited up to now consider individual as units of analysis. In contrast to this, Miners (1979) as cited in Akin et al (1985) considers family as a unit of analysis and assumes a family to maximize utility subject to a household budget constraint. According to Miners, the utility function and the budget constraint are:

$\text{Max } U = U(M_j, N_j, D, Z) \quad j = 1,\ldots, n$

S.t

$$\Sigma_j(P_j + L_j t_j^M) M_j + \Sigma_j (Q_j + L_j t_j^N) N_j + (P_D + \Sigma_j L_j t_j^D) D = (P_z + \Sigma_j L_j t_j^Z) Z = \Sigma_j L_j (T_j - T_j^S) + Y$$

Where:

U- Utility

M_j - Medical goods and services consumed by the j^{th} family member

N_j - j^{th} member's consumption of household produced medical care

D -Composite goods representing the sanitary condition within the home

Z - Composite of all other goods and service consumed by the household

P_j, Q_j - Money prices of medical care visits and household medicine used by the j^{th} individuals

L_j - j^{th} individual's wage rate

t_j^M, t_j^N - j^{th} individuals time input into consumption of medical care and production of home remedies

P_D, P_z -Money price of D and Z respectively

t_j^D , t_j^Z -time inputs of the j^{th} individual into the consumption of D and Z respectively

T_j-T_j^S- Total production time of j^{th} individual (less sick time)

Y- Unearned household income

Miners' model includes homemade care, the sanitation condition and purchased medical goods and other composite commodities in family's utility function for each member of the family. However, Miners treats time in the budget constraint like Acton, that it is just included illogically without household production consideration. Moreover, the model is too complicated to use it for empirical study.

In contrast to all works cited up to now, Heller (1982) developed a model of demand for health care that includes preventive and hygiene variables. Heller defines utility over composite goods, preventive service, and discretionary purchase of medical care, i.e.

Max U = U (k, x, m')

s.t $(\pi_1 + wt)\, k + (\pi_2 + ws)(m + m') + (\pi_3 + wv)x < Y = y + wT$

Given that the production function:

m =G (H) ----------health need

H = H (x, k; A, E, e) ----------health status

Where,

x -composite of other goods and services

H - Health status

k - Preventive service

A -Age

E -Hygiene quality of home environment

e- Virulence of disease agents in the community

m- Necessary level of curative care

m'-Discretionary purchase of medical care

(m'+m) =M -Total purchase of medical care

π_1, π_2, π_3 -Money price of k, M and x respectively

t, s ,v - time prices of k, M, and x respectively

w- Wage rate

y - Unearned income

wT- earned income

T- Productive time available

Y-full income

The distinguishing feature of Heller's model is that, quantity of the necessary level of curative care depends on health status, while the health status depends on the consumption of other goods. The consumption of preventive services depends on environmental hygiene, disease prevalence rate and age of the individual. Even though the model tries to include new feature, like hygiene, and preventive service into the utility function, the consideration of the necessary level of medical care as related to health status is not clearly formulated, i.e. it is not clear from the model at what minimal level of health status should the individuals purchase curative service.

Chapter Three: Research Methodology

3.1 Empirical Model Specification

The Demand of curative health care can be modeled based on economic theory and past studies. Thus, following Gertler and van der Gaag (1990:65-74) the demand for curative health care can be modeled as follows. If a member of a household experiences an accident or illness the household decide whether to seek medical care or not. The advantage of consuming medical care is improvement in health and the cost of medical care is a reduction in consumption of other goods and services. In the process of deciding to seek medical care or not, household selects from a finite set of alterative (self care is one) based on expected health improvement and the cost incurred in getting the service. The costs include the direct cost (cash payment for service, drugs and transportation) and indirect cost (the opportunity cost of traveling and waiting time). Thus, the expected conditional utility of a household conditioned on receiving health care from provider j for individual i is given as:

$U_{ji}=U(H_{ji}, C_j)$ ---------- (1)

Where:

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

C_j - consumption expenditure net of the cost of medical care from provider j

And the C_j depends on the budge constraint of the household, that is,

$C_j + P_{ji} + WT_{ji} = Y$---------- (2)

Where:

Y -household income

P_{ji} - direct payment to provider j for individual i's treatment

W -is the opportunity cost of time.

T_{ji}- time spent to obtain care from provider j for individual i's treatment

The medical care purchased from provider j is invested in an individual health, which brings (produces) improvement in health (expected improvement) as compared to self care and this can be seen as the quality of provider j. If we denote health status of self care as H_{oi} and the quality of provider j for the treatment of individual i as Q_{ji} then,

$$Q_{ji} = H_{ji}-H_{oi}$$

And

$$H_{ji} = Q_{ji} +H_{oi} \text{ ---------- (3)}$$

From equation (2) above

$$C_j = Y - (P_{ji}+WT_{ji}) \text{ ---------- (4),}$$

and the expected conditional utility of equation (1), after substituting equating (4) for C_j, and equation (3) for H_{ji}, becomes

$$U_{ji} =U (Q_{ji} +H_{oi}, Y-P_{ji}-WT_{ji}) \text{ ---------- (5)}$$

The unconditional utility maximization of the problem of the households which face j+1 alternatives (including self care) becomes:

$$U^* = U (U_{0i}, U_{1i},\ldots, U_{ji}) \text{ ----------(6)}$$

Where U* is maximum utility

U_{oi} -expected conditional utility of self-care

U_{ji} - expected conditional utility of treatment from provider j

The solution to (6) gives the alternative that is chosen. When a random term is added to it, it is the probability that each alternative is chosen and this can be interpreted as the demand function in a discrete choice model. The functional form of the demand function depends on the functional form of the conditional utility function, and the distribution of the stochastic term. Gertler and van der Gaag (1990) proposed the conditional utility function that does not impose a constant marginal rate of substitution for all level of incomes and consistent with utility maximization. This conditional utility function is quadratic, which is linear in health and quadratic in consumption. Thus equation (6) becomes:

$$U_{ji} = \alpha_o (Q_{ji} + H_{oi}) + \alpha_1 (Y - P_{ij} - WT_{ji}) + \alpha_2 (Y - P_{ij} - WT_{ji})^2 + \varepsilon_{ji} \text{ ---------- (7)}$$

Where:

ε_{ji} - is the random disturbance term.

The expected improvement in health expressed in equation (3) can be viewed as being produced through a household production function, which uses individual, household and providers characteristics as input. In addition, the marginal utility of an individual's health may vary with household characteristics such as age, sex, and family composition and structure. Pollak and Wachter (1975) argued that the effect of demographic variables in the household production function and in the marginal utility of quality cannot be identified separately. Thus, a model that shows how utility is derived from quality can be identified as:

$\alpha_o Q_{ji} = \Phi_{oj} + \Phi_{1j} X + \eta_{ji}$--------- (8)

Where X is a vector of the determinant of quality and utility from quality (individual, household and providers quality)

η_{ji} - random disturbance term

Substituting equation (8) above in equation (7) and ignoring $\alpha_o H_{oi}$ since it appears in all alternatives, we have

$U_{ji} = \Phi_{oj} + \Phi_{1j} X + \alpha_1(Y-P_{ij}-WT_{ji}) + \alpha_2(Y-P_{ij}-WT_{ji})^2 + \varepsilon_{ji} + \eta_{ji}$ ---------- (9)

If we denote $\Phi_{oj} + \Phi_{1j} X + \alpha_1(Y-P_{ij}-WT_{ji}) + \alpha_2(Y-P_{ij}-WT_{ji})^2$ by V_{ji} and $\varepsilon_{ji} + \eta_{ji}$ by ψ_{ji} for compactness of notation, then equation (9) becomes:

$U_{ji} = V_{ji} + \psi_{ji}$ ---------- (10)

This gives the specification of the indirect conditional utility function. Based on the distributional assumption of the error terms (ψ_{ji}) the model of the demand for curative health care can be specified.

Most of the previous studies specified this model as a multinomial logit (MNL). But, the MNL as discussed in Maddala (1983) suffers from the independency of irrelevant assumption (IIA). This assumption is equivalent to assuming that the stochastic portions of the conditional utility function are uncorrelated across alternatives and this imposes constant cross-price elasticities. The problem of MNL can be avoided by using Nested Multinomial Logit (NMNL). The NMNL allows correlation across sub groups of alternatives and thus non-constant price elasticities. For the specification of NMNL the joint distribution of $\varepsilon_{ji} + \eta_{ji}$ is assumed to be type B extreme value distribution (Gumble) as discussed in Maddala (1983)

3.2 Data Source, Sampling and Estimation Procedure

3.2.1 Data Source

The data used for this study are primary and cross sectional. The data were collected through household sample survey. The questionnaire for the study was prepared in English and translated into Amharic. It was designed to illicit information on household characteristics and the perception of households regarding health and health care providers. The survey was undertaken during the month of February of 2003 for three weeks. For this survey, eight enumerators and two supervisors were employed and trained adequately to enable them to have full understanding of the purpose of the survey and the meaning of each question.

3.2.2 Sampling Procedure.

According to the 1994 census report Jimma town has around 100 thousand population and 19 thousand households. Using this information, the sample for the study was designed as two stage simple random sampling. In this procedure first the "kebeles" and then the households were selected. In the first stage of sampling 10 "kebeles" out of 19 "kebeles" of the town (52% of the "kebeles") were selected, and in the second stage of the sampling procedure 950 households (10% of the selected "kebeles") were selected. From the total 950 households 275(29%) of them reported an illness or accident within four-week period prior to the survey. Since in some households more than one member of their family may experience an illness or an accident, the total data set of the study became 316 observations after ignoring 15 incomplete sample points.

3.2.3 Justification for the Selection of the Study Area

The town is selected for this study for the following main reasons:

First, Jimma town as a zonal town has one community based Medical University, which has the objective of teaching the community the importance of health and health care services. Thus, under this condition the community is expected to have good knowledge of the importance of health care services.

Second, the heterogeneity of the population and the diversified socio-economic activity of the town may make it a good representative of Oromia Zonal towns.

The third and the last reason is that there is no study on the demand for health care of the town.

3.3 Estimation Procedure

The empirical model of the study is identified as NMNL. This model can be estimated by maximum likelihood estimation depending on the level of decisions that are dependent on relevant alternatives available to the consumer. The relevant medical care alternatives in Jimma town are public hospital, public PHCU (Clinic and Health center) and private providers (clinic and drug outlets). Thus, the analysis has a two level household decision tree where the household first decides whether to seek medical service or not. If they decide to use modern medical treatment they have the option to choose between different health care providers. In order to model this decision process let us consider equation 10 (given on page 34) again, i.e,

$U_{ji} = V_{ji} + \psi_{ji}$

The term ψ_{ji}, is assumed to follow generalized extreme value (GEV) of type B (Gumble) distribution and its cumulative distribution function (CDF) for a two level decision is given by:

$F(\psi) = \exp\{-[\exp(\psi_{1i}/\sigma) + \exp(\psi_{2i}/\sigma) + \exp(\psi_{3i}/\sigma) + \ldots + \exp(\psi_{ji}/\sigma)]^{\sigma} \exp(-\psi_{0i})\}$

Where:

σ- is the common parameter and it is a measure of similarity of the alternatives at a choice level. The joint probability that an individual will choose provider k from among J+1 alternative classified into two modes of treatment (modern and self care treatment) is given by:

$p(Mo, k) = p(Mo).p(k/Mo)$, where Mo is mode of treatment.

Thus, the joint probability of provider k and modern mode of treatment (m) is given by:

$p(k, m) = p(m)p(k/m)$ ----------(12)

The likelihood function of equation 12 is given by;

$L = \pi^{n}_{i=1}\{\pi^{j}_{k=0} p(m, k)^{y}\}[1-p(m)]^{1-y}$ ----------(13)

Where:

y is 1 if provider k is visited or zero otherwise.

$p(k/m) = \exp(z_k)\{(\Sigma^{j}_{k=0}\exp(z_k))\}^{-1}$

$p(m) = \exp(w_{Mo}+\sigma INV_{M0})\{\Sigma_{Mo} \exp(w_{Mo}+\sigma INV_{Mo})\}^{-1}$

$INV_{Mo} = \ln(\Sigma^{j}_{k=0}\exp(z_k))$,inclusive value (expected maximum utility from modern mode of treatment.)

z_k - are factors that affect the decision of choosing between modern health care providers.

w_{Mo} - are factors that affect the decision to choose between the mode of treatment.

There are two ways of estimating the parameters of the above nested multinomial logit model. The first method is full information maximum likelihood estimation of the log likelihood of equation 13.The second procedure is to use two-step maximum likelihood estimation, and the procedure involves the following steps:

1. In the first step, the coefficients of the factors that affect the choice of the lower nest and the inclusive value of the branch will be estimated by considering the lower nest as multinomial logit.
2. In the second step, the coefficients of the factors that affect the choice of the branch and the coefficients of the inclusive value will be estimated by considering the branches (the upper nest) as multinomial logit.

This paper uses the two-step procedure due to the unavailability of the program that handle the full information maximum likelihood estimation of equation 13.This procedure yields consistent and asymptotically normal estimates of the parameters. However, it is not asymptotically efficient as a full information maximum likelihood estimator (see McFadden (1984), Hensher (1986) and Ortuzar and Eillusen (1990).

Variable Definition

The variables used in the adopted model of this paper to estimate the demand for modern care, public hospital, and private health care providers are as presented in Table 4 and 5 below. In these tables the dependent variables with the associated explanatory variables are defined. In the next section, the expected relations between dependent and independent variables will be discussed.

Table 4: Variable Definition for Mode of Treatment Choice
(Demand for Modern Health Care)

Variable Name	Description
INV	Inclusive value (expected maximum utility form health modern health care providers).It is calculated from the result of NMNL model of health care provider choice equation.
Eduhh:	Education level of household head. It is classified into three categories, i.e. household head with no education, primary education and secondary education and above.
1) Neduhh	Household head with no education. It assumes one if the patient is from this household category or zero otherwise.
2) Peduhh	Household head with primary education. It assumes one if the patient is from this household category or zero otherwise.
3) Seduhh	Household head with secondary education and above. This category is used as a base of analysis.
Hhsex	Dummy variables for household head sex. It takes one if the patient is form female-headed household and zero otherwise.
Nhday	Number of healthy days within a four week period prior to the survey.
Nadu	Number of adults in the family
Nach	Number of children in the family

Table 5: Variable Definition for Health Care Providers Choice
(Demand for Public Hospital and Private Health Care Providers)

Variable Name	Variable Descriptions
Agp	Patient's age in year
Psex	Dummy variables for patient's sex. It assumes one if the patient is female and zero otherwise.
Edup	Education level of the patient. It is classified into three categories, i.e. patient with no education, primary education and secondary education and above
1) Nedup	Patient with no education. It takes one if the patient's education is in this category or zero otherwise.
2) Pedup	Patient with primary education. It assumes one if the patient's education falls in this category or zero otherwise.
3) Sedup	Patient with secondary education and above. It is used as a base of analysis.
Dvqu	Dummy variable for perceived quality of treatment. It takes one if the patient's evaluate the quality of treatment as good and above and zero otherwise.
Cons	Consumption level after direct and indirect medical costs.
Cosq	The square of consumption level after direct and indirect medical costs.

Expected Results

Based on theoretical and past studies the relation between dependent and independent variables is as explained below.

Consumption (Cons) is expected to be the most important determinant of the demand for health care. Consumption being the residual income after the cost of medical service, it is expected to have positive impact on the demand for health care services.

Consumption Squared (Consq) represents the marginal utility of consumption and thus it is expected to have negative relationship with the demand for curative health care.

Patient's age (Agp): There are two different views about the effect of age on the demand for health care. Some studies suggest that the relation between age and health care demand is U-shaped. That is, infant and young children are the frequent users of health care since they are vulnerable to infectious diseases, whereas older people usually suffer from degenerative diseases. Others argue that the demand for health care increases with age. Thus, the net effect of age on the demand for health care is ambiguous. However, in this study, age is expected to have positive impact on the demand for health care assuming that the society gives little attention to children due to cultural reasons.

Household Head Sex (Hhsex): Due to cultural and other norms of the society patients from female-headed household is expected to seek modern medical treatment less than patients from male-headed household. Moreover, female-headed household is expected to generate less income than female-headed household and thus negative relation is expected. However, if the decision of the mother is more democratic than the father, then this relation may not hold. In this study, the latter assumption is more appropriate than the first two and thus positive relation is expected.

Number of Children and Adults: The net effect of adults on the demand for curative health care seems ambiguous. This is due to the fact that on the one hand, the increase in the number of adults makes home care (self care) easy and decreases the demand for modern medical treatment, while on the other hand adults may generate more income and this may increase the demand for modern medial treatment. In this study, the relation between the demand for curative health care and the number of adult in the family is expected to be negative due to

low employment rate. Similarly, the relation between the demand for curative health care and the number of children in the family is expected to be positive.

Number of healthy days (Nhday): Stands as a proxy for severity of illness which is a measure of level of healthiness and thus, it is expected to have negative relation with demand for curative health care.

Perceived quality of treatment (Dvqu): Other things being equal, if the consumer is able to evaluate the provider's quality, then the consumer prefers the health care provider with more quality. Thus, the relation between the demand for health care providers and perceived quality of treatment is expected to be positive.

Education level of the patient (Edup): The education level of the patient may influence the perception of the individual towards modern health care and thus may increase the demand for modern medical treatment. However, some researchers argue that more educated people are more efficient in self-care than people without education and as a result they demand modern health care services less than people without education. Thus, the net effect of education seems ambiguous. But in this case since the general situation of the country suggests that more educated people may be aware of the usefulness of modern medical treatment than people without education then it is expected to have positive effect on demand for modern medical treatment.

Education level of household head (Eduh): the education level of the household head is important variable in the demand for modern medical treatment when the household head is the sole decision maker. In this case, the relation between education level of household head and the demand for modern health care services is expected to be positive.

Chapter Four: Data Analysis and Discussion of the Findings

4.1 Descriptive Analysis

The survey data indicate that from the total 316 patients the highest proportion (33.2%) get treatment from hospital and 28.2% of the patients do not visit health care providers for treatment. The rest 20.3% and 18.4% of the patients seek treatment form private and public health stations, respectively. These figures suggest that there may be providers' characteristics and individual patient's characteristics that are important in choosing health care providers and mode of treatment. Thus, in the next section these characteristics will be investigated in detail.

Income as economic variable, as can be seen form Table 6 below, seems to be an important determinant of demand for health care and choice of health care providers. In all treatment options, the highest proportion of the patients comes from the first income quartile and the proportion is highest in hospital and self-treatment alternatives. Similarly, in public PHCU and private providers the highest proportion of the patients comes from the first income quartile, even though the magnitude is different. In all treatment options, the proportion of patients decreases as income quartile increase which may indicate the fact that the poor are more likely to have bad health than the rich.

Table 6: Treatment Chosen by Income Quartile

Income Quartile in Birr		Treatment Chosen			
		Hospital	PHCU	Private	Self care
0 - 400	Count	59	30	31	48
	% Within Treatment	56.19	51.72	48.44	53.93
401 - 800	Count	20	16	18	18
	% Within Treatment	19.05	27.59	28.13	20.22
801-1200	Count	15	9	6	18
	% Within Treatment	14.29	15.52	9.38	20.22
Above 1201	Count	11	3	9	5
	% Within Treatment	10.48	5.17	14.06	5.62
Total	Count	105	58	64	89
	% Within Treatment	100	100	100	100

Source: Survey data

In addition to the income of the patient, the direct and indirect cost of medical treatment may play an important role in health care demand and provider choice. The direct cost of medical treatment includes the cash payment for drugs, treatment and transportation cost. As can be seen from Table 7 below, the survey data indicates that the highest proportion of patients from hospital and PHCU pay less than 45 Birr while in contrast to this, in private providers the highest proportion of patients pay more than 45 Birr. That is, in private provider 63.1% of the patients pay more than 45 Birr, where as it is only 8.6% and 28.5%of the patients that pay more than 45 Birr in PHCU and hospital, respectively.

Table 7: Treatment Chosen by Expenditure Category per Treatment

Expenditure Category in Birr		Treatment Chosen		
		HOSPITAL	PHCU	PRIVATE
0	Count	4.00	6.00	0.00
	% Within Treatment	3.81	10.34	0.00
.5-15	Count	22.00	12.00	5.00
	% Within Treatment	20.95	20.69	7.81
15.1-45	Count	49.00	35.00	19.00
	% Within Treatment	46.67	60.34	29.69
45.1-75	Count	20.00	3.00	15.00
	% Within Treatment	19.05	5.17	23.44
Above 75	Count	10.00	2.00	25.00
	% Within Treatment	9.52	3.45	39.06
Total	Count	105.00	58.00	64.00
	% Within Treatment	100.00	100.00	100.00

Source: Survey data.

Thus, this is a strong indication that as price increase the demand for publicly provided health care service may decrease and as a result the consumer may either join the private provider or may opt for self care. The direct cost may not be the only factor that determines the choice of health care providers as can be seen from Table 8 below, the choice of health care providers depends also on the indirect cost of treatment such as travel and waiting time. As direct cost is high in private provider the indirect cost is high in publicly provided health care service. As a result, as the waiting time increase the proportion of patients falls sharply in private provider whereas the reverse holds in hospital and PHCU.

Table 8: Treatment Chosen by Waiting Time

Waiting Time in Hour		Treatment Chosen			Total
		HOSPITAL	PHCU	PRIVATE	
<1/2	Count	6	1	14	21
	% Within Treatment	5.71	1.72	21.88	9.25
1/2-1	Count	12	12	31	55
	% Within Treatment	11.43	20.69	48.44	24.23
1-2	Count	11	9	7	27
	% Within Treatment	10.48	15.52	10.94	11.89
2-4	Count	37	17	9	63
	% Within Treatment	35.24	29.31	14.06	27.75
4-6	Count	9	5	3	17
	% Within Treatment	8.57	8.62	4.69	7.49
> 6	Count	30	14	0	44
	% Within Treatment	28.57	24.14	0	19.38
Total	Count	105	58	64	227
	% Within Treatment	100	100	100	100

Source: Survey data.

In general, the data show that there is an association between choosing health care providers and the economic variables. Publicly provided health care is associated with less direct cost and high indirect cost whereas the privately provided health care services are associated with high direct cost and low indirect cost. The average direct treatment cost in the case of private provider is 81.45 Birr, which is almost double that of hospital and PHCU (49.24 and 30.04 Birr respectively). In addition to the economic variable, the perception of the individual about their own health status and quality of health care providers may also affect the decision of choosing between providers and the decision of choosing modern treatment. In the next section, we will look at the effect of these factors on the demand for health care.

Table 9: Behavior of Health Workers, Quality of Treatment and Treatment Chosen

Treatment Chosen		Behavior of Health workers					Quality of Treatment				
		Very Good	Good	Poor	Very Poor	Total	Very Good	Good	Poor	Very Poor	Total
HOSPITAL	Count	20	67	15	3	105	3	65	21	16	105
	% Within Treatment	19.05	63.81	14.29	2.86	100	2.9	61.9	20	15.2	100
PHCU	Count	14	37	7	0	58	6	31	11	10	58
	% Within Treatment	24.14	63.79	12.07	0	100	10.3	53.4	19	17.2	100
PRIVATE	Count	37	27	0	0	64	21	36	5	2	64
	% Within Treatment	57.81	42.19	0	0	100	32.8	56.3	7.8	3.1	100

Source: Survey data

Individual patients may evaluate the quality of treatment based on the behavior of health workers, and other facility attributes. As can be seen from Table 9 above, 80% of the patients from hospital and PHCU rank the behavior of private health workers as good, where as the whole patients from the private providers consider the behavior of health works as good. However, only 60% of the patients from hospital and PHCU rank the quality of treatment as good in contrast to 90% in private providers. The result shows little association between the perception of patients about health care workers behavior and quality of treatment. This further indicates that patients do not evaluate quality of treatment based on health care workers behaviors. Thus, patients may evaluate quality of treatment based on other factors and may give more attention to it in choosing health care providers, other things being equal.

Moreover, when patients were asked their first main reason for choosing the health care providers, as shown in Table 10 below, 38.1% of hospital patients mention quality of treatment, 36.2% of the patients mention less treatment cost and 15.2% cite proximity (indirect cost) as a reason of choosing hospital care. In PHCU, proximity accounts for 41.4%, while less treatment cost and quality of treatments account for 31% and 10.3%, respectively. In private health care providers, the quality of treatment is the first main reason (42.2%) of choosing treatment in private sector, whereas proximity (31.3%) and less waiting time (15.6%) are the second and the third reasons of choosing treatment from private providers.

In general, in hospital and private health care providers, perception of quality of treatment and indirect cost are the major reason of choosing health care providers. Especially in Jimma town, where Jimma hospital is the only tertiary health care alterative available to the consumer, it may be considered as a health care provider with high quality of treatment. In PHCU however, the direct and the indirect costs are the major reasons for choosing the providers. This may be due to the fact that PHCU are designed to give free maternal and child health care services. In a similar manner, of the total 89 patients who choose self care: 43.8% mention financial problem and 46.1% mention simplicity of the illness as a reason of not seeking modern medical treatment. This also indicates that the cost of medical treatment and the perception of one's health status plays major role in choosing modern medical treatment.

Table 10: Distribution of Patients by Reason of Choosing the Facility

Reason of Choosing the Facility		Treatment Chosen		
		HOSPITAL	PHCU	PRIVATE
Proximity	Count	16	24	20
	% Within Treatment	15.24	41.38	31.25
Less Payment	Count	38	18	3
	% Within Treatment	36.19	31.03	4.69
Quality of Treatment	Count	40	6	27
	% Within Treatment	38.1	10.34	42.19
Less Waiting Time	Count	1	1	10
	% Within Treatment	0.95	1.72	15.63
Drug Availability	Count	0	2	1
	% Within Treatment	0	3.45	1.56
Free Treatment	Count	10	6	0
	% Within Treatment	9.52	10.34	0
Others	Count	0	1	3
	% Within Treatment	0	1.72	4.69
Total	Count	105	58	64
	% Within Treatment	100	100	100

Source: Survey data.

Although the perception of individual matters, it is also important to note that the perception of individuals may be influenced by information processing and evaluation ability, which may depend much on the education level of the individual. This is also supposed to influence the decision of whether to choose modern medical treatment or not. As can be seen from Table 11 below, the proportion of household heads with secondary education is the highest in almost all treatment options. This result may indicate that seeking medical treatment could be influenced by education level of household head. Furthermore, the education level of the patient has also similar patterns, i.e patients with secondary education is the highest in almost in all treatment options. This may indicate that households seek modern medical treatment for more educated members of the family than less educated members of the family.

Table 11: Facility Chosen by Education Level of Household Head and Patient

Treatment Chosen		Education Level of Household Head					Patient Education				
		Illiterate	Primary	Secondary	Above Secondary	Total	Illiterate	Primary	Secondary	Above Secondary	Total
HOSPITAL	Count	27	27	39	12	105	37	27	36	4	104
	% Within Treatment	25.7	25.7	37.1	11.4	100	35.6	26	34.6	3.85	100
PHCU	Count	14	19	23	2	58	17	18	23	0	58
	% Within Treatment	24.1	32.8	39.7	3.45	100	29.3	31	39.7	0	100
PRIVATE	Count	11	17	25	11	64	25	19	19	1	64
	% Within Treatment	17.2	26.6	39.1	17.2	100	39.1	29.7	29.7	1.56	100
SELF-CARE	Count	16	22	44	7	89	23	16	46	3	88
	% Within Treatment	18	24.7	49.4	7.87	100	26.1	18.2	52.3	3.41	100

Source: Survey data.

In addition to economic and perception variables, demographic characteristics of the household may have a role in choosing modern medical treatment and in choosing between health care providers. In the next section the effect of these variables on the decision of choosing modern medical treatment and between health care providers will be investigated.

As can be seen from Table 12 below, the highest proportion of patients in all treatment options are female patients. This may suggest that households are more likely to seek modern medical treatment for female patients than male patients. However, households' decision of choosing between health care providers does not depend on patient's sex. Similarly, female-headed households are more likely to seek modern medical treatment than male-headed households' even though the decision of choosing between health care providers is not affected by household head sex.

Table 12: Treatment Chosen by Patient's and Household Head Sex

Treatment Chosen		Household head Sex		Total	Patient's sex		Total
		Male	Female		Male	Female	
HOSPITAL	Count	79	26	105	50	55	105
	% Within Treatment	75.24	24.76	100	47.62	52.38	100
PHCU	Count	43	15	58	28	30	58
	% Within Treatment	74.14	25.86	100	48.28	51.72	100
PRIVATE	Count	50	14	64	23	41	64
	% Within Treatment	78.13	21.87	100	35.94	64.06	100
SELF-CARE	Count	74	15	89	39	50	89
	% Within Treatment	83.15	16.85	100	43.82	56.18	100

Source: Survey data.

The other demographic variable that may influence the demand for modern medical treatment is the number of adults and children in the household. As can be seen from Table 13 below, the first highest proportion of patients in each alternative treatment comes from the household which have children between 1 or 2 and the second largest proportion comes form the household which have 3 to 5 children. Similarly, the households which have 3-6 adults constitutes 65-71% of the patients in each treatment category while households which have three or less number of adults in the family constitutes 18.1-28.1% of the patients in each treatment category. Thus, there seems to be no variation in treatment choice due to number of adults and number of children, since the proportion of patients in each treatment category does not vary by the number of children and adults in the household. However, the data show an increase in proportion of patients who seek modern medical treatment as the number of children in the family increases.

Table 13: Treatment Chosen by Number of Children and Number of Adults in the Family

Treatment Chosen		Category of number of adult				Category of number of children				
		<3	3-6	>6	Total	0	1-2	3-5	>5	Total
HOSPITAL	Count	19	75	11	105	23	51	30	1	105
	% Within Treatment	18.1	71.43	10.48	100	21.9	48.57	28.57	0.95	100
PHCU	Count	14	38	6	58	7	32	19	0	58
	% Within Treatment	24.14	65.52	10.34	100	12.07	55.17	32.76	0	100
PRIVATE	Count	18	42	4	64	6	42	16	0	64
	% Within Treatment	28.13	65.63	6.25	100	9.38	65.63	25	0	100
SELF-CARE	Count	25	59	5	89	12	53	24	0	89
	% Within Treatment	28.09	66.29	5.62	100	13.48	59.55	26.97	0	100

Source: Survey data.

The other demographic variable that may influence the demand for curative health care is age of the patients. As can be seen from Table below 14 below, the age group 16-35 represents the highest proportion of patients in each treatment alternatives. In private health care providers the proportion of patients in each category shows little variation across the age group where as in hospital, PHCU and self-care the proportion of patients seems to vary across age groups. This indicates that the age of the patient has a role in health care demand and choice of health care providers.

Table 14: Distribution of Patients by Age group and Choice of Treatment

Treatment Chosen		Age Group of the Patient					Total
		< 5	5-15	16-35	36-49	> 50	
HOSPITAL	Count	14	15	45	11	20	105
	% Within Treatment	13.33	14.29	42.86	10.48	19.05	100
PHCU	Count	11	16	23	4	4	58
	% Within Treatment	18.97	27.59	39.66	6.9	6.9	100
PRIVATE	Count	10	10	16	12	16	64
	% Within Treatment	15.63	15.63	25	18.75	25	100
SELF-CARE	Count	8	15	49	8	9	89
	% Within Treatment	8.99	16.85	55.06	8.99	10.11	100

Source: Survey data

4.2 Econometric Analysis.

In this section the estimation results of the first and the second level NMNL will be discussed as follows. The parameter of the first NMNL model estimated in two-stage method is presented in Table 15 below. Even though it is difficult to interpret the magnitude of the coefficient, the sign and the significance of the coefficient would reveal whether the model is able to explain the factors that affect the decision to choose between health care providers.

Table 15: NMNL Model of Provider Choice Estimates

Public Hospital	**Coef**	**Std.Err.**	**z**	**P>|z|**	**[95% Conf.Interval]**	
Agp	0.0281899	0.0103499	2.72	0.006	0.0079045	0.0484754
Psex	0.1912574	0.3458447	0.55	0.58	-0.486586	0.8691004
Nedup	0.0669546	0.3970462	0.17	0.866	-0.711242	0.8451509
Pedup	-0.29247	0.4068111	-0.72	0.472	-1.089801	0.5048654
Dvqu	0.2353132	0.3739758	0.63	0.529	-0.497665	0.968291
Cons	0.0038386	0.0015132	2.54	0.011	-0.006805	0.008728
Consq	-2.66E-06	1.08E-06	-2.45	0.014	-3.34E-07	-1.78E-06
_const	0.4291965	0.6065613	0.71	0.479	-0.759642	1.618035
Private Providers	**Coef**	**Std.Err.**	**z**	**P>|z|**	**[95% Conf.Interval]**	
Agp	0.031484	0.0109975	2.86	0.004	0.0099289	0.0530384
Psex	0.097849	0.3847487	0.25	0.799	-0.656245	0.8519424
Nedup	0.315692	0.4445737	0.71	0.478	-0.555727	1.18697
Pedup	0.040519	0.4543892	0.09	0.929	-0.850067	0.9311056
Dvqu	0.579923	0.2371431	2.44	0.015	0.2768616	1.436708
Cons	0.003564	0.001547	2.3	0.021	-0.006596	0.00532
Consq	-2.66E-06	1.09E-06	-2.44	0.015	-3.22E-07	-1.79E-06
_const	-0.705744	0.6875779	-1.03	0.305	2.053371	1.618035

LR $\chi^2(14)=32.14$ Pseudo $R^2=.0665$
Prob>χ2=.0038 Number of obs.=227
Log likelihood=-225.63401

The coefficients of consumption and consumption squared are statistically significant in both public hospital and private providers demand estimation. The result indicates that income, direct and indirect medical costs are important determinants of the demand for medical care. The sign of the coefficients are as expected where; the positive sign of consumption's coefficient indicates the direct relation between consumption and the demand for medical care

and the negative sign of the coefficient of consumption squared indicates the decrease in marginal utility of consumption.

From the demographic variables age of the patient is significant determinant of the demand for medical care at both private health care providers and public hospital. The sign of the coefficient indicates that older patients are more likely to visit health care providers than younger patients and children. The other demographic factor, sex of the patient, is not a significant determinant of the demand for medical care. However, the positive sing of the coefficient indicates that households are more likely to seek medical care for female patients than male patients from public hospital and private health care providers.

The education level of the patient, as a factor that may affect the perception of individual towards different health care providers, is not a significant factor that determines the demand for both types of providers. However, primary education is positively related to the demand for private health care providers and negatively related to public hospital care, indicating that households are more likely to use private provider's care than public hospital for educated member of their family. At both public hospital and private health care providers, patients with no education are more likely to seek medical care than educated patients, even though the effect is statistically insignificant. The positive sign of the coefficient may indicate the existing high illiteracy rate and may not have any other implication on the impact of using modern health care providers.

In relation to the perception of patients, the perceived quality of treatment affects the demand for private health care providers positively and significantly. In contrast to this, the perceived quality of treatment is not a significant factor in choosing hospital care even though its effect

is positive. This result indicates that the perceived quality of treatment is one of the factors that affect the decision of choosing between health care providers.

In general, the demand for curative health care, at both public hospital and private providers, is affected by consumption level, patient's age and the perceived quality of treatment. The fact that consumption level is an important determinant of the demand for curative health care indicates that household income and the cost of medical care are also important factors that affect the demand for health care providers.

The parameter of the second level of NMNL model estimation is given in Table 16. At this level, the factors that are assumed to affect the decision to choose between modes of treatment were analyzed. The estimated value of the inclusive value parameter is between zero and one confirming that the NMNL model is better than the MNL model and it is consistent with utility maximization axioms. Moreover, the value is close to 0.5 indicating that there is a moderate substitution between health care providers than self care and modern medical treatment options.

Table 16: NMNL Model of Mode of Treatment Choice Estimates

Mode of Treatment	Coef	Std.Err.	z	P>|z|	[95% Conf.Interval]	
INV	.5410302	.1683867	3.21	.001	.2109983	.8710622
Neduhh	-.1150352	.3907922	-.29	.768	-.8809738	.6509034
Peduhh	.71584	.3221442	.22	.824	-.559807	.702975
Hhsex	.523648	.371118	1.41	.158	-.20373	1.251026
Nhday	-.0586794	.0255866	-2.29	.02	-.10888282	-.0085306
Nadu	.0865523	.0772774	1.12	.263	-.0649087	.2380133
Nch	.23079541	.1134799	2.03	.042	.0083789	.4532119
_const	.028533	.8094581	1.27	.2	-.5580054	2.615012

LR $\chi^2(7)=31.71$ Pseudo $R^2=.0844$
Prob>χ2=.00000 Number of obs.=316
Log likelihood=-172.04

Among the factors that affect the decision to choose between self-care and modern medical treatment option number of healthy days and number of children in the family are found to be statistically significant. The number of healthy days affects household's decision of choosing modern medical treatment negatively and significantly, while this decision is positively and significantly affected by the number of children in the family. This indicates that the more the number of children in the family the more likely the households opt for modern medical treatment.

Household head characteristics like education and sex were also analyzed at this level and found to be insignificant. However, the sign of the coefficients indicate that female-headed and primary educated-headed households are more likely to choose modern medical treatment than male-headed and illiterate-headed households for their patients.

Based on level one and two estimation results, the effects of income, direct and indirect medical costs on the demand for curative health care can be analyzed. However, in the estimated equation price and income are included in non-linear manner and it is difficult to assess their effect on demand directly from the results. To assess the effect of income and price, the arc price and waiting time elasticities of the demand will be estimated following Gertler and van der Gaag (1990). To do this, first the probability an individual (in a given income quartile) will choose a provider at a top and bottom of the price range will be estimated for every individual in the income quartile keeping all other variables at their mean value except the price and income. Then, arc price elasticities are estimated by dividing the average percentage change in the sum of probabilities by percentage change in price. Similarly, arc waiting time elasticities are also calculated using waiting time and its opportunity cost, to investigate the rationing effect of waiting time.

Table 17: Arc Price Elasticities

		Income quartile in Birr			
Public	Price range in Birr	0-400	401-800	801-1200	1200+
Hospital	0-50	-0.0067497	-0.0059901	-0.005322	-0.005081
	50-90	-0.0533028	-0.0494702	-0.044928	-0.043128
	90-130	-0.0585978	-0.0556207	-0.05082	-0.048669
	130-170	-0.0816683	-0.083099	-0.078957	-0.076822
	0-50	-0.0041527	-0.003302	-0.002522	-0.002205
Private	50-90	-0.0325554	-0.0282142	-0.022846	-0.020399
Providers	90-130	-0.0352552	-0.0318064	-0.0261	-0.023254
	130-170	-0.0480018	-0.0493092	-0.038118	-0.034836

The arc price and arc waiting time elasticities for public hospital and private providers are calculated for four-income quartiles and waiting time range as presented in Table 17 and 18. The magnitudes of the estimates of the price elasticities for both public hospital and private providers are small. However, the magnitude of the elasticities varies across price ranges and decreases significantly at higher price ranges. This indicates that the consumer is sensitive to change in price at higher price range than at lower price ranges. Within price range the price elasticities of demand for both public hospital and private provider falls as income falls, indicating that the poor are more price sensitive than the rich and thus, the increase in price of health services reduces health service utilization of the poor more than that of the rich.

Table 18: Arc Waiting Time Elasticities

	Hours of	Income quartile in Birr			
Public	Waiting Time	0-400	401-800	801-1200	1200+
Hospital	1-3	-0.0013619	-0.00120238	-0.0010634	-0.000962808
	3-5	-0.0040847	-0.00361773	-0.0032036	-0.002903576
	5-7	-0.0068041	-0.00604508	-0.0053529	-0.00484826
	7-9	-0.0095203	-0.0089606	-0.0082458	-0.007761311
Private	1-3	-0.0008353	-0.0006596	-0.000499	-0.000379652
Providers	3-5	-0.0025051	-0.00198991	-0.0015113	-0.00115464
	5-7	-0.0041721	-0.00333393	-0.0025273	-0.001920773
	7-9	-0.0058361	-0.00522669	-0.0043677	-0.003728649

Arc waiting time elasticities are similar to that of the arc price elastisties. The estimate shows that the individual in the lower income quartile is more waiting time sensitive than those in

the higher income quartile. The result indicates that the poor are sensitive to opportunity cost of time than the rich. This further indicates that the poor individual affords less to lose productive time than the rich. This result is supported by the fact that the lower income group in the sample consists of those who earn their income through non-regular activities. Thus, they spent much time to earn little money and have higher marginal utility of time and money than the rich. Furthermore, the arc price and arc waiting time elastisties are higher at public hospital than private providers. This result indicates that consumers are more sensitive to public hospital price and waiting time than private providers' prices and waiting time. This may be due the significant effect of quality factors in the demand for private health care providers.

Chapter Five: Summary and Concluding Remarks

5.1 Summary

Health is important in the development process as healthy people contribute positively to the growth of economy and welfare of the society. But due to some controlled and uncontrolled factors, individual may not have good health status. In order to restore good health, first households decide whether to use self-care or modern medical treatment for the sick individual form their family. If they decide to use the modern medical treatment option, the next step is to choose between different health care providers. In these decision processes, there are different factors that may influence households' decision. This paper tried to investigate the factors that affect households' decision of choosing between mode of treatments and the decision of choosing between health care providers once, modern medical treatment is chosen.

The paper identified and estimated NMNL model using sequential estimation procedure. First, the estimated result of the choice of the mode of treatment shows that level of health status, number of children in the family and the expected maximum utility from health care providers are significant factors that affect households' decision of choosing modern medical treatment. The level of health status negatively affects the choice of modern medical treatment whereas; the number of children in the family and the expected maximum utility affect the choice of modern medical treatment positively. Moreover, the estimated coefficient of the expected maximum utility indicates that there is more substitution between health care providers than between self-care and modern medical treatment options.

Second, the estimated result of the choice of health care providers indicates that, consumption, consumption squared, patient's age and perceived quality of treatments are important factors that affect the demand for curative health care. All these variables, except the perceived quality of treatment, have the same effect on both public hospital and private health care providers demand. Perceived quality of treatment has positive effect on the demand for curative health care even though its effect is significant only at private health care providers.

The fact that consumption and consumption squared are important determinants of the demand for health care provider implies that household income, direct and indirect medical costs are important determinants of the demand for curative health care. To see the effect of these variables, arc price and arc waiting time elasticities are estimated for both public hospital and private providers. The result indicates that the demand for curative health care is price insensitive indicating that curative health service matters. This result further indicate that the poor are more waiting time and price sensitive than the rich.

From the demographic factors, age of the patients is found to have a significant positive impact on the demand for curative health care. This indicates that households are more likely to seek curative services for adult than young patients. With regard to perception, perceived quality of care is found to affect the demand for private health care providers positively and significantly. In contrast, though Jimma hospital is the biggest health facility in the town, the perceived quality of treatment has positive insignificant impact on the demand for public hospital care. Furthermore, other variables like consumption, consumption squared and patients age are equally significant and have the same sign in both public hospital and private

health care providers demand equations. Thus, these results imply that patients prefer private health care providers to public hospital for the reason of perceived quality of treatment.

In general, the major findings of this paper are as follows:

1. The demand for curative health care is price insensitive and the insensitiveness decreases as price increases.

2. The poor are more waiting time and price sensitive than the rich.

3. An increase in price of public hospital is more likely to lead patients to private providers than opt for self care.

4. The demand for curative health care increases as patient's age increases.

5. Perceived quality of treatment is a significant factor that affects the alternative health care providers to be chosen.

6. Level of health status, as represented by number of healthy days, negatively affects the demand for modern health care treatment.

5.2 Concluding Remarks

Based up on the above findings the following concluding remarks can be made.

1. The demand for curative health care is price insensitive and the insensitivity decrease as price increases implies that moderate price increase at public hospital will generate substantial revenue without affecting health service utilization.

2. The fact that the poor are more waiting time and price sensitive than the rich implies that the potential of collecting revenue from the poor is low. This further implies that uniform price increase is not good and some kind of price discrimination has to be introduced so as to protect the poor and decrease the free riding of the rich.

3. The result that states an increase in prices of public hospital is more likely to lead patients to private providers than opt for self-care implies another argument in favor of differentiated increase in user fee at hospital. That is, patients with more income may join the private sector leaving a space for the poor in public hospital when they face higher price as compared to the poor.

4. The increase of the demand for curative service with age implies that children should be exempted from higher price at public hospital. Furthermore, health education should be given for parents to increase their awareness on child health so that parents may seek treatment for sick children at modern providers.

5. The perceived quality of treatment as the only factors that affects the alternative health care providers to be chosen implies that the increase in revenue from the increased user fees should be invested in increasing hospital care quality. This action helps to raise hospital care utilization by attracting consumer that previously chose private

providers based on quality. Moreover, this action may bring dual benefits for the health care system by increasing revenue and health service utilization simultaneously.

6. The last result that states the level of health status negatively affects the demand for curative health care implies the need to study the factors that affect individual's level of healthiness. This may help government to follow a policy that improves individual's level of healthiness so that the demand for curative health decreases without affecting the right and ability of patients to use curative health care.

In general, the policy message of the paper is the introduction of the modest differentiated increase of user fees at public hospital. This helps to ease the budget constraint, to increase hospital service quality and increase health service utilization at public hospital.

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Questionnaire for Household Survey on Curative Health Care Service Consumption in Jimma Town

Respondent's Name_____

House No_____Higher_____keblele_____

1 Patients Characteristics

Is there any member of the household's who has been suffering from illness /injury during the last four weeks? ☐Yes ☐ No **(if no stop here)**

If yes, how many are they? _____

Please, mention their name, age, sex, and education.

S. No	Patients Name	Sex		Age	Education					
		Male	Female		Elementary	Juniors	High School	Above High School	Religious Education	Other(specify)

1.3 If the age of the patient is less than 15 years, please specify the education level of the mother

☐Elementary (grade 1-6) ☐High School (grade 9-12) ☐ Religious

☐Juniors (grade 7-8) ☐ Above High School ☐ Others (specify)

How sever was their illness?

S.No	Patients Name	Severity of illness		
		Not Sever	Sever	Very ever

1.5 Did any one of the patients go to medical treatment?

☐Yes ☐No **(if no go to 1.15)**

1.6 If yes, where did they go first?

S.No	Patients Name	Public			Private		Traditional Medicine
		Hospital	Health Center	Health Station	Health Station	Pharmacy or drug shops and vendors	

1.7 Why did they choose the mentioned health facilities?

S.No	Patients Name	Reason for Choosing the Health Facilities					
		less waiting time	Availability of drugs	Quality of care	Proximity	low price	other(specify)

1.8 How many times did they visit the health facility?

Patients Name	No of visits to the health facility			
	once	twice	trice	more than three

1.9 How much money were the patients spent on treatment for a single visit?

S.No	Patients Name	Amount of money paid			
		For treatment(Laboratory service, Card, Examination)	Transport (round trip)	Drugs	Total

1.10 From where did the patients purchase the prescribed drugs?

S.No	Patients Name	Source of Drug Purchased				
		Public health facility	Red Cross Pharmacy	Private Pharmacy Drug shops and vendors	Private health facility	Special pharmacy within public health facility

1.11What means of transportation did the patients use to reach the health facility?

S.No	Patients Name	Means of Transportation			
		by car (taxi etc)	On foot	By horse cart	Others (Specify)

1.12 How far is the health facility visited by the patients in terms of physical distance traveling time and waiting time

S.No	Patients Name	Distance in kilometer	Traveling time in hours(minutes)			waiting time in hours (minutes)
			by car	on foot	horse cart	

1.13 How do the patients view the behavior of health care personnel?

S.No	Patients Name	Health Workers Behavior			
		Worse	Bad	Good	v. Good

1.14 How was the quality of the treatment as evaluated by the patient?

S.No	Patients Name	Service Quality			
		Poorer	poor	good	v. good

1.15 How many days have the patients been suffering form illness and unable to perform their regular activity due to illness or injury?

S.No	Patients Name	No of days	
		suffered	absent from work

1.16 If there are any of the patients who were not visited the health facility, what was the reason for not visiting the health facility?

S.No	Patients Name	Reason for not visiting health facility				
		lack of money	the illness was not server	lack of time	the treatment does not help	Others(Please specify)

1.18 How was the previous health status of the patients?

S.No	Patients Name	Previous Health Status of the Patients			
		Worse	bad	good	v. good

2. Households Characteristics

2.1 Family's head name_____

2.2 Family's head gender ☐ Male ☐Female

2.3 What is the age of the family's head? _____ Years

2.4 What is the education level of the family's head?

☐Elementary (grade 1-6) ☐High School (grade 9-12) ☐Above High School

☐ Juniors(grade 7-8) ☐Religious Education

2.5 What is your (family's head) occupation?

☐Privately employed ☐ Self-employed

☐ Other (specify)

2.6 How much do you earn form the job?

_____Birr per week or_____Birr per month

2.7 How much time do you spend on this job?

_____hours per day or _____hours per month

2.8 Do you have any other job apart from the main job? ☐Yes ☐No (IF NO GO TO 2.11)

2.9 If Yes, how much do you earn from this job?

_____ Birr per week or _____Birr per month

2.10 How much time do you spend on this job?

_____hours per day or _____hours per month

2.11 Have you married? ☐Yes ☐ No (IF NO GO TO 2.19)

2.12 If Yes, what is his or her education level

☐Elementary (grade 1-6) ☐High School (grade 9-12) ☐ Religious Education

☐Juniors (grade 7-8) ☐Above High School ☐Other (specify)

2.13What is her/ his occupation?

☐Civil servant ☐Privately employed

☐Self employed ☐Other (specify)

2.14 How much time does she or he spend on this job?

_____hours per day or _____hours per month

2.15 How much does she/he earn from this job?

_____ Birr per week or _____Birr per month

2.16 Does he or she have any job apart from the main job? ☐Yes ☐No(IF NO GO TO 2.19)

2.17 If Yes, How much does she or he earn from this job?

_____hours per day or _____hours per month

2.18 How much time does she or he spend on this job?

_____hours per day or _____hours per month

2.19 What is the relation of the family's head to the family?

☐Father ☐Mother ☐Sister ☐Brother

☐Other (specify)

2.20 If the relation of the family's head is different from father and mother, who is the person responsible for cooking, shopping and other similar activities?

☐ Family's head ☐ Housemaid ☐Other (specify)

3. General Households Conditions

3.1 Do the household have any housemaid? ☐ Yes ☐No

3.2 What is the total size of the family? _____

3.3 What is the total number of children whose age is less than 15 years? _____

3.4 Is there any household member (apart from those reported above) who have job or income?

☐Yes ☐No (IF NO GO TO 3.6)

3.5 If yes, please mention their name, income, type of job, and amount of time spent on work daily or weekly?

S.No	Name	weekly or Monthly income	time spent on job daily or weekly	Type of work			
				civil servant	privately employed	self emplo yed	Other (specify)

3.6 Do you (the family) have livestock like cow, sheep, etc? ☐Yes ☐No (IF NO GO TO 3.8)

3.7 If Yes, please mention the amount of money that can be received, if they were sold at current

Market price.----------Birr at current market price

3.8 Do you have any farm land? ☐Yes ☐No (IF NO GO TO 3.10)

3.9 If yes how do you earn form the cultivation annually?

_____Birr pre year

3.10 Do you have any car, radio tape recorder, TV, own home etc? ☐Yes ☐ No (please tick the one which the family have)

S.No.	Car	Radio	Tape Recorder	TV	Own Home

3.11 Have you sold any household asset in the past four weeks? Yes No (IF NO GO TO

3.12 If Yes, what is the total amount of money received from the sales?

----------birr

3.13 What is the total income of the family?

_____birr per week or _____birr per month.

3.14What is the main source of family's drinking water?

☐ Pond ☐ River ☐Dam ☐Private Pipe ☐Communal Pipe

☐Other (specify)

3.15 Do you have any pit latrine? ☐ Yes ☐ No

3.16 Do you have any waste disposal site? ☐Yes ☐ No

3.17 If yes where do you dispose?

☐Open field in the family's compound ☐Pit in the family's compound

☐Communal disposal site

3.18 To what ethnic group does the household belong?

☐Amahara ☐ Keffa ☐Gurage

☐Yem ☐ Silte ☐Kullo ☐Other (specify)

3.19 What is the religious denomination of the family?

☐Traditional Religion ☐ Islam ☐ Other (specify)

☐ Orthodox Christian ☐ Protestant Christian