DEMAND FOR HEALTH CARE IN KENYA: THE CASE OF VIHIGA DISTRICT

BY:

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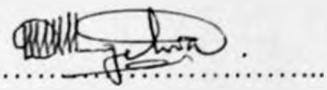
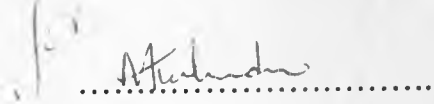
DECLARATION

This Research paper is my original work and has not been presented for a degree in any other University.

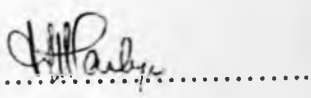


Levi O. Mugilwa.

This Research paper has been submitted for examination with our approval as University supervisors.



Professor G. M. Mwabu.



Mr. P. O. Machyo.

DEDICATION

To my father, the late Estone Mugilwa

TABLE OF CONTENTS

LIST OF TABLES

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ABSTRACT

This study analyses the factors that influence the demand for health care services in Vihiga District. We start from the presumption that when households fall sick, they make decisions on whether to seek or not seek care, and on where to seek care if they decide to do so. We employ a discrete choice model to investigate how household characteristics, type of sickness and quality of services influence these health care decisions. For those who choose to visit health care facilities, the study goes further to investigate how those characteristics, nature of sickness and service quality, influence the number of visits they make to the facilities.

The main findings of the study are that prices, income, distance, education and quality of the services are the main determinants of demand for health care in the study area. Other determinants of type of service demanded and the rate at which the services are utilized include service prices, and the number of days people had missed work due to illness. The number of work-days missed is positively correlated with the number of visits to health facilities (the rate of service utilization) while prices are negatively correlated with service utilization. Our findings reveal that malaria is not given the attention it deserves, as it is one of the main killer diseases in the study district. The results further reveal that female-headed households have higher probabilities of seeking care than those of male-headed households, which is suggestive of higher morbidity incidences among female-headed households. The study concludes with policy recommendations based on these findings.

CHAPTER ONE: INTRODUCTION

1.1 Background

Good health is vital to the socio-economic development of any country, given that it enables people to participate in economic, social and political development. Health policies and strategies should therefore be geared towards reducing the incidence of disease and improving the health status of the people in order to improve their quality of life. In Kenya, the objectives of the health sector have included reduction in mortality, morbidity and fertility through promotion of health care, and increasing access to health care services. Policies towards meeting these objectives were adopted in 1965 after the publication of the *Sessional paper No. 10 of 1965 on African Socialism and its application to planning in Kenya*, which set strategies towards fighting disease, illiteracy and poverty. Due to the Government's inability to address these issues adequately, it has encouraged the private sector to engage in the delivery and financing of these services. Some of the most important programs include family planning, child immunization, diarrhea diseases and growth monitoring. Interventions in communicable diseases have included HIV/AIDS, leprosy, malaria and tuberculosis.

It has been established that higher percentage of non-poor[1] households in Kenya report being sick than the poor. Majority of the poor depend on buying drugs from pharmacies or visiting public dispensaries when they fall sick. The non-poor visit private doctors and public dispensaries (Republic of Kenya, 2000). The main reasons for these choices have been argued to be affordability, perceived severity of the illness and distance to the facilities. The main medical expenditure for both the non-poor and the poor is on medicine, followed by hospital fees and third is the doctors' fees. The non-poor have higher medical expenditures than the poor in all these health aspects. It is estimated that the non-poor spend more than eleven times the amount spent by the poor. It is also estimated that 12 percent of those who fall sick do not seek medical attention, while 22

[1] Those whose monthly income is above Kshs. 1,239 in rural areas and Kshs. 2,648 in urban areas.

percent self-treat, indicating that only two out of three sick people seek care from health care facilities (Republic of Kenya, 2000).

Demand for health care services is a derived demand arising from the demand for good health. But the health sector has many peculiar characteristics, which is why sometimes the study of the sector is termed as "abnormal economics" (Hsiao, 1995). This is basically because health care consists of a mixture of public and private goods. For example, the public and merit goods' characteristics are found in disease control and immunization programmes respectively. Further, some of the health components have some negative social externalities such as those caused by an outbreak of communicable diseases. These special characteristics make it necessary for provision of health care to be done by both the private and the public sectors. Some of the market failures in this sector are correctable by the government while others are not. Health is also a basic necessity, which calls for government intervention in order to ensure its accessibility to all. Because of these special characteristics of health care, the free market system cannot be used as the dominant mechanism of providing it. The existences of health insurance and information asymmetry make it difficult to specify a pure demand variable in empirical analysis of health care (McGuire *et al*, 1988). This difficulty is worsened by the presence of government subsidies and not-for-profit organizations in the sector.

1.2 Area of Study

Vihiga district is one of the eight districts of Western Province. The total area of the district is 541 square kilometers. The population in 1999 was 488,883 and is projected to reach 550,800 and 671,404 in 2002 and 2008 respectively (Republic of Kenya, 2002). There are 105,701 households, each with an average of 4.5 persons. The district has a total of 80 health care facilities. Additional 7 health clinics are under construction. There are 57 privately owned clinics, four hospitals and 20 health clinics. Pending the completion of the district hospital, Mbale Rural Health Training Center (RHTC) has been doubling up as a training center as well as a district hospital, offering both referral and inpatient services to the residents. The RHTC lacks most facilities required for a district

hospital and therefore patients were being referred to Kaimosi Friends' Hospital and Mukumu Mission Hospital. With the recent opening of the district hospital, these referrals are expected to reduce.

The doctor per patient ratio in the district is 1:50,000, while that of the whole country stands at 1:33,000. The average distance to nearest medical facility is 5km. The infant mortality rate in the district has risen from 64 per 1,000, in 1995 to 100 per 1,000 in 2001. The crude birth rate is 11.8 per 1,000 and the death rate is 12.8 per 1,000. Life expectancy is 55.4 and 57.7 years for males and females respectively. The total fertility is 5.5 percent. The most prevalent diseases in the district are malaria, respiratory tract infections, skin diseases and pneumonia (Republic of Kenya, 2002).

The average household income is Kshs. 2,000 per month. The contribution of the district to national poverty is 3 percent. About 62 percent of the district's population live in absolute poverty and about 60 percent of the population are food poor (Republic of Kenya, 2002). Over the last 10 years, poverty levels have been increasing. In the early 1990's the community could on average afford various services. However, beginning late 1990s, ability to afford hospital bills and school fees, among others, continued to diminish leading to over-reliance on the few people who have off-farm jobs.

The district also experiences a high and increasing cases of HIV/AIDS seropositivity. It has a prevalence rate of 15.6 percent (2000) as compared to 12 percent and 14 percent prevalence at Provincial and National levels respectively, a fact portraying a gloom future on the population trend of the district. HIV/AIDS has become the major killer in the District. In all the health facilities, 50 percent of the admissions are HIV/AIDS patients.

According to the third welfare monitoring survey (Republic of Kenya, 2000), the district registered 13.3 percent and 24.6 incidence of sickness among the poor and the non-poor respectively. The mean days sick is higher among the non-poor than the poor, and the number of cases where sickness persisted over the survey period was 5.6 percent among

the non-poor, while for the poor it was insignificant. Overall, more incidences of sickness were reported among the non-poor than the average for the country.

A greater proportion of the poor sick who sought care, visited public dispensaries (36.2 percent), followed by buying drugs from pharmacies/chemists (27.1 percent), private dispensaries (20.8 percent) and provincial district hospitals (11.9 percent). Amongst the non-poor sick who sought care, a larger proportion bought drugs from chemists (37.8 percent), followed by provincial district hospital (22.7 percent) (Republic of Kenya, 2000). Traditional and faith healing are notably insignificant in this region. However, this could be because most people treat such visits are confidential, and therefore could have been under-reported. The district is peculiar from most other districts, which registered higher demand for private doctors'/dispensaries' services.

The average number of days of missed work due to sickness was very high to national standards in the district. Whereas, the whole country registered 6.2 and 4.99 days among the poor and non-poor, the district registered 6.8 and 8.7 days among the poor and non-poor respectively. The situation was even worse for a greater proportion (18.7 percent) of the poor sick and (10.2 percent) of the non-poor sick did not seek any form of care, against national figures of 11.8 percent and 7.7 percent amongst the two groups. This makes the district to be among four last districts, in terms of the proportion of the sick who received treatment among the poor. For the non-poor it was ranked tenth out of forty-five.

For the sick poor who did not receive treatment, most of them attributed it to the services being too expensive (81.7 percent), followed by the sickness being perceived as minor (12.5 percent) and self-treatment (5.8 percent). Distance, refusal by head of household and religious beliefs contribution for failure to seek care was insignificant among the non-poor. The reasons for not seeking care, was the perceived severity of the sickness (64.55 percent) and price barriers (26.1 percent). Comparing these reasons to the national averages, reveal that the main reasons for not seeking care within the district are disproportionately higher than that of the nation. These departures from the national

averages calls for a deeper analysis to determine the peculiarity of demand for health care services in the district.

The average expenditure on health among the poor in the district is mainly on medicine was Kshs. 7.0 and hospital Kshs. 6.5. The non-poor spent more on medicine (Kshs. 34.1), followed by hospital charges (Kshs.32.3) and doctor's fees (Kshs. 9.3). These expenditures represent 35.7 percent of what is averagely spent on medicine by poor households and 39.7 percent of what is averagely spent on medicine by non-poor households in Kenya. These reveal that the residents of the district are far below the national averages in terms of expenditure on medicine.

1.3 Research Problem

The health of the population is important because it enables people to engage in the production process effectively and be able to enjoy life to its full extent. Therefore a country that is able to eradicate or reduce incidences of sickness is likely to register higher economic growth than the one with a sickly population. Further, on a long-term basis, the health of the younger population contributes to their effectiveness in production in later period. Apart from health enabling people to participate in economic activities, it enables them to enjoy life to its full extent, making it not just an investment good, but a consumption good as well. This has necessitated the use of measures such as Disability Adjusted Life Years (DALY) and Quality Adjusted Life Years (QALY) in determining the health status of the population. These measures show how much of productive time is lost due to illness and the enjoyment lost due to illness. Peoples' health status has therefore to be maintained and restored immediately to avoid losses in production and enjoyment of life. One of the ways to maintain and restore the health status is through ensuring accessibility of quality health care to all. This quality health care can only be accessed through the use of health care facilities, which have formally qualified medical personnel.

Whereas it is important to seek care when a sick episode is reported, majority of the poor sick people in Vihiga district depend on buying drugs from pharmacies and self-treating. This no-care[2] option is expanding, especially among the poor. This phenomenon is alarming, as the district's number of those living in absolute poverty has been increasing, reaching 62 percent in 2000 (Republic of Kenya, 2002). This indicates that the trend of no-care will continue to increase if the problem of poverty increases. For most of the sick, if the sickness persists, the second option is to self-treat by buying drugs from shops and pharmacies. Seeking of intervention from health care facilities comes only as a third choice and mostly when the sickness has become severe.

Continuous self-treatment and no treatment can be dangerous to the health of the people. The common belief among most Kenyans that absence of pain is synonymous to good health has led to an increasingly larger proportion of people either self-treating or taking too long before seeking formal medical care. This increased self-treatment has led to mushrooming of pharmacies that sell drugs unselectively to make profits. Thus, drugs that are supposed to be sold only on prescription are sold without adhering to that requirement. In some cases the sick person or the buyer only states the nature of the problem, and the pharmacist decides on what drug to sell to them. In other cases, drugs that are sold over the counter are bought, but the user does not know or bother to read instructions, hence leading to under-dose or over-dose. This practice is persistent, therefore requiring that efforts be made to increase the demand for health services, not only in the district, but in the country as well.

Whereas it is estimated that 12 percent of those who fall sick do not seek medical attention, about 22 percent self-treat in Kenya. While in the district, 45.8 percent of the sick poor, either do not receive treatment or self-treat. The situation is worse for the non-poor, with 47.0 percent not receiving treatment or self-treating. Though there is no documented evidence of the effects of self-treatment on long-term health status of the

[2] In this paper no-care is defined as the outcome of a decision not to seek treatment from qualified medical personnel who are licensed to treat.

people, it is better for the sick to seek diagnoses of the disease from trained medical personnel before treatment commences.

Further, the district is one of the lowest ranked in terms of demand for health care services. Yet, time taken to reach nearest qualified doctor's office, nearest dispensary and nearest hospital is not great if compared to the highly ranked districts. This calls for an in-depth investigation to find out the factors that could be leading to this low demand for health services in the district.

Though the third welfare monitoring survey (Republic of Kenya, 2000) documented the data on the decisions taken by sick people in the district, the reasons for the health-seeking behavior remain unknown. Investigating these reasons is crucial in policy analysis and formulation. The extent of the reasons for not seeking care or choosing a particular health facility is the basis of policy formulation regarding demand for health care.

1.4 Objectives of the Study

The study documents the reasons why some people do not seek medical care, and for those who seek care, it analyzes the factors they consider in making the choice of which type of facility to visit. The study also attempts to establish whether health facilities' features, or quality as perceived by patients affect demand, and if so to what extent. The specific objectives of the study are:

- To find out the extent to which hypothesized health care determinants affect demand in the study district;
- To determine the extent to which these hypothesized determinants influence the choice of visiting a private and public health facility;
- To come up with policy recommendations on the changes both at the household level and service provider level, that can stimulate demand for health care facilities in the district.

1.5 Significance of the Study

Most population-based studies have paid little attention to the role of providers and system features. Other studies have focused on a selected set of factors rather than multiple determinants of demand for these services. Many studies have been limited to one or two types of setting without taking into account barriers that prevent people from gaining access. But utilization is viewed as a product of patient characteristics plus provider and system attributes (Dutton, 1986). One of the most neglected demand issues in primary health care (PHC) programmes is the quality of services (Akin *et al*, 1978). Therefore, it is critical to also consider the health system attributes as they play an important role in determining whether the sick will not seek medical care; and if they choose to seek it, why they will choose a particular health care institution. Financial and economic costs are just a part of the determinants of demand for medical care. The other deterrents, which are mostly ignored because of their non-monetary nature, include patient or decision-maker's education level, sex of head of household, family size, type of sickness and facility characteristics, especially quality of services. This study examines a wider range of factors that affect health care service utilization.

Most earlier studies assumed that patients or agents acting as decision-makers on behalf of the patients have no knowledge about the health facilities' attributes. This is not realistic because in most cases, before these decisions are made there is some information-seeking about the facilities that they intend to visit. Even if no visits are made, this information seeking and experience from earlier visits could be a contributory factor to this decision. This study considers the factors that determine the demand for health care services both on the demand side (push factors) and the supply side (pull factors).

This study deviates from other studies that have used perceived level of sickness as a factor determining the demand for health care by considering the type of sickness. This deviation is important in the study as households also make decisions on whether to demand for health care or not on the basis of the perceived type of sickness. Dow (1995)

observes from anecdotal accounts that, *"...chronically ill poor people in developing countries who often suffer malaria while attempting to continue with their work ...then they may not report malaria as sickness"*. This depicts that some households may decide not to seek care because they perceive the illness as "mere" malaria. This study seeks to find out if malaria, as one of the main killer diseases in Africa, is given the attention that it deserves in health care decisions of households. This study uses perceived type of sickness rather than severance of the sickness, which is used by most earlier studies.

This study also deviates from most other studies because it hypothesizes number of days that a person missed work (either due to illness or taking care of a sick person) as determinant of demand for health care. This is included in this study because if a sickness persists despite the option of no treatment and self-treatment, then the option of seeking treatment from health facilities may be finally chosen. Thus persistence and severity of the sickness is hypothesized to determine demand for health care.

This study contributes to the existing knowledge about the demand for health care in the Kenya. The results of this study provide empirical and relevant evidence to policy makers on what kind of policies (e.g. building more facilities, reviewing service prices and quality) to be put in place if demand has to increase. It provides some information on what changes in the structure and organization of service delivery would enhance the demand for health care. It also assists hospital administrators and financiers on the health care facility features that attract patients, hence enabling them to take appropriate measures to increase demand.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Literature

Grossman (1972) developed a theoretical model based on the neoclassical framework. This model assumed the existence of certainty in demand for health. It considered demand for health care services as derived demand arising from demand for good health. Demand for health care services, is just one of the factors that can enhance health or increase the health stock. Examples of other factors include nutrition, lifestyles, culture, habits and gender. In his theoretical formulation, demand for health is considered to have consumption elements (utility is derived from feeling healthy) and investment elements (sound health enables an individual to participate in economic activities and earn income). In this model, the consumer maximizes an inter-temporal utility under conditions of certainty. Health services enter the utility function indirectly through health capital. The budget constraint in the model is the discounted lifetime *full income*[3].

A consumer will therefore demand for health care, hence increase health stock as long as marginal cost of investment in health is lower than the marginal rate of return. The consumption will continue until an equilibrium point is attained. The equilibrium point is where the marginal cost of the investment is equal to the marginal rate of return. When the health stock declines beyond a certain positive minimum, a death results.

According to this Grossman model, an increase in income will lead to an increase in demand for health services, because their price becomes relatively cheaper. The increase in consumption of health services will increase the health stock far from the minimum, hence elongating lives. But he notes that the increase in income could also lead to habits (e.g. smoking, drinking and substituting physical exercises for work) that could decrease the health stock accumulated.

[3] Based on time available for work (hence for earning income) or leisure.

In the model it is argued that education levels increases the efficiency of production of health stock. This implies that increase in education levels will lead to an increase to in health stock, hence leading to relatively less demand for health services. But theory contradicts this view, in that more educated people value their health more and will demand for health care services more.

Age is considered a positive correlate to depreciation of health stock. This means that with the same amount of inputs, an older person would build relatively less health stock than a younger person. Hence the equilibrium levels for an older person would be attained at lower levels of demand for health care than the demand for younger people. Therefore, we would expect older people's demand for health care to be less than the demand for younger people. On the contrary, older people demand for more health care than the younger people.

Christianson (1976) noted that demand decisions for health services are made in stages. After realizing that there is a medical problem an individual's first decision is whether to seek care or not. If the option chosen is to seek care, then an individual has to decide on where to seek the care. The final decision is the number of visits to make to a particular or a number of facilities.

Satterthwaite (1979), Pauly and Satterthwaite (1981) proposed that primary health care is a "reputation good" such that patients learn about its quality through search. This means that when a decision to seek care is made, the decision about which facility to utilize will be found upon a search process, which is attributed to information provided by relatives, friends and associates. However, Mwabu (1984) adds that primary health care is not only a "reputation good", but an " experience good" as well. This means that apart from information being given by relatives, friends and associates; patients can choose facilities according to their experiences during previous visits.

Schultz (1999, 1981) observes that health status will rise with increased public spending on health services. It will fall with a rise in relative prices of health inputs such as salaries

of medical personnel, cost of drugs and other medical supplies and services and relative prices of nutrients that help fight off infections and disease. He found higher levels of education are correlated with lower levels of infant mortality, even after holding household income constant. The relationship between mothers' education level is stronger than that of fathers, which can be explained by the fact that mothers are more often in charge childcare than the fathers. He estimates that an additional year of schooling to the mother, in low-income countries of Africa, is often associated with a 5-10 percent reduction in her child's likelihood of dying in the first five years. Technological factors and climatic conditions are also argued to determine health status of a region.

2.2 Empirical Literature

Dutton (1986) explored the effects of specific provider and system features on patient use of health care in Washington D.C. The study considered financial, time and organizational barriers, and patterns and physician characteristics. A regression equation was estimated for each measure of the variables representing individual, family characteristics and attributes of the source of care. Findings were that low income, practice clientele and high charges were the most significant deterrents to use. The other deterrents were absence of Medicaid, distance, limited hours and patients sharing physicians. Charges and distance had a disproportionate impact on the poor. The combined impact on structural barriers in hospital outpatient departments reduced access by 50 percent.

Hay *et al* (1987) used an econometric model to test the determinants of demand for dental health services. The study sought to find out the effect of changes in price, changes in the wage rate and the amount of time spent in home production of dental care on the demand for these services. Primary data was obtained through administration of questionnaires. Results obtained by the study indicated that out-of-pocket expenses were significant and negatively related to visits to providers of dental care.

Habib *et al* (1986) did a study on the determinants of health services utilization in Southern Iraq using multiple regression analyses. They found the average consultation rate to be 33 percent of the population and the annual estimated rate was 4.3 per person per year. There was an average consultation of 82 percent of the sick. The most important factors affecting utilization were level of perceived illness in the household and the distance to the nearest health center. Household income did not appear to be an important factor except for attendance at private clinics.

Abbas *et al* (1986) explored the determinants of utilization of maternal and child health care services in Jordan. Their study showed high levels of association between certain individuals and health service access variables and use and non-use of MCH services. However, this study did not consider family income, sex of the provider and perceived quality of care.

World Bank (1990) carried a survey on need and demand for health services in El Salvador. The study revealed that for individuals with perceived illness, the probability of seeking care outside the home was higher for individuals whose main activities such as school, or care of household were interrupted by illness. Among those who reported that illness interrupted their activities, 39.5 percent sought care, while those whose illness did not interrupt their activities, 17.5 percent sought care. The probability was 44 percent for choosing a MOH facility and 51 percent for selecting a private facility.

Acton (1975) researched on the non-monetary factors in the demand for medical services. He used a utility maximization model to develop predictions for free and non-free care of users in New York. A simultaneous equation system was used for the outpatients departments and municipal hospitals. The study results showed that non-monetary factors, such as distance (economic costs) act like prices in discouraging demand. It also showed that earned income and non-earned income have different impacts i.e. as money prices out-of-pocket reduced, because of private or public insurance schemes, demand becomes more responsive to time prices and other non-monetary factors.

Heller (1982) analyzed the determinants of demand for health care services in Peninsular Malaysia. The study sought to determine the sensitivity of households' demand for outpatients and inpatients care to changes in time costs and financial resources, income and households' behavior of seeking traditional medical practitioners as opposed to modern health facilities. The study used a logit model, and estimated using the Two-Stage Least Squares (2SLS) method after transforming the dependent variable. Data was obtained from household survey carried out in 1975. The results showed that demand for health services, as measured by number of visits, was very inelastic to cash price, cost in time and income. Consumers were found to respond to the relative prices of alternative sources of health care. As income increased, consumers shifted away from traditional to modern practitioners.

Akin *et al* (1985) used a model identical to that used by Acton and Heller of utility maximization for the Bicol region of the Philippines. They found that quality variables were not statistically significant, indicating that quality as approximated by the practitioner most likely to be seen, does not affect the medical service choice. The study found strong movement of patients towards private physician for illness perceived to be serious. Thus the Bicolano patients do not pay much to the identity of the practitioner whom they see as they do to orientation between the modern and the traditional and to the type of facility (private vs. public). The study also found out that in some cases it is realistic to assume that government health workers will compete with other practitioners, but traditional healers will generally be principal competitors of village based primary health care workers. Therefore many people will not stop using traditional practitioners as some care is thought to be missing among the modern facilities. From the demand analysis, visit prices had little effect on whether services were used and the choice of the practitioner. The threshold at which prices begin to affect decision-making in medical care was quite high, though private doctors were at least twenty times as expensive as the public clinics. Though distance is considered to be a major impediment to using modern medical services in the third world, the study showed it that did not affect the choice of medical facility. The threshold for these facilities was relatively high, standing at 54km, 37km and 19km for public facility, private facility and traditional healer respectively,

with maximum travel times of 4, 3.9 and 1.25 hours. Similarly, waiting time did not seem to deter visits. Overall, the study indicated that consumption patterns are correlated with income quartiles, but poverty *per se* is not the cause of the poorest quartile's medical consumption decisions, but other correlates of income such as education levels and urban residence contribute to consumption patterns as well.

Akin *et al* (1986) developed a model of demand for primary health care in the developing world. The main objectives of the study were to examine medical facility use, expenditure patterns and to provide an analysis of the demand for medical services. Different estimation techniques were used as deemed suitable for the various types of care. Conditional probit was used for infant immunization, tobit for prenatal care and multiple logit for estimation of outpatient and delivery services. Data was obtained from household surveys from one of the poorest regions of the Philippines conducted in 1978 and 1981. Economic variables were found to be statistically insignificant, implying poverty and costs have little influence on demand for health care. However, education, urban residence and perceived seriousness of the illness played greater roles in determining utilization patterns.

Popkin *et al* (1988) sought to determine whether user-charges for maternal and child services significantly determine demand for health care. The data used in the study was collected in 33 villages. Mixed multi logit techniques were used to estimate the relationships between delivery characteristics, mothers' characteristics and delivery care. The study assumed that each of the six delivery choices was independent and had different characteristics, but in the real sense there was some degree of substitutability. The results showed that money and time prices had a negative influence on the choice of delivery. Surprisingly, prices and household income were found not to influence choice of delivery services.

Guilkey *et al* (1987) included the demand for prenatal care use in some poor regions in Philippines. The study focused on information gaps including lack of information concerning the use of traditional practitioners and effects of PHC strategy on reaching the

low-income rural households. Data was collected from 3,000 rural and urban women during pregnancy and four days postpartum. The study found out that a large number of factors influenced the traditional, modern public and modern private choices. Fewer factors affected the first month in which the expectant mothers visited the facilities. Quality of care, accessibility and availability of insurance had significant effects on the prenatal patterns.

Mwabu *et al* (1990) analyzed utilization of maternal and child health services in Kwale and Kirinyaga districts in Kenya. They analyzed the behavior of mothers who seek antenatal, postnatal and child immunization services from public health facilities. A questionnaire was used on households with children under five years of age in 1989 to obtain the data. Kwale was found to have majority of its deliveries conducted at home, leading to excessive bleeding and infection. This home delivery was found to be as a result of traditional practices. Kirinyaga was found to have relatively lower deliveries conducted at home, with distance and transport costs being the major deterrents to use. About 88 percent of mothers made 1-7 visits to the antenatal clinics. The main deterrent for the remaining 12 percent was lack of knowledge of the need for antenatal care. Distance to the facility was identified to be the main reason for low immunization of children in Kwale, while in Kirinyaga the main deterrent to children immunization was lack of awareness.

Mwabu *et al* (1991) sought to test the effect of the pricing reforms to health care demand in Kenya. They tested the hypothesis that user-charges have a negative effect on demand for health care. They used data on when user-charges were in place and when the Government had suspended it. They used a utility maximization model. The demand equation was estimated using data collected daily and weekly in selected health facilities in rural Kenya. The results showed that user-charges discourage the utilization of health facilities. Utilization of health care services dropped by 38 percent after introduction of user-fees, which was followed by an increase of 29 percent after suspension of the fees.

Mwabu (1984) developed theoretical and empirical frameworks for analyzing choices of health care facilities by households during episodes of illness. Data for the study was collected in Meru district. The study considered the quality of health care facilities and that consumer have partial knowledge about the facilities. The study established that education, quality of health care facilities and religion had a statistically significant effect on the choice of facility. The study found economic variables such as time and money costs to marginally influence demand for medical care. It was also able to explain patients' behavior in terms of changing the use of facilities over the course of an illness episode.

Glick, *et al* (2000) researched on utilization patterns and demand determinants for education and health services in Madagascar. They used data from the Permanent Household Survey (EPM) carried out on 4,500 households in 1993-1994. They used nested logit models in their estimation. They found that cost of treatment (price) has negative and significant effects on hospital care. Household income, as represented by household expenditures per capita had strong effects on choice of care, as the better off individuals were more likely to seek care from private doctors, private clinics and private pharmacies than the poor. The dummy variable for gender was not significant, thus women were not less likely than men to seek care when sick. The quality of care had mixed effects on demand for care. Availability of vaccines in hospitals and availability of malaria medicines increased demand at these facilities. The availability of doctors had no significant effects on choice of a hospital or basic care. Availability of electricity and refrigeration had little effect on the demand for health services. The duration of illness raised the likelihood of hospital care, but not basic care. Years of schooling of the individual did not affect the choice of care. However, it was noted that the schooling years may have affected the demand indirectly through its effects on income, hence expenditures. Distance for the case of children (under 15 years) had a highly significant negative impact on the decision to seek basic care.

Ndele (1988) using a model similar to that used by Acton (1975), analyzed the factors that influence demand for various types of health services in Nairobi. The study used

different models for different health services. For outpatient and antenatal care, he used a multiplicative equation model, while for the maternity, immunization and family planning services, he used a binary logit model. The results showed that price and income elasticities of demand for health care services were low. The coefficients of age, behavior of staff and quality of treatment were found to be statistically significant determinants of health care. Income and staff behavior had positive effects on utilization of immunization services, while distance had a negative effect. Surprisingly, time spent at the facility had a positive effect on utilization of immunization services. Economic factors were found not to have significant effect on utilization of the health care services.

Njaramba (1994) sought to find out the factors affecting demand for maternal health services in Thika division of Kiambu district. The study used stepwise regression analysis on primary data collected through administration of questionnaires. The results indicated that the effects of distance to health facility and monetary price were statistically significant and had negative effects on the number of visits. The coefficient of age was statistically insignificant and found to be positively related to number of visits. The coefficient of the perceived quality of treatment was statistically insignificant and was positive related to number of visits. The effects of education and number of children previously born were also statistically insignificant, with positive and negative coefficients respectively.

2.3 Overview of Literature

Consumption decisions in health care are taken with little knowledge on what the outcome will be. These uncertainties make it difficult for rational behavior. Thus, individuals cannot tell with surety that by consuming such quantities, then they add specified quantities to the health stock. Therefore it remains hard to evaluate the marginal benefits (in terms of extra healthy days) against marginal cost (in terms of extra expenditure on health care). If such certainty is assumed, then a rational individual would evaluate the extra resources to be spent to obtain extra healthy days against the extra

resources to be gained as a result of the extra healthy days and choose when it is economical to die. Hence these uncertainties make modeling in demand for health and health care farther from reality.

Quality as perceived by the sick (e.g. availability of essential drugs) seems to affect the decisions of whether to seek care or not and which facility to choose, than quality as perceived by medical personnel (e.g. availability of doctors, refrigeration facilities, electricity). This could be attributed to the kind of information sought from friends, relatives, associates and the experiences gained during earlier visits. This information seeking in most cases revolves around prices, waiting time, drug availability, cleanliness, attitude of attendants towards patients but rarely on the number of X-ray machines, refrigeration machines, electricity, the number of doctors, number of hospital beds, etc, which medical personnel would look at in assessing quality.

The empirical studies reviewed have used different methodologies and variables to establish the factors that affect demand for health care. The studies have used the regression analysis (multiple and stepwise), simultaneous equations, utility maximization models and discrete models (logit and probit). The studies used these different approaches because of the nature of the problems they sought to shed light on. Because of the complexity and abnormalities of health as a good, different methodologies are applied in the researches. Some approaches seem relatively relevant to the kind of the health good in consideration than others.

The results of these studies likewise have differed in several ways. Most of the studies reviewed have found a statistically insignificant positive relationship between income (wage rate) and the demand for health care. Out of the nine studies that considered income, only four found a positive and statistically significant relationship. This is not in line with economic theory that presupposes increase in income will have greater effects on the demand for health care.

Fourteen of the studies sought to find the effects of prices (user-charges or out of pocket expenses) on demand for health care. Only six studies found prices to have a negative and statistically significant relationship with demand for health care. The remaining eight studies did not. The latter results are also not in line with economic theory, which suggests that as prices change, the demand for health care will also change, but in the opposite direction.

Out of the seven studies that considered distance (cost in time), all found distance to have negative effects on demand for health care, though in one study distance was statistically insignificant. The other study found distance threshold for to be over 19km for traditional healers' services, 34km for private facility and 57 for public facility. This is consistent with economic theory, whereby long distances from facilities are viewed to discourage demand.

From the most of the studies reviewed, incomes and prices are statistically insignificant in determining the demand for health care services. This is the reason that stimulated a lot research into this area in most parts of Africa after introduction of cost-sharing in health services. However, no general conclusive results have been achieved, i.e. one cannot generally assert that cost-sharing led to a decrease in demand for health services. These discrepancies could be attributed mainly to information asymmetry. The nature of this good is that the consumers or agents take decisions about consumption knowing well that if the good is not consumed the ultimate result might be fatal. Further, they have less information about the sickness than the care providers. Even, if they had more information about the sickness, they cannot tell what is needed to treat the sickness and the price they that will eventually pay. This information asymmetry makes consumption decisions of this good be made with little consideration of income (ability to pay) and price. Nonetheless, non-economic variables considered in the different studies have shown some consistence with what economic theory predicts. Among the non-economic variables, distance has shown the negative effect and statistical significance that economic theory provides.

CHAPTER THREE: CONCEPTUAL ISSUES

3.1 Theoretical Model

This study uses a combination of discrete and continuous regression models to analyze health care demand in Vihiga district, Kenya. This is because the choice of a type of health facility is purely discrete and the household characteristics and provider attributes that determine whether a person will seek care or not are observable. We assume that the decisions on whether to seek care from a public, a private facility or not to seek care are made independently. Because of the assumed three alternatives (seek no-care; seek care from a public or private health care facility), we use a multiple discrete choice model. But once the sick person decides to seek care, the next decision is on how many visits to the facility should be made. This will require the use of a continuous regression model, with number of visits as the dependent variable and household characteristics, perceived type of illness and health facility attributes (including prices) as the independent variables.

Because of the complexity involved in health care decision-making at the household level (Mwabu, 1986), we assume that the head of the household is the one responsible for making such decisions. We can say that a household, i derives utility from consumption of health services good, say h and a composite good, say t, among other factors. Thus:

$$U_i = u_i(h, t; \psi) \quad \ldots\ldots 1$$

where: U_i is the utility for household, i;

h is the health care services;

t are the other goods;

ψ are other factors e.g. beliefs, religion, etc.

The specific utility that the household gets from consuming health care services, can therefore be expressed as:

$$Z_i = \alpha + \beta X_i + e \quad \ldots\ldots 2$$

where: Z_i is the utility index of the household;

α and β are the behavioral parameters to be estimated; and

X_i is a vector of economic and social characteristics of household *i*, e.g., nature of sickness and attributes of the facility.

Discrete Choice Case

From equation 2 above, we can form the multiple discrete choice model, by first letting utility derived from visiting a public facility (u_1), private facility (u_2) and from no-care (u_3) be written generally as:

$$u_j = \beta_j Z_j + \varepsilon_j \quad \ldots\ldots 3$$

Where $j=(1,2,3)$; and

β is a vector of utility parameters to be estimated.

Since the probability that any of the three alternatives is chosen, will depend on utility derived, or rather the economic and social characteristics, nature of sickness and quality of the providers, then,

$$P_i = f(Z_i) = (\alpha + \beta X_i) \quad \ldots\ldots 4$$

P_i is the probability that individual *i* will make a certain choice, given X_i. This is conditional probability.

We can now define P_1, P_2 and P_3 as the probabilities for care from public facility, private facility and from no-care respectively. Consequently, we can define the associated utility indices as Z_1, Z_2 and Z_3 respectively and write the stochastic version of Z_j as:

$$Z_j = \beta_0 + \beta_1 PRI + \beta_2 INC + \beta_3 EDHH + \beta_4 DIST + \beta_5 FS + \beta_6 DAMIWO + \beta_7 SHH + \beta_8 TSICK + \beta_9 QUAL + \varepsilon_j \quad \ldots\ldots 5$$

Where; j=(1,2,3); and

β's are the parameters to be estimated;

PRI - user charges (prices) paid;

INC - monthly income of the household;

EDHH-highest education level (number of years) attained by the household head;

DIST- distance to the nearest health care facility;

FS- family size;

DAMIWO- days missed work as a result of sickness;

SHH- dummy variable to capture the sex of the head of the household (1- male, 0-female);

TSICK- dummy variable to capture the perceived type of illness (0-malaria, 1-otherwise)

QUAL - dummy variable for perceived quality of services (1-satisfactory, 0 otherwise); and

ε - Error term.

Assuming that cumulative distribution of ε_1, ε_2 and ε_3 are logistic, then the probability of individual *i* choosing a public facility is:

$$P_{i1} = \frac{e^{Zi1}}{e^{Zi1} + e^{Zi2} + e^{Zi3}} \quad \ldots\ldots 6$$

Taking the no-care option as the reference health care option (i.e. setting Z_3 to zero) the probability that care is sought from a public or private facility, can then given by the logit model:

$$P_{ij} = \frac{1}{1 + e^{-Z^{*}ij}} \quad \ldots\ldots 7$$

Where:

Z^{*}_{ij} is the modified logit index for household/individual *i* when the variables for no-care are set to zero or omitted, while *j* are the remaining two alternatives (*j*=1,2).

All the variables in the modified models are relative variables; they permit estimation of the effects on care options relative to no-care. The modification enables us to interpret our results relative to a reference group. In terms of utility, they denote the extra utility gained by using private or public facility above that of no-care.

In using this model, if PRI has a negative coefficient (as theory predicts), then we expect as prices of care increase relative to no-care, Z^* will decrease and the term e^{-Z^*} will increase. Hence, the whole denominator $(1+e^{-Z^*})$ increases too. An increase in the denominator means a decrease in the entire term; i.e., the probability (P_1 or P_2) of seeking care decreases. In essence, this means that if the prices of private or public health facilities increase relative to those of no-care, the probability that a sick person will seek care decreases.

Because we are using individual observations, the most suitable estimation technique is the maximum likelihood. We do this by first defining $Z_1=1$, when care is sought then, $Z_1=0$ otherwise. Having established that $P_j = 1/(1+e^{-Z^*j})$ and $Z_j = \alpha+\beta X_j$, we start with trial of parameters (α,β). For the first observation of X_1, we can calculate the probability of a sick person seeking care (P_1) and that of not seeking care (P_0). Since $P_0=1-P_1$ and by taking the probability of any value of Z_1 as $p(Z_1)$, then we may combine the two cases to form:

$$p(Z_1) = Z_1^{Z_1}(1-P_1)^{1-Z_1} \quad \text{.....8}$$

The coefficients on Z are calculated by maximizing the probabilities of observing the sample data. Therefore the probability of the whole sample will be obtained by multiplying the probabilities for the whole sample. Thus:

$$p(Z_1, Z_2, \ldots) = p(Z_1)p(Z_2)\ldots \quad \text{.....9(a)}$$

or

$$p(Z_1, Z_2, \ldots) = \prod_{i=1}^{n} P_i^{Z_i}(1-P_i)^{1-Z_i} \ldots \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 9(b)$$

This number depends on the trial value of the parameters (α,β). Therefore the likelihood function, $L(\alpha,\beta)$ will be:

$$L(\alpha,\beta) = \prod_{i=1}^{n} P_i^{Z_i}(1-P_i)^{n-Z_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 10$$

Many pairs of α,β are tried out until the pair that maximizes $L(\alpha,\beta)$ is found. This pair is the one used in the estimation.

Continuous Choice Case

The number of visits to health facilities by individual *i*, (Z_i) depends on the characteristics of the household, nature of illness, as well as the attributes of the health care provider (X_i). Hence equation is estimated differently for public and private facilities, using a continuous regression model. The number of visits is the dependent variable while the independent variables remain the same as in the discrete choice case. Ordinary Least Squares (OLS) estimation technique is used.

3.2 Empirical Model

The multinomial logit model is used to determine the conditional probabilities of each of the alternatives being chosen, using no-care as the reference option. This enables us to estimate the probability that a given type of facility is chosen, when one or more of the household characteristics, type of sickness and provider attributes change. In the case of

continuous choice, the extent of response of visits to changes in exogenous factors (prices, household characteristics) is estimated with the least squares method.

The main objective of empirical model is to help us determine the magnitude of the effects of the household characteristics, type of sickness and quality of provider on the number of visits (or probability) to each type of facility.

3.3 Hypotheses

The null hypotheses tested are that household characteristics, type of sickness and quality of facilities have no effect on health care decisions.

Table 3.1 below shows the expected signs of effects of selected explanatory variables in the discrete choice case.

Table 3.1: Expected Signs Of Behavioral Parameters: Discrete Choice Model

Variables	Expected impact on P_1 and P_2 (Care)	Descriptions
PRI	Negative	If prices of care increase, the probability seeking* care decreases.
INC	Positive	If household incomes increase, the probability of seeking care increases.
EDHH	Positive	If education increases, the probability of seeking care increases.
DIST	Negative	If distance to the nearest health care facilities increases, the probability seeking care decreases.
FS	Negative	If household size increases, the probability of seeking care decreases.
DAMIWO	Positive	If days one missed work due to illness increases, the probability of seeking care increases.
SHH	Uncertain	The effect of gender on probability of care is uncertain (we cannot predict apriori how probabilities of care differ between male and female sub samples).
TSICK	Positive	If the type of sickness is perceived as non-malaria, the probability of seeking care increases.
QUAL	Positive	If quality of services improves, the probability of seeking care increases.

* Note that the probabilities of seeking care from a public or a private health facility will be computed separately.

Table 3.2 below shows the expected impact of the explanatory variables in the continuous choice case.

Table 3.2: Expected Signs Of Behavioral Parameters: Continuous Choice Case Model

Variables	Expected impact on Z_1 and Z_2 (No. of visits)	Descriptions
PRI	Negative	Increase in prices of care leads to decrease a decrease in number of visits*.
INC	Positive	Increase in household income leads to an increase in number of visits.
EDHH	Positive	Increase in the education level of head of household leads to increase in number of visits.
DIST	Negative	Increase in distance to the nearest health facility leads to decrease in number of visits.
FS	Negative	Increase in family size leads to decrease in number of visits.
DAMIWO	Positive	Increase in days missed work leads to an increase in number of visits.
SHH	Uncertain	The effect of gender on number of visits is uncertain (we cannot predict a priori).
TSICK	Positive	Change in the perceived type of sickness from malaria to non-malaria increases number of visits.
QUAL	Positive	Improvement in quality of health care leads to increase in number of visits.

* Note also that the estimation will be done separately for public and private health facilities.

CHAPTER FOUR: DATA

4.1 Data Sources and Data Collection Techniques

The sources of data for this study is raw data obtained form the third Welfare Monitoring Survey (WMS III) collected between February and May, and September and November 1997. The survey was carried out by the Ministry of Finance and Planning, in collaboration with the World Bank.

The survey used the National Sample Survey and Evaluation Programme (NASSEP) framework developed from the 1989 population census. The framework evolved through mapping and delineating almost equal-size measures of contiguous households in the enumeration area in each of district (strata). The number of clusters in each stratum was found by considering the proportion to the national population. The rural frame considered 36 clusters in districts with over 500,000 people, 24 clusters in districts with 250,000-499,000 people, 16 clusters in districts with 100,000-249,999 people and 12 in districts with less than 100,000 people. Three-stage sampling involving the selection of Primary Sampling Units (PSUs) at the district level, clusters sampled out from the PSUs and averagely 12 households sampled out from the clusters. The urban framework consisted of all district headquarters and towns with a population of over 10,000 people. Number of clusters in urban areas was allocated according to the proportion of the population relative to that of Nairobi.

The NASSEP framework, through this sampling technique, allocated Vihiga District 12 rural clusters and one urban cluster. These consisted of 120 rural households and 11 urban households, covering 666 members. The national survey covered 902 rural clusters and 205 urban clusters, representing 8,962 and 1,911 households and 44,055 and 6,650 members respectively.

4.2 Data Processing

Due to the use of data not specifically meant for this study, several problems were encountered in the way the data was collected and presented. This necessitated the refining and redefining some variables to suit its use in this study. Whereas this may have led to loss and some distortions in the data, care was taken so as not to deviate from the original data as much as possible.

In cases where only one variable was missing, the average for the variable was used to fill such gaps. In other cases where averages were perceived not to make sense logical reasoning was used to fill in the gap, e.g. if there was no identification for head of household, the oldest person was taken to be the head. As for the distance to the nearest health facilities, travel time was used instead of mileage.

The quality variable was not covered explicitly by the survey. This forced us to define an appropriate technique to measure it. The respondents had options of choosing one or more than one amongst *satisfied, not clean, long waiting time, no trained professionals, too expensive, no drugs available, treatment unsuccessful* and *other*. The technique used was that if the answer given was *satisfied* plus at most one other option, this was taken to mean satisfied to our study. If the respondent's answer was *satisfied* and two or more other options this meant unsatisfactory to our study.

The expenditures on doctors/dentists, medicine, hospital and other medical were aggregated to get the price paid to facilities. To obtain the prices paid by every sick person in the household, we divided the price by the number of individuals who sought care from the household. Though this is not a good representation because it does not show the differences in price levels between facilities, only a few households registered visits to both types of facilities. In the cases of no-care, the prices were not necessarily zero, because some households self-treated (e.g. buying drugs) and these prices were included in the refined data.

Total household expenditures are used in this study as a proxy to household incomes. We obtained these expenditures by aggregating the value of monthly own-production items with that of monthly purchased items, less the loans advanced to the households. These could have led to inflated incomes, as it is normally perceived (only in terms of funds coming to the household, without taking into consideration the own-production for own consumption). However, for our study, this is more relevant as it takes into account all the household's opportunities.

The total number of sick episodes was 118. However, two of the episodes were dropped from the sample for lacking information on the expenditure, head of household's highest education level reached and time taken to the nearest health care facility.

CHAPTER FIVE: RESULTS

5.1 Descriptive Statistics

Table 5.1 below shows the distribution of care options decisions that the households exercise in the event of an illness.

Table 5.1: Sample frequencies for decisions taken while sick

Health Care Option Chosen	Relative Frequency
Public Health Facility	0.2845
Private Health Facility	0.3276
No-Care	0.3879
Total	**1.0000**
Sample Size 116	

The data obtained showed that the survey covered 146 households, with 74 households registering at least one member being sick, representing 50.68 percent of the households. Out the 116 episodes, 71 cases sought care, representing 61.2 percent. As for those who sought care, 46.5 percent visited public health care facilities, while the remaining 53.5 percent visited private facilities.

Table 5.2 below shows a comparison of descriptive statistics between all sickness episodes and for only those who sought care.

Table 5.2: Descriptive Statistics for All Total Sickness Episodes and for only those who Sought Care

Variable	For all those who reported being sick (116 observations)				For only those who sought care (71 observations)			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
PRI	239.0604	430.6018	0	1666.667	362.831	505.4305	0	1666.667
INC	6858.518	8703.434	103.0833	43318.17	8563.662	10407.51	66.66666	43318.17
EDHH	7.724138	4.826712	0	20	8.676056	3.659721	0	20
DIST	31.2069	14.27404	10	60	30	14.24279	10	60
FS	5.482759	2.555413	1	12	6.112676	2.381772	1	12
DAMIWO	7.422414	7.992552	0	31	8.690141	9.14579	0	31
SHH	.5086207	.5020946	0	1	.5070423	.5035088	0	1
TSICK	.2327586	.4244231	0	1	.2957746	.4596386	0	1
QUAL	.5689655	.4973694	0	1	.7605634	.429777	0	1

From the table we deduce that the average price for the whole sample is lower than that of those who sought care, showing the obvious fact that the care option is relatively expensive than the no-care option. The average incomes of those who demanded for care is also relatively greater than that of the whole group, signifying that income levels influence the decision of whether to seek care or not.

From the table we also note that the average of the highest education level reached by the head of households was standard 8 (7.7) as compared to form 1 (8.7) among those who sought care. This reveals that the highest education level reached by the head of household positively influence the decision to seek care.

The average time taken (or that could be taken if care was to be sought) to reach the nearest health care facilities is 32 minutes. As for those who sought care the average time taken to reach the nearest facilities was 30 minutes. This also shows that distance might have contributed to the decisions of not seeking care.

Males made up 50.9 percent of the sample with female comprising the remaining 49.1 percent. Malaria was the main sickness that the residents reported, representing 76.7

percent of the total sickness episodes. 52.6 percent of the sick reported that the services received or known from experience were satisfactory.

Table 5.3 below shows the descriptive statistics for each of the alternative chosen when an episode of sickness was reported.

Table 5.3: Descriptive Statistics of each of the Choices

Variable	Public Health Facilities (33 Cases)		Private Health Facilities (38 Cases)		No-care (45 Cases)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
PRI	224.899	360.1574	508.9298	573.25	22.44444	49.69935
INC	5350.72	4442.671	13145.95	12273.52	2654.847	1742.254
EDHH	9.30303	2.63966	11.02632	3.948909	3.777778	3.936362
DIST	25.75758	11.4647	26.57895	12.14247	39.11111	14.43201
FS	6	2.304886	6.210526	2.473185	4.488889	2.528225
DAMIWO	10.18182	10.2879	7.394737	7.937388	5.422222	5.215749
SHH	.3333333	33.47871	.6578947	.4807829	.5111111	.505525
TSICK	.3333333	33.47871	.2631579	.4462583	.1333333	.3437758
QUAL	.7272727	33.452267	.8947368	.3110117	.1777778	.3866458

The table shows the expected relationship, that public facilities are less expensive than private facilities and more expensive than the no-care option. Private health facilities' prices are more than double those of public facilities, while no-care prices are more than ten times the prices of public facilities.

Similarly, the average incomes of those households that used private facilities is more than double that of those who utilize public facilities, while that of the households that did not seek care is double that of those who utilized public facilities. The highest education level attained by the head of household is highest for those who visited private

facilities, followed by those who visited public facilities and is extremely low for those who did not seek care. This shows that more educated heads of households value the health of their household members than the less educated. However, the household incomes being a correlate of education levels, this attribution is not exclusive.

Those who did not seek care would have spent the longest time to reach the nearest health facility, than those who sought care. Further, seeking care from a private facility takes a longer time than seeking care from a public facility. This partly explains why care was not sought for some households.

The average family size of those who sought care was highest for those who visited private facilities, followed by those who visited private facilities and those who did not seek care. These findings are not as expected, as one would expect that those households with fewer members would value more the health of the members. However, the proposition that a family with fewer members would find the opportunity cost of accompanying the sick person to the health facility cannot be ruled out.

The number of workdays missed due to illness was highest for those who sought care from public facilities, followed by those who visited private health facilities and then those who did not seek care. Perhaps the reason behind these differences is that the households take averagely over five days of missed work due to illness before they seek for care. In this case, the number of days people missed work due to illness may be taken as a proxy for persistence of the sickness.

Amongst those who sought care from private facilities, 65.79 percent were from male-headed households, as compared to 51.11 percent for no-care and 33.33 percent for public facilities. This shows that male heads of household used private facilities, while female heads sought care from public facilities in the event of sickness. They both take decisions of no-care option almost equally. This could be attributed to two reasons. First, the male-headed household is likely to be more financially empowered and therefore able to afford prices charged by the private facilities. Secondly, the female heads' opportunity

cost of accompanying the sick to hospital could be so high as she is required to attend to routine daily duties in the homestead.

Among those who visited public facilities, 33.33 percent of the cases had been perceived as non-malaria, as compared to 26.32 percent for private hospitals and 13.33 percent for no- care. This implies that if the perceived illness is malaria, there is a likelihood of the no-care option being chosen. However, if care is to be sought, then households prefer private to public facilities. This shows that one of the main killer diseases, malaria, is not given the attention it deserves in terms of seeking care as it deserves.

Quality as perceived by those who utilized private facilities was greatest as 89.47 reported the facilities being quality. On average 72.73 percent of those who visited the public facilities reported that the facilities were of acceptable quality, as compared to an average 38.66 percent among those who did not seek care. The choice of no-care therefore could partly be attributed to unsatisfactory perception of quality in the available health care facilities.

The descriptive statistics have given us an understanding on how the decisions on whether to seek care from private facilities, public facilities and no-care are made. This has enabled us to come up with the possible reasons to why these decisions are made. But, we are at this stage unable to quantify the extent to which these reasons influence these decisions. Quantification is important in resource allocation, because it allows planners to know the level of change that will be experienced with a given input. Hence it allows planners to put the scarce resources/inputs in areas that will yield the greatest desired output. This calls for further statistical analysis to quantify the pull and the push factors in order to know areas that need emphasis and use of the scarce resources to stimulate demand for health care. This is done through the models developed earlier for this study.

5.2 Multinomial Logit Results

Table 5.4 presents the multinomial logit results obtained from the data refined for the purpose of this study. It is important to restate that no-care is the reference group in the estimation results presented.

Table 5.4: Estimation Results for Public and Private Health Facilities

Dependent Variable	Independent Variable	Coefficient	Standard Error	Z-Statistic	P>|Z|
Logit Index for Public Health Facilities (Z_1)	CONSTANT	-2.098195	1.891806	-1.109	0.267
	PRI (Price)	-0.187505	0.0067527	-2.777*	0.005
	INC (Income)	0.000223	0.0002379	0.937	0.349
	EDHH (Education)	0.4496367	0.1893291	2.375*	0.018
	DIST (Distance)	-0.938892	0.0379946	-2.471*	0.013
	FS (Family Size)	-0.151553	0.1965088	-0.771	0.441
	DAMIWO (Days Missed Work)	0.0102807	.0542429	0.190	0.850
	SHH (Sex of Head of Household – Dummy, M=1, F=0)	-2.143509	1.172497	-1.828	0.068
	TSICK(Type of Sickness – Dummy, Malaria=0, Otherwise=1)	0.9844042	1.048878	0.939	0.348
	QUAL(Quality-Dummy, Satisfactory=1, Otherwise=0)	1.868946	0.9396258	1.989*	0.047
Logit Index for Private Health Facilities (Z_2)	CONSTANT	-4.127991	2.13781	-1.931	0.053
	PRI (Price)	-0.018367	0.0067538	-2.720*	0.007
	INC (Income)	0.0004814	0.0002452	1.963*	0.050
	EDHH (Education)	0.4108973	0.1909622	2.152*	0.031
	DIST (Distance)	-0.046072	0.0399822	-1.152	0.249
	FS (Family Size)	-0.2963702	0.2134275	-1.389	0.165
	DAMIWO (Days Missed Work)	-0.0439618	0.0581542	-0.756	0.450
	SHH (Sex of Head of Household – Dummy, M=1, F=0)	-1.419639	1.188969	-1.194	0.232
	TSICK(Type of Sickness – Dummy, Malaria=0, Otherwise=1)	0.3835424	1.084807	0.354	0.724
	QUAL (Quality-Dummy, Satisfactory=1, Otherwise=0)	2.71312	1.018848	2.663*	0.008
Pseudo R^2 =0.5467 Log likelihood = -57.34188 No. of observations =116 LR chi2(18) = 138.32 No-care is the reference group					

* Statistically significant at the 5% level.

As the Pseudo R^2 indicates, the explanatory variables account for 54.7 percent of the variations in demand for health care services (as measured by visit probabilities).

It is important to explain the general interpretation of the coefficients of the above models and relate them to the conditional probability model specified in the methodology as equation 7. The coefficients of the multinomial logit models are not marginal changes to the dependent variable, which is the conditional probability. However, they may be interpreted as marginal changes to the utility indices, Z_1 and Z_2. The estimated effects of the interaction terms on the choices of households are always relative effects to the reference group, meaning that they are relative to the impacts of the variable whose coefficients have been set to zero.

This implies that a positive coefficient for a variable shows the magnitude by which the value of the coefficient exceeds that of the reference provider. In more general terms, a positive coefficient of a variable shows the amount by which benefits (utility) of seeking treatment from a given type of facility would increase above that of no-care. Conversely, a negative coefficient for a variable shows the magnitude by which the value of the coefficient falls short of that of the reference group. For example, the negative coefficient for prices (-0.187505 and -0.018367) above shows that a unit increase in price of care reduces utility at a public and private facilities by 0.188 and 0.018 respectively. These are the marginal reductions in utility occasioned by extra payments for treatment at public and private facilities relative to no reductions in utility at the no-care option. In the same way, a positive coefficient for income shows the amount by which households' utility would increase if care was to be sought from a public or private facility.

Having interpreted the effect of the independent variables on the utility indices, i.e. Z_1 and Z_2, we now look at the effect of such changes on the probabilities of seeking care. Increase in the utility indices (Z) leads to a decrease in the term e^{-Z}. Consequently, a decrease in this term leads to a decrease in the whole denominator $(1+e^{-Z})$. Further, such a decrease in the denominator leads to an increase in the entire right hand side of the equation, or from the left-hand side, an increase in probability. Therefore, we may say that an increase in price of seeking care leads to a decrease in Z, and an increase in e^{-Z}, hence an increase in denominator, translating to a decrease in the probability of seeking

care. Hence, we can generalize that the increase in prices of seeking care relative to the price of not seeking care leads to a decrease in the probability of seeking care. The converse for positive coefficients is also true. This implies that the signs of the coefficients of the independent variables influence the probabilities in the direction indicated by those signs.

5.2.1 Results for Public Health Facilities

The effect of the price variable is statistically significant; implying that it is an important determinant of demand health care in public facilities in the district. From the negative coefficient we deduce that an increase in price levels in public health facilities relative to those of no-care, will reduce a sick person's probability of seeking care from a public facility. These results are consistent with economic theory and in line with the findings by Dutton (1986), Hay *et al* (1987), Acton (1975) and Mwabu *et al* (1991).

The coefficient of the income variable is found to be statistically insignificant. This shows that income levels of households are not an important determinant of demand for health care in public facilities. However, the sign of the coefficient is as expected, thus an increase in household incomes leads to an increase in the probability of seeking care from public facilities. The statistical insignificance shows that the explanatory power of this variable is rather weak. Heller (1982) and Habib *et al* (1986) obtained similar results.

The effect of education is statistically significant; showing that this variable is an important determinant of demand for health care services in public facilities. The sign of the coefficient is positive indicating that an increase in the education level of the head of household increases the household's probability of seeking care from public facilities. Because of the statistical significance, an increase in the head of households' education level is more likely to lead to an increase in the shift from no-care to public facilities care.

The coefficient of the distance variable is also statistically significant; depicting that it is an important determinant of demand for health care in public health facilities. The

negative sign shows that distance discourages the demand for health care in the public facilities. Hence, other things equal, an increase in distance will lead to a decrease in the probability of a household seeking care from the public facilities and increase the probability of the household not seeking care.

The effect of family size is statistically insignificant; meaning that is not a n important determinant of demand for health care in the district. The sign of the coefficient is as expected, showing that as a family's size increases, the probability of seeking care from a public health facility decreases.

The coefficient on the number of days people missed work is statistically insignificant; indicating that it is not an important determinant of demand for health services in public facilities. Nevertheless, its sign is as expected, thus when sickness persists, leading to an increase in the days people miss work due to illness, household members' probability of seeking care from public facilities increases.

The coefficient of the sex of the head of household is statistically insignificant too, meaning that it is not important in determining the demand for health care in public facilities. The negative sign of the coefficient implies that if the household head is male, then the probability that care will be sought from a public facility rather than the no-care option decreases. This shows that female heads take sickness more serious than the male heads. Schultz (1981, 1999) has reported similar results.

The effect of type of sickness variable is statistically insignificant; thus it is not an important determinant of demand for health care in public facilities. However, the positive coefficient implies that if households perceive the sickness as malaria, the probability of seeking care from public facilities decreases. This shows that malaria is not accorded the attention it deserves, both as the most prevalent and as one of the main killer- diseases in this district.

The coefficient on quality of the facilities is statistically significant; therefore it is an important determinant of demand for health care in public health facilities. The positive coefficient implies that when there is improvement in quality within public facilities, the probability of care being sought from these facilities increases.

5.2.2 Results for Private Health Facilities

This effect of the price variable is statistically significant; implying that it is an important determinant of demand health care in private facilities. Since it has a negative coefficient, an increase in price levels lead to a decrease in households' probabilities of care at private facilities.

The coefficient of the household income variable is found to be statistically significant. This shows that income levels of households are an important determinant of demand for health care in private facilities. The sign of the coefficient is positive, thus an increase in household incomes leads to an increase in the probability of seeking care from private facilities relative to no-care. This deviation from the results obtained from that of public facilities could be explained by the difference in average prices charged by both facilities.

The effect on education is also statistically significant; showing that this variable is an important determinant of demand for health care services in private facilities. The sign of the coefficient is positive indicating that an increase in the education level of the head of household increases the household's probability of seeking care from private facilities.

The coefficient of the distance variable is statistically insignificant; depicting that it is not an important determinant of demand for health care in private health facilities. The negative sign shows that distance discourages the demand for health care in the private facilities. Compared to the results of public facilities, households will mind traveling longer distances to visit public facilities than they would mind traveling longer distances to visit private facilities.

The effect of family size is statistically insignificant; meaning that is not an important determinant of demand for health care in the district. The negative sign of the coefficient shows that as family size increases, the probability of seeking care from a private health facility decreases.

The coefficient on the number of days people missed work due to illness is statistically insignificant; indicating that it is not an important determinant of demand for health services in public facilities. The negative sign is as expected, thus when sickness persists it lead to an increase in the days that people miss work. This increase in the days that people miss work increases the probability of seeking care from private facilities.

The coefficient of the sex of the head of household variable is statistically insignificant too; meaning that it is not important in determining the demand for health care in private facilities. The negative sign of the coefficient implies that if the household head is male, then the probability that care will be sought from a private facility decreases. Like in the public facilities' case, the female heads take sickness more seriously than the male heads.

The coefficient of the type of sickness variable is statistically insignificant; thus it is not an important determinant of demand for health care in private facilities. However, the positive coefficient implies that if households perceive the sickness as malaria, the probability of seeking care from a private facility decreases. This is also true for the public health facilities. Hence, irrespective of type of health facility, if the illness is perceived as malaria, the probability of care decreases.

The coefficient on quality of the facilities is statistically significant; therefore it is an important determinant of demand for health care in private health facilities. The positive coefficient implies that when quality improves within private facilities, the probability of care being sought from them increases.

5.3 Continuous Choice Regression Results

In this model we seek to find out how the independent variables of this study affect the number of visits made to the facilities. We therefore estimate two models, one for the public facilities and the other for the private facilities. We also estimate the model irrespective of type of facility. The results obtained when we estimate the models for public and private facilities differently are as presented in table 5.5 below.

Table 5.5 OLS Results for Public and Private Facilities

Number of Visits is the Dependent Variable						
Explanatory Variable	Public Facilities (33 observations)			Private Facilities (38 observations)		
	Coefficient	t-statistic	P>|t|	Coefficient	t-statistic	P>|t|
CONSTANT	0.2649987	0.211	0.835	1.478103	1.301	0.204
PRI	-0.0012587	-1.300	0.206	-0.002111	-3.380*	0.002
INC	0.0001791	1.861	0.076	-0.000145	-4.634*	0.000
EDHH	0.1003605	0.842	0.408	0.1246274	1.678	0.104
DIST	0.0151039	0.590	0.561	-0.0115984	-0.582	0.565
FS	0.0374108	0.263	0.795	-0.1289457	-1.271	0.214
DAMIWO	0.0870583	2.895*	0.008	0.1662297	6.642*	0.000
SHH	-0.2206048	-0.332	0.743	0.1944656	0.438	0.665
TSICK	0.6677586	0.874	0.391	0.5906209	1.355	0.186
QUAL	0.2392923	0.343	0.735	0.6442493	0.894	0.379
R^2	0.5954			0.6942		

* Statistically significant at 5 percent level.

As the R^2 indicates, the explanatory variables account for 59.5 percent and 69.4 percent of the variations in number of visits to public and private facilities respectively.

These results show that prices are not important determinants of number of visits to public facilities, but they are important to number of visits made to private facilities. This could be because the prices charged by the public health facilities are relatively lower than those charged by the private health facilities, hence at these low levels they do not affect the number of visits much. The sign of the coefficient of prices for both types of facilities is as expected, showing that increases in prices lead to reduction in number of

visits. Among the public health facilities, and holding other things constant, an increase of Kshs. 1000 in price would lead to 1.26 decline in number of visits. A similar increase in the prices of private facilities will lead to a 2.1 decrease in number of visits.

Income is unimportant determinant of number of visits to public facilities, but important determinant to private facilities. The sign of the coefficient is as expected for the public facilities, yet for the private facilities it is not. This contradicts the usual belief that as incomes of households increase, then they will tend to seek care from private facilities. This suggests that visits to public health facilities are an inferior good in the district. This unexpected negative sign could be due to three major reasons, first, since education is a correlate income, richer (more educated) people will not make more visits because they are able to afford and enjoy other health-enhancing goods and services (e.g. balanced or prescribed diet and exercises); secondly, the richer (more educated) are likely to explain to the physician more accurately their health problem and issues relating to their bodies (e.g. allergies) and to follow the physicians' directives on the use of drugs and other requirements accurately than the poor (less educated); and lastly, the less educated (poor) take long before seeking care, hence most of their cases are bound to be severe.

Education is also unimportant determinant of number of visits to both private and public health facilities. The signs of the coefficients are as we expected, thus an increase in education leads to an increase in the number of visits to both types of facilities.

Distance to the nearest health facility has no effect on service demand from the two types of facilities, implying that distance is not an important determinant of the number of visits that a sick person will make to the health facilities. The most probable reason for this could be that once a decision is made to seek care and the patient is advised to go back, this advise is taken more seriously. The sign of the coefficient is not as expected for the public health facilities. However, for the private health facilities it is as expected. Similarly, family size has no effect on service demand from the two types of health facilities. This implies that family size is not an important determinant of number of visits to health facilities.

The days people miss to work as a result of illness are important determinants of number of visits to health care facilities. These results are as expected, showing that if illness persists, then more visits will be made to the facilities. For every day that work is missed due to illness, the visits increase by 0.087 and 0.16 among the public and private facilities respectively.

The sex of the head of household, the type of sickness and quality of services are unimportant determinants of number of visits to health care facilities. If the head of household is male, the number of visits to these facilities decreases, but with higher margins for the public facilities. If the type of sickness is perceived as not malaria, the number of visits will increase. This increase will be more at public health facilities that it is for the private health facilities. Similarly, if the quality of the services improves, the number of visits will increase irrespective of facility type. Consequently, the increase for the private facilities will be higher for private facilities than the public health facilities.

The results obtained when we estimate the models for both public and private jointly to determine the determinants of number of visits to health facilities irrespective of the type of facility are presented in table 5.6 below.

Table 5.6: Pooled OLS Results for Health Care Facilities

Number of Visits is the Dependent Variable			
Explanatory Variable	Health Care Facilities (71 observations)		
	Coefficient	t-statistic	P>|t|
CONSTANT	1.12528	1.393	0.169
PRI	-0.0007896	-1.470	0.147
INC	-0.0000795	-2.727*	0.008
EDHH	0.0792712	1.208	0.232
DIST	-0.0040794	-0.263	0.793
FS	0.0141464	0.180	0.858
DAMIWO	0.1358185	7.230*	0.000
SHH	0.0799693	0.216	0.830
TSICK	0.7359878	1.938	0.057
QUAL	0.5260516	1.080	0.284
R^2	0.5286		

* Statistically significant at 5 percent level.

The R^2 indicates that the explanatory variables account for 52.9 percent of the variations in the number of visits to health facilities.

These results show that income is statistically significant, but with unexpected sign, portraying health care as an inferior good. As explained earlier, this unexpected sign could be attributed to the influence of the private health facilities where price is an indicator of quality. The days that work is missed due to illness are important determinants of number of visits to health facilities, irrespective of type of facility. An increase in the days one missed work will lead to an increase in the number of visits. Type of sickness, though not statistically significant at 5 percent, but significant at 6 percent, shows that if the sickness is perceived as not malaria the number of visits will increase.

Prices are unimportant determinant of number of visits to health facilities. However, they influence the decisions to seek care, such that increase in prices lead to a decrease in number of visits. Education is also unimportant determinant of number of visits to health care facilities. An increase in education leads to an increase in the number of visits. Distance is also unimportant determinant of number of visits to the facilities. As it increases, the number of visits decline. Likewise, family size is unimportant determinant of number of visits to health care facilities and has a negative effect on the number of visits. Sex of the head of household is unimportant determinant of number of visits to the health care facilities. If the head of household is male, then the number of visits increase. The quality of services is also unimportant determinant of number of visits to health care facilities, but its improvement will lead to an increase in number of visits to the facilities.

Note that the results above are based on the assumption that number of visits is decided upon after the decision to seek care is made. On the assumption that the number of visits is decided upon before the decision on what type of facility to visit, the results are presented in appendix 2. This would mean that if the visits are zero, then the alternative

chosen is no-care. If the number of visits is non-zero, then the household would decide on the type of facility to visit.

5.4 Summary of the Findings

The findings of this study show that health care prices, distance to the facilities, education levels of heads of households and quality of the services are the main determinants of demand for health care in public facilities in the study district. An increase in prices and distance to the health facilities will deter the use of public facilities. Subsequently, increase in education levels of heads of households and quality will encourage the use of the public facilities. This means that for the households' probabilities of seeking care from public health facilities to increase substantially, emphasis should be laid on these determinants.

The main determinants of demand for health care within the private health care sub-sector are prices, quality of services, education levels of heads of households and incomes of the household. In policies designed to increase the demand for health care within the private facilities, these are the factors to be given sufficient weight.

The days that work is missed due to illness is the main determinant of number of visits made to the public health facilities. As the days increase, the number of visits increase too. This indicates that in most cases, more visits are made to public health facilities if the sickness persists or is severe in that it can make one to miss work.

The main determinants of number of visits to the private facilities are days a person missed work due to illness and prices. As the days increase, the number of visits to private facilities increase too. Conversely, as prices increases, the number of visits to this type of facility decreases.

Other findings are that if the sickness is perceived as malaria, then there is higher probability that households will choose no-care. The probability for a male-headed

CHAPTER SIX: CONCLUSIONS

6.1 Summary and policy implications

The main objective of this study was to analyze the determinants of demand for health care services in Vihiga district. The hypothesized determinants were drawn from household characteristics, type of sickness and the quality of the services. The alternatives taken by sick people were divided into three, thus no-care, visit to public facility and visit to public facility. If at least a visit was made, the study went further to investigate whether these household characteristics, type of sickness and quality of the services influenced the decision on number of visits. Raw data from the third welfare monitoring survey comprising 116 sick episodes in the district was used to realize the objectives of this study.

Prices of health care services were found to be important determinants of demand for care at both public and private health facilities. This means that if prices increase, the probability of seeking care from both types of facilities decrease, and the probability of no-care increases. In order to increase the demand for health care in the district, the Government should review the prices charged by the public health facilities or reverse its policy on cost-sharing in this sector. The recent announcement that health services will soon be free in the public health facilities is a step in the right direction, if demand for health care has to be stimulated. As for the private health facilities, policies should be geared towards reducing the prices of health sector inputs. These could be through reverting from just zero-rating and exempting from tax imported health care inputs, such as equipment and drugs to subsidizing them. Tax exemptions should also be extended to private hospitals, the fees paid to obtain licenses for private clinic and hospital operations should also be waived. These policies will go along way in not only increasing the probability that care will be sought, but in increasing number of visits to these facilities as well.

Since distance to the nearest health facility is an important deterrent of demand for health care services, there is need to build more health care facilities in this district. Additional

health care facilities will reduce the distances to the nearest facilities and stimulate demand for the health services. Building more health care facilities will lead to significant increase in utilization of health services. Building more health facilities will have a greater impact on the probability of seeking care from public health facilities than it would have on the private health facilities; hence policy makers should continue to prioritize addition of public health care facilities in this region. Such action will not only stimulate the demand for the services, but number of visits made to the facilities as well.

There is also need to encourage the enrolment in schools, as this has an impact on the demand for health care as well as the number of visits. More educated people appreciate more the existence of health care facilities. In pursuit of the goal of health for all, education has also to be emphasized. Policies geared towards such goal should also have a component that will ensure more enrolment in schools. Ensuring that basic education is compulsory for all as well as encouraging adult education in the district could do stimulate the demand for health care. The former is a long-term strategy, while the latter is a short-term strategy. From this study we find that education level is a correlate of demand for health services.

The quality of the facilities plays a great role in determining whether households will seek health care or not. Quality is vital in determining the choice made for both types of health facilities. Improvement in the quality, as perceived by households, will stimulate demand for health care in both public and private facilities. This calls for policies that will not only concentrate on improving quality as perceived by the medical personnel, but those perceived by the patients as well. Whereas improvement in quality as may be perceived by medical personnel (such as equipping, staffing and electrification) are important in health facilities, they should be accompanied by improvement in quality as perceived by the users of the facilities. It is therefore important for health planners to consider the facilities' attributes perceived by households as contributing to quality, such as drug availability, waiting time, attitude of attendants towards patients and cleanliness alongside those perceived by the medical personnel. These will ensure an increase in

household's chances of seeking treatment in the event of illness care as well as increase in number of visits by sick people.

Health planners should incorporate the poverty reduction strategies into programs aimed at stimulating demand for health care. Increased household incomes will lead to increased probability of households seeking care when they fall sick. The results of this study show that increased income would have a greater increase in the probabilities of a household seeking care from a private facility than a public facility. Since the study has established a negative relationship between income and visits to private health care facilities, poverty reduction strategies will lead to a reduction in number of visits made by a sick person to the facility. This is could be an indication of quick recovery, hence little productive time is lost.

The days people miss work due to illness is the main determinant of number of visits to health facilities, irrespective of type. The days people miss work due to illness is a proxy for both the severity and persistency of the sickness. Sick people in the district make more visits only when the sickness is perceived as severe and is persistent. But issues to do health require that check-ups be made as recovery progresses. This calls for campaigns in the district to educate the residents on the importance of these check-ups.

This study has confirmed William Dow's (1995) hypothesis that in developing countries, most malaria cases are not reported probably because they are not considered to be a serious illness, especially among the poor. In Vihiga district malaria is not given the attention it deserves, a factor that contributes in making it one of the main killer diseases in the district. This calls for increased Anti-Malaria campaigns and awareness programs like those accorded to HIV/AIDS. Reduction in malaria episodes coupled with an increase in seeking care when malaria strikes, will significantly reduce the morbidity and mortality rates in the district.

The recent Government proposal to reverse its policy on cost-sharing in the health sector will ensure that access to public health care facilities will increase. However, such policy

must ensure that the quality of the facilities is not compromised, as is mostly the case with free services. The implementation of the policy, without the consideration of quality, especially availability of essential drugs will not achieve the targeted objective of increased accessibility to health care facilities. It is also important for the Government to reconsider its cost-sharing policy in the education sector, especially basic education. Whereas these will lead to increase in budget deficits, it is a worthy long-term investment, as a healthy and educated population will lead to increased economic activity, hence more taxable incomes in the future.

6.2 Limitations of the Study

The results from this study should be interpreted with caution because of several simplifying assumptions made at various stages. For example, the study has assumed that the family is the decision-making unit and the head of household is the decision-maker, especially on decisions concerning the action to be taken once a family member is sick. This may not be realistic, especially for adult and income-earning members of the family, as they tend to make decision about their health care independent of the head. The study has disregarded the role played by traditional medicine practitioners, modern herbalists and faith healers, among others, who are often argued to be very efficient in treatment some diseases. This study treated self-treatment and no-care together, but in real sense, self-treatment is often an option if the sickness is perceived as not severe.

6.3 Suggestions for further work

There is need for further research in this area, especially when the care options are more disaggregated, because this study has only looked at only three options, despite there being numerous options (e.g. buying drugs from chemists/shops, seeking spiritual healing, visiting traditional and modern herbalists). Further, the care facilities can be disaggregated into hospitals, clinics and dispensaries.

Further researches in this area should also be disease-specific, i.e. to establish if the kind of illness as perceived by the households, affects the decisions on whether and where to seek care. This is so because of the belief that some diseases are not treatable by formal practitioners and are treatable by the informal practitioners.

REFERENCES

Abbas, A.A. and Walker, G.J.A. (1986): Determinants of the Utilization of Maternal and Child Health Services in Jordan; *International Journal of Epidemiology Vol. 15, No. 3*: Great Britain.

Acton, J.P. (1975): Non-monetary Factors in the Demand for Medical Services: Some Empirical evidence; *Journal of Political Economy 1975, Vol. 83 No. 3.*

Akin, J.S., Griffin, C.C., Guilkey D.K., Popkin B.M. (1985): The Demand for Primary Health Services in the Third World, Rowman and Allanheld publishers, U.S.A.

_____ **(1986)**: The Demand for Primary Health Care Services in the Bicol Region of Philippines: *Journal of Labor Economics, Vol. 4 1986.*

Christianson, J. B. (1976): Evaluating Locations for Outpatient Medical Care Facilities, *Land Economics*, Vol. 52 (3), August 1976, pp 298-313.

Dutton, Diana (1986): Financial, Organizational and Professional Factors Affecting Health Care utilization: *Pergamon Journals Ltd.* Great Britain.

Dow, William H. (1995): "Discrete Choice Estimation of Price-Elasticities: The Benefits of a Flexible Behavioral Model of Health Care Demand". Economic Growth Center Discussion Papers. September 1995.

Glick, P., Razafindravonona, J. and Randretsa, I. (2000): Education and Health Services in Madagascar: Utilization Patterns and Demand Determinants: Cornell University Working Paper 107, June 2000.

Grossman, M.(1972): On the Concept of Health Capital and Demand for Health: *Journal of Political Economy* 80(2):223-235.

Guilkey, D.K., Popkin, B.M., Wong, E.L., Akin, J.S. (1987): Accessibility, Quality of care and prenatal use in the Philippines: *Social Science and Medicine,* Vol. 24 No. 11 pp. 927-944.

Habib, Omran S. and Vaughan, J. Patrick (1986): The Determinants of Health Services Utilization in Southern Iraqi: A Household Interview Survey: *International Journal of Epidemiology Vol. 15, No. 3:* Great Britain.

Hay, J.W., Bailit H. and Chiriboga, D.A. 1982: The Demand for Dental Health: *Social Science and Medicine,* Vol. 16 pp. 1285-1289.

Heller, Peter S. (1982): A Model of Demand for Medical and Health Services in Peninsular Malaysia: *Social Science and Medicine,* Vol. 16 pp. 267-284.

Hsiao, W.C., Abnormal Economics in the Health Sector*: Journal of Health Policy, Politics and Law* 32 (1995) Elsevier.

McGuire, A., Henderson, J. and Gavin, M.: The Economics of Health Care; An Introductory Text: Clays Ltd., St. Ives PLC, Great Britain.

Mwabu, G.M. (1980): The Economics of Primary Health Care in Kenya; The Case of Tharaka Rural Health Unit: Staff Colloquium Paper.

Mwabu, G.M. (1984): A Model of Household Choice among Medical Treatment Alternatives in Rural Kenya: Unpublished Ph.D. Dissertation, Boston University.

Mwabu, G. M. (1986), "Health Care Decisions at the Household Level: Results of a Rural Health Survey in Kenya", *Social Science and Medicine, 22(3)*.

Mwabu, G.M., Ainsworth, M. and Nyamete A. (1993): Quality of Medical Care and Choice of Medical Treatment in Kenya; An Empirical Analysis, The World Bank, African Technical Department, Human Resources and Poverty Division, Working Paper No. 9.

Mwabu, G.M., Ellis, R.P. (1990): The Demand for Outpatient Medical Care in Rural Kenya. A paper presented to the B.U./Havard/MIT Health Economics Seminar.

Ndele, S.M. (1988): Demand for Health Services in Nairobi. Unpublished M.A. Thesis, U.O.N., 1988.

Njaramba, J.G. (1994): Demand for Maternal Health Services: A Case Study of Antenatal Care in Thika Division of Kiambu District. Unpublished M.A. Thesis, U.O.N., 1994.

Pauly, M. and Satterthwaite, M. (1981): The Pricing of Primary Health Care Physicians Services: A Test of The Role of Consumer Information. *The Bell Journal of Economics, 12:2* (Autumn, 1981) pp. 488-526.

Republic of Kenya (2000): Second Report on Poverty in Kenya, Vol. I & II: Government Printer, 2000.

_____ **(1965):** Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya (Government Printer).

_____ **(2002)**: Vihiga District Development Plan 2002-2008; Government Printer, 2002.

Schultz, T.P. (1999): Health and Schooling Investments in Africa: *Journal of Economic Perspectives; Vol. 13, No. 3 pp. 67-88: 2014 Broadway, Suite 305, Nashvile, TW 37203.*

World Bank (1990); Overholt C.A. and Saunders M.K. (Ed.): Policy Choices and Practical Problems in Health Economics: Cases from Latin America and the Caribbean. EDI Learning Resources Series: Washington, D.C.

APPENDICES

APPENDIX 1: Comparisons of Selected Health Indicators Between Vihiga District and Kenya (1997)

Appendix Table 1 A: Incidences of sickness (percent)

		Incidence	Mean days sick	Days Sick		
				≤2wks	2-4wks	>4wks
Vihiga	Poor	13.3	8.9	84.4	15.6	0.0
	Non-poor	24.6	11.0	81.2	13.2	5.6
Kenya	Poor	13.7	10.1	83.7	8.3	3.8
	Non-poor	17.7	10.8	83.5	12.9	3.6

Appendix Table 1 B: Action Taken while Sick (percent)

		Private Doctor/ Dispensary	Public Dispensary	Community Health Centre	Private Hospital	Provincial/district Hospital	Missionary Hospital/ dispensary	Pharmacy / Chemist	Traditional/ faith healer
Vihiga	Poor	20.8	36.2	4.0	0.0	11.9	0.0	27.1	0.0
	Non-poor	10.9	9.2	12.7	0.0	22.7	6.8	37.8	0.0
Kenya	Poor	20.8	26.1	8.1	3.7	10.6	7.1	23.2	0.4
	Non-poor	23.6	18.9	6.9	9.4	12.3	8.1	18.7	2.0

Appendix Table 1 C: Sick Population by Days missed work due Illness and whether received treatment (percent)

		Average number of days missed work	Received treatment	Did not receive treatment
Vihiga	Poor	6.8	81.3	18.7
	Non-poor	8.7	89.8	10.2
Kenya	Poor	7.2	88.2	11.8
	Non-poor	7.7	92.3	7.7

Appendix Table 1 D: Reasons for not seeking care (percent)

		Minor illness	Self treatment	Too expensive	Too far	Head refused	Religious beliefs	Other
Vihiga	Poor	12.5	5.8	81.7	0.0	0.0	0.0	0.0
	Non-poor	64.5	0.0	26.1	0.0	0.0	0.0	9.4
Kenya	Poor	26.6	22.2	40.0	2.5	0.6	1.9	6.2
	Non-poor	50.7	21.1	16.4	4.5	0.0	1.0	6.3

Appendix Table 1 E: Distribution of time taken to reach nearest qualified doctor's office (percent)

		<10 minutes	10-30 minutes	30-60 minutes	> 60 minutes
Vihiga	Poor	0.0	42.4	12.8	44.8
	Non-poor	0.0	59.9	12.1	28.4
Kenya	Poor	1.2	29.2	14.9	54.7
	Non-poor	2.5	33.4	16.9	47.3

Appendix Table 1 F: Distribution of time taken to reach nearest Dispensary (percent)

		<10 minutes	10-30 minutes	30-60 minutes	>60 minutes
Vihiga	Poor	1.5	48.0	32.9	17.7
	Non-poor	2.2	66.0	21.6	10.2
Kenya	Poor	1.7	44.1	21.8	32.4
	Non-poor	2.8	44.1	21.8	32.4

Appendix Table 1 G: Distribution of time taken to reach nearest Hospital (percent)

		<10 minutes	10-30 minutes	30-60 minutes	>60 minutes
Vihiga	Poor	0.0	13.4	22.5	64.1
	Non-poor	0.0	15.9	34.9	49.2
Kenya	Poor	0.2	14.9	14.6	70.3
	Non-poor	0.4	18.8	16.9	63.9

Appendix Table 1 H: Mean Expenditures on Health (KShs.)

		Doctor's Fee	Medicine	Hospital	Other Medical	Medical Insurance
Vihiga	Poor	0.0	7.0	6.5	2.8	0.0
	Non-poor	9.3	34.1	32.3	0.0	0.0
Kenya	Poor	1.2	19.6	5.1	6.7	1.5
	Non-poor	11.8	85.7	36.4	8.4	6.1

Source: Second Report on Poverty in Kenya, Vol. II: Poverty and Social Indicators (Republic of Kenya, 2000).

APPENDIX 2: Other Results

Appendix Table 2 A: Pooled[4] OLS Results for All Sickness Episodes

Number of Visits is the Dependent Variable			
Explanatory Variable	Sick Episodes (116 observations)		
	Coefficient	t-statistic	P>|t|
CONSTANT	-0.0521438	-0.092	0.927
PRI	-0.0012286	-2.297**	0.024
INC	-0.0000855	-3.009*	0.003
EDHH	0.156594	3.912*	0.000
DIST	-0.011818	-1.109	0.270
FS	-0.0191952	-0.319	0.750
DAMIWO	0.132962	7.510*	0.000
SHH	-0.2214377	-0.758	0.450
TSICK	0.6334541	1.900***	0.060
QUAL	1.093278	3.270*	0.001
R^2	0.5904		

* Statistically Significant at 1 percent.
** Statistically Significant at 5 percent.
*** Statistically Significant at 10 percent.

[4] Here visits for all those who reported being sick is considered; for those who did not seek care, the number of visits are zero.