

**DETERMINANTS OF HEALTH CARE SEEKING BEHAVIOUR FOR
MALARIA TREATMENT IN UGANDA**

Master of Arts (Economics) Thesis

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DECLARATION

I hereby declare that this thesis is my original work and that it has never been submitted, for similar purposes, to any University or any institution of higher learning. Acknowledgements have been duly made where other people's work has been used. I, therefore, remain solely responsible for all errors herein.

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STATEMENT OF APPROVAL

We, the undersigned, certify that this work results from the student's own effort. It has, therefore, been submitted with our approval.

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LIST OF ACRONYMS

ACT	Artemisinin-based Combination Therapy
AERC	African Economic Research Consortium
AIDS	Acquired Immune Deficiency Syndrome
BI	Bamako Initiative
CDC	Centres for Disease Control
FY	Financial Year
GAVI	Global Alliance for Vaccines and Immunizations
GoU	Government of Uganda
HIV	Human Immuno-Deficiency Virus
HSSP	Health Sector Strategic Plan
IIA	Independence from Irrelevant Alternatives
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IPT	Intermittent Preventive Treatment
ITN	Insecticide Treated (mosquito) Nets
JHU/CCP	John Hopkins University Communications for Change Project
JSI	John Snow International
MMR	Maternal Mortality Rate
MNLM	Multinomial Logit Model
MOH	Ministry of Health
MOP	Malaria Operational Plan
OPD	Out-Patients Department
PEAP	Poverty Eradication Action Plan
PMI	(United States') Presidential Malaria Initiative
RBM	Roll Back Malaria
RRH	Regional Referral Hospitals
RTI	Research Triangle Institute
SIDA	Swedish International Development Agency
SP	Sulfadoxine / Pyrimethamine

UBOS	Uganda Bureau of Statistics
UMCSP	Uganda Malaria Control Strategic Plan
UNHS	Uganda National Household Survey
Ushs	Uganda Shillings
WHO	World Health Organization
WHOSIS	World Health Organization Statistical Information System

DEDICATION

This work is dedicated to my parents and to John, Satu, Jane and Onesi and to the memories of my grandfather and friend Aaron Ndirima.

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For the life, strength and courage to carry on, I owe it to God. *Deo gratias.*

Domino, Deus, optimo maximo, in manus tuum futuro et opus meum commendo.

ABSTRACT

Despite being preventable and curable, malaria continues to be one of the global leading killer diseases especially amongst young children. Curative as well as preventive measures have been devised and revised but the war against malaria seems far from over. To re-awaken the curative fight and therefore reduce fatality of the disease, a socio-economic perspective of treatment seeking behaviour needed to be studied to help inform a possible approach in educating the masses as well as ensuring timely consumption of an appropriate dosage.

This study uses a national household survey dataset to investigate the determinants of health care seeking behaviour for malaria treatment in Uganda. A multinomial logit model is applied to analyze which/how socioeconomic factors influence malaria treatment seeking behaviour.

It is found out that most people in Uganda go to private providers for first treatment of a malaria episode, some to government providers whereas less than 4% get treatment at home/no care at all. Household welfare and size are found to increase the probability of seeking treatment from a private provider. Male individuals, also, have higher probability of seeking treatment from private providers than females whereas education is found to only affect treatment to an extent that educated individuals have a lower probability, than the uneducated, of seeking treatment from a traditional health provider. Distance is, also, found to reduce probability of seeking health care from private provider. On the level of regions, northern Ugandans have limited usage of private facilities compared to other regions.

Therefore, interventions to increase utilization of malaria treatment should give special attention to the poor and increase private provider-government partnership and support. In particular, private providers- in rural areas and areas that do not have a nearby government health facility-should be adequately facilitated by the government so as to provide low cost malaria treatment.

CHAPTER ONE

INTRODUCTION

1.1 Background

Malaria kills up to a million people world wide annually and nine in ten of the deaths occur on the African continent. Being mostly found in the poor countries of the world, malaria has been referred to as a disease of poverty (Gallup, 2001). In addition, the disease causes and exacerbates poverty mainly by exerting a high cost burden to households. Chuma et al (2006) shows that lower cost burdens to households do not necessarily show fewer burdens but rather, for poor households, shows the high level of health care deprivation that these people experience by foregoing treatment, thus risking complications. The major household burden is of medical expense, lost income during illness and care giving to patients, premature deaths, and still the impoverishment that comes with coping strategies adopted by the poor like selling off their assets as important (and sometimes scarce) as land and domestic animals. Malaria therefore has far reaching welfare catastrophes which lead to vulnerability.

Malaria impacts negatively on households; directly through spending on treatment, and indirectly through medical and non-medical costs (like transport, special foods for patients) of care seeking. Income losses to the sick member of a household and the caregiver(s) are also a big cost to households. In addition, in case of deaths, the premature and untimely death of an individual and the associated funeral costs are quite impoverishing to the poor (Chuma, 2006).

In addition, the vulnerability that malaria imparts on households is the most impoverishing owing to its intertemporal nature. Chambers (1998) refers to vulnerability as “the exposure to contingencies and stress and difficulty in coping with them”. It is the attempt, beyond means, to meet the expenses of malaria cost that impoverishes households when they adopt coping strategies like getting into debts and selling any assets that can be marketed. This reduces the ability of the households to meet the basic

needs and leaves them empty handed to address further malaria epidemics and other calamities in general. Thus poor households are the most vulnerable to malaria.

At a macro level, it has been found out that, among other costs (RBM¹, 2003);

- Malaria costs Africa more than US\$12 billion annually.
- Those who suffer most are Africa's most impoverished and that malaria keeps them poor.
- A poor family living in malaria infected area may spend 25% or more of its income on prevention and treatment.
- Malaria has slowed down economic growth in Africa by 1.3% per annum.

It was on the basis of this and building more on the need to "roll back malaria" that in the year 2000; African leaders, experts and donors met in Abuja, Nigeria in what was observed as the convergence of political momentum, institutional synergy and technical consensus on Malaria. They, thus, signed a declaration to adhere to a course of action and render their respective support to achieve the targets related to "roll back malaria" contained therein.

The RBM initiative was undertaken by the World Health Organization in 1998 as an international effort to control malaria. It aims at halving the 2000 levels of malaria morbidity and mortality by 2010, and reducing this malaria burden by a further 50 percent by 2015.

The RBM initiative is the framework within which Uganda implements malaria control activities. The objectives of the initiative are to ensure that pregnant women and children under five years of age have access to the most suitable and affordable combination of personal and community protective measures such as insecticide-treated mosquito nets (ITNs) and prompt, effective treatment for malaria within 24 hours of onset of illness. Another objective is to ensure that at least 60 percent of all pregnant women have access to intermittent preventive treatment (IPT).

¹ Roll Back Malaria

1.1.1 Malaria situation in Uganda

Uganda is a low income country with population estimated at 28 million people based on the 2002 National Housing and Population Census which was 24.3 million at the time. This is consistent with the UNHS 2005/6 that estimated the population at 27.2 million. The gender composition of the population is 51% female and 49% male. This proportion has remained quite stable since the 2002 population census through the two phases of the UNHS in October 2005 and May 2006. Uganda's population is largely rural based with 85% living in rural areas compared to the 15% urban counterparts. The country has experienced tremendous economic growth since the late 1980s with an average rate of economic growth estimated at 6.1%. Consequently major health indicators of infant and maternal mortality have also improved but at a rather lower rate compared to improvements in economic growth. At present, infant mortality stands at 79 per 1000 live births, whereas maternal mortality rate is at 505 per 100,000 live births (WHOSIS, 2007). Poverty levels have also reduced and currently stand at 31% of the population that are considered to be living below the poverty line for their rural or urban sub-region (UBOS, 2006).

The Uganda Poverty Status Report (GoU, 2005) reveals that 16.3 percent of households identified health-related problems as the most important factors that influence a decrease in welfare. With respect to the foregoing poverty and health challenge, the Government of Uganda (GoU) has established clear goals for improving the health of Ugandans through the Health Sector Strategic Plan (HSSP). The programme goal of the Health Sector Strategic Plan (HSSP II) 2005/06-2009/10 is *“Reduced morbidity and mortality from the major causes of ill health, premature deaths, and reduced disparities therein”* and therefore contains a framework for effective treatment, prevention and reduction in hospital fatality cases of malaria.

In Uganda, the major cause of maternal and child mortality is malaria. Malaria is the leading cause of morbidity and mortality in Uganda, even exceeding HIV and AIDS. It is endemic in 95% of the country and estimates show that malaria accounts for about 25.4% of the outpatient's visits to health facilities and the annual number of deaths attributable

to malaria range from 70,000 to 100,000. Children less than 5 years of age are the most affected and nearly half of hospital inpatient pediatric deaths are due to malaria (PMI, 2007).

On a general view, incidence of the disease has been decreasing in Uganda. Between 2002/03 and 2005/6, the incidence of disease has decreased from 58% to 50% and it is reported to be the dominant cause of sickness in Uganda accounting for about 50% (UBOS 2006). Table 1.1 below shows the trend of disease incidence in Uganda.

Table 1.1 Type of illness/symptoms, area of residence (%) and trend of illness

Illness	2002/03			2005/06		
	Rural (%)	Urban (%)	Uganda (%)	Rural (%)	Urban (%)	Uganda (%)
Malaria/Fever	62.7	57.8	58.5	48.9	53.3	49.6
Respiratory Infections	15.1	12.9	13.2	14.2	14.7	14.1
Diarrhea	2.2	4.4	4.1	7.3	9.8	9.4
Injury	1.3	1.0	1.0	5.4	7.0	6.8
Skin infections	1.6	3.1	2.9	3.2	3.2	3.2
Others ²	7.2	20.9	20.0	16.3	17.0	16.9

Source: UBOS UNHS report 2006

To combat malaria, with assistance from several donor agencies, NGOs, multilateral aid agencies and developed countries, the Government of Uganda (GoU) has put in place several programmes and strategies aimed at reducing malaria related mortality and morbidity. With this, the Government of Uganda has put in place the Uganda Malaria Control Strategic Plan (UMCSP) 2005/6-2009/10, which is the second plan in the country

² Others include fainting, pain on passing urine, coughing blood, genital sores, mental disorder, child-birth related, serious headache and others.

to address the malaria problem in a sustainable manner. The plan complements the broader five-year Health Sector Strategic Plan, which is part of the Poverty Eradication Action Plan (PEAP). In the PEAP, malaria features as a high priority health and poverty issue. The plan builds on the achievements and challenges of the previous five-year period and describes core intervention strategies and their specific objectives and sets targets. The PEAP also highlights several interventions in the control of malaria, for instance the waiving of taxes on mosquito nets and insecticides and launching of the home-based treatment programme for combating malaria. The United States President's Malaria initiative for Sub-Saharan Africa in the year 2006 piloted a fight against malaria in three highly endemic countries among which Uganda featured alongside Angola and Tanzania. In addition, the fight against malaria in Uganda has intensified with major partnerships from donors and multilateral organizations. In addition, research institutions/malaria implementing partners like John Hopkins University Communications for Change project (JHU/CCP), Research Triangle Institute (RTI), John Snow International (JSI), Centres for Disease Control and Prevention (CDC), have joined the struggle to fight malaria in Uganda and it, therefore, remains to be seen to what extent the efforts come to fruition with respect to the underlying targets.

1.2 Problem statement

It is a major concern that despite many programmes aimed at reducing the morbidity and mortality associated with malaria, the disease remains to pose the greatest challenge to the health of Ugandans. Probably this can be demystified by whether/how people seek treatment to restore their stock of health to optimal level. Among the two objectives of the national malaria control plan is;

To go to scale nationally with a package of effective and appropriate core interventions that promote positive behaviour change and prevent and treat malaria (PMI, page 9).

However, a major challenge to the interventions directed at reducing malaria in Uganda is that the interventions that focus on treatment are largely medically skewed neglecting consumption and demand patterns of health care from a household perspective. For

example, malaria treatment interventions in Uganda emphasize improved medical case management, diagnosis and drug effectiveness that necessitated a shift from Chloroquine (CQ) and Sulfadoxine / Pyrimethamine (SP) to Artemisinin-based Combination Therapy (ACT) (MOP, 2007³). Much as this is a formidable effort, household characteristics need to be considered in designing meaningful interventions especially that people may need to; know that drugs exist (information flow associated with literacy levels), need to have means of accessing treatment (facility accessibility as well as income since treatment is associated with a price) and also that cost burdens associated with household size may dictate the quality of health care sought.

Underpinning this study, too, is the fact that though many studies have investigated social economic factors that affect demand for health care and some of them in Uganda (Lawson, 2004; Okurut et al., 2006), health care seeking behaviour for malaria (as a leading killer) treatment in Uganda, to my knowledge, has not been investigated. According to Chuma (2006), the perceived nature of illness, socioeconomic status, and the household's asset base determines whether people seek treatment and the type of responses they adopt. Therefore, this study undertakes to investigate social economic factors that influence the seeking behaviour for malaria treatment so as to provide a basis for effective curative strategies to augment those already in place.

1.3 Objectives of the study

The study tries to investigate factors that are responsible for the behaviour of malaria patients in seeking treatment.

Specifically, the study will undertake to;

- i. Establish whether household welfare is significant in explaining provider choice for malaria treatment.
- ii. Establish whether sex of an individual is crucial in explaining malaria treatment seeking behaviour.

³ President's Malaria Initiative Uganda. Malaria Operational Plan FY 2007.

- iii. Investigate whether distance to a facility affects treatment seeking behaviour for malaria.

1.4 Study hypothesis

- i. Household welfare does not have a significant impact on provider choice for malaria treatment.
- ii. Sex of an individual does not affect provider choice for malaria treatment.
- iii. Distance to a facility does not affect provider choice for malaria treatment.

1.5 Thesis organization

The remainder of the thesis is organized into four chapters. Chapter two reviews the theoretical and empirical literature. Chapter three discusses the methodology to be employed in the study where as the results are presented and discussed in chapter four. Finally, chapter five concludes the study and outlines some policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter seeks to review literature relating to health care demand with particular attention to malaria treatment. Section 2.1 reviews the theoretical framework upon which health care demand studies are based whereas section 2.2 reviews the empirical literature of health care demand with emphasis on malaria treatment.

2.1 Theoretical framework

Health care is both a consumption and investment good. As an investment good, health care is a major input to the health of an individual which improves welfare and enhances the quality of human capital thus improving productivity and increasing the number of days available for productive activities. Therefore, time lost during illness and the loss of efficiency associated with certain sickness that a worker may possess pose a great loss to output. This motivates seeking of health care to reinstate/improve the health of an individual.

In seeking health care, an individual seeks to maximize utility by attaining the desired health status at a minimal cost both monetary and time. Therefore, the economic theory of consumer choice forms a framework for the analysis of health care seeking behaviour. Health care from different providers can be classified as a differentiated commodity from which a particular individual derives different utility levels depending upon both the consumer and commodity (in this case provider) characteristics. Despite the ordinal nature of utility, individual consumers are able to rank their preferences rationally. Preference ordering is assumed to have three basic properties:

- Completeness; where an individual may reveal one of the following: A is preferred to B; B is preferred to A; or A and B are equally attractive.
- Transitivity; which assumes that individual choice is internally consistent. Thus, if A is preferred to B, and B is preferred to C then, A will always be preferred to C.
- Continuity; so that if A is preferred to B, then any situation close to A will be preferred to any situation close to B.

With alternative sources of health care, consumers may appear to be indifferent toward the facilities, or to rank, higher, those facilities that are more preferred. This ranking is dependant on the implicit utility functions. These utility functions are, further, dependant on several factors/characteristics-socio economic or otherwise-which an individual possesses/interfaces. We can, however, learn about preferences from the behaviour we observe when individuals respond as result of the characteristics they possess or as a result of changes in income, prices, perceptions, environmental factors and circumstances.

A basic theoretical framework of utility maximization in demand for health care and household production of health, therefore, underpins the empirical analysis of most health care demand studies. This approach is similar to that of previous health care demand studies (Getler et al 1987; Orbeta and Alba, 1997; Lindelow, 2002). In this framework, an individual is assumed to derive utility from consumption of health (g) and non health goods (c). In particular, individuals are assumed to have the following utility conditional on using health care provider j .

$$U_j = U(c_j, g_j) \dots \dots \dots (1)$$

The individual is said to maximize this utility subject to two constraints. One is the budget constraint

$$I = c_j + p_j \dots \dots \dots (2)$$

where p_j is the total cost for using provider j and I is the share of the individual in the household budget.⁴ The other is the health production function.

$$G_j = g_0 + q_j \dots \dots \dots (3)$$

⁴ To simplify the notation, the price of the consumption good is assumed to be unity so that C_j is also the total expenditure on consumption goods.

where g_0 is the health status without professional health care⁵ and q_j measures the incremental health benefits from using health care provider j . So for a home or no care option, it is assumed that $q_j = 0$, or equivalently $G_j = g_0$. Using the constraints, the utility function can be expressed as

$$U_j = U(I - p_j, G_j) \dots\dots\dots(4)$$

This equation can then be used as a basis for a random utility model for polychotomous choice. Conditional on being ill, an individual faces J options, each differing from the other in terms of its perceived effectiveness, given the patients constraints. So for choice j , we can define U^* as the level of indirect utility associated with the alternative.

$$U^* = \max (U_1, U_2, \dots, U_J) \dots\dots\dots(5)$$

Since this utility is conditional on a person complaining about his health, it is interpreted as short run demand for health care (Orbeta and Alba, 1997).

However, the assumption of neoclassical economic theory presents strong limitations for practical applications. Bierlaire (1997) states that the complexity of human behaviour suggests that a choice model should explicitly capture some level of uncertainty. Random utility models are therefore based on the deterministic decision rules from neoclassical economic theory, with the uncertainty being captured by random variables.

Ben –Arkiva and Bierlaire (1999) provide an outline of the random utility theory. The assumption in random utility models is that the decision maker has a perfect discrimination capability. However, he is assumed to have incomplete information and as such, uncertainty must be taken into account. The utility, therefore, is modeled as a random variable to reflect this uncertainty. To be specific, the utility that individual i associates with alternative j in a choice set ϕ is given by

⁵ Similarly, we assume that the amount of health care one consumes directly translates to the amount of health status gained such that h_j is being used to represent either of them.

$$U_{ij} = V_{ij} + \varepsilon_{ij}; \quad \text{for } i = 1, \dots, N; j = 1, \dots, J \dots \dots \dots (6)$$

where V_{ij} is the deterministic component of the total utility, ε_{ij} is the random term capturing the uncertainty, N is the number of respondents and J is the number of alternatives. The individual chooses the alternative with the highest utility given the constraints. Therefore the probability that alternative j is chosen by the decision maker i from a choice set φ is the probability that utility from alternative j is greater than the utility from any other choice. That is, $U_{ij} > U_{ik}$. Since U_{ij} is unobservable, a dummy latent response variable, y is defined to take on the values in the set of all alternatives, i.e.

$j \in \varphi = \{1, \dots, J\}$, so that the probability of choosing alternative j is:

$$\begin{aligned} \Pr(y_i = j) \\ &= \Pr(U_{ij} > U_{ik}); \forall k \in \varphi, j \neq k \dots \dots \dots (7) \\ &= \Pr(V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik}) \\ &= \Pr(\varepsilon_{ij} - \varepsilon_{ik} > V_{ik} - V_{ij}) \\ &= \Pr(v_{jk} > V_{ik} - V_{ij}) \end{aligned}$$

The assumptions regarding the distribution of the random term v_{jk} are necessary in making the random utility model operational for empirical analysis. McFadden (1973)⁶ has shown that if the v_{ij} is independent and follows a type 1 extreme value (Gumbel) distribution

$$F(v_{ij}) = \exp(\exp(-v_{ij})) \dots \dots \dots (8)$$

Then the probability that individual i chooses alternative j is

⁶ See Greene (2003)

$$\Pr(y = j) = \frac{\exp(V_{ij})}{\sum_{k=1}^J \exp(V_{ik})} \dots\dots\dots (9)$$

This gives the multinomial logit model. The multinomial logit model (MNL) is based on the assumption of independence from irrelevant alternatives (IIA), which implies that the probability ratio between two alternatives is not affected by the presence or absence of other alternatives. However, when other alternatives are more closely correlated such that they could be grouped in a class, the assumption does not hold. However, McFadden (1984)⁷ points out that empirically, the MNL is relatively robust as measured by goodness of fit and prediction accuracy in many cases where the IIA is theoretically implausible. The MNL is also easy to estimate and interpret. The present study makes use of the multinomial logit model in the estimation procedure.

2.2 Empirical Literature

The perceived nature of illness, socioeconomic status, and the household's asset base determines whether people seek treatment and the type of responses they adopt (Chuma, 2006).

Akin et al (1999), while examining health care facility choice patterns in Sri Lanka (where public facilities have relatively good reputation compared to most countries), find out that people in the highest income quartile choose a non free facility over 54% of the time as compared to only 32% of those in the lowest income quartile. They also find out that contrary to the hypothesis of severity leading to the choice of more advanced levels of care, more severely ill individuals are more likely to choose minor public western facilities and less likely to choose private advanced hospitals. But there is need to demystify whether it is not the case that only the poorer households suffered illnesses that worsened to severe state. As if to lend credence to this hypothesis, the study reports that

⁷ See Lindelow (2002)

for all severely ill, individuals in the lowest income quartile travel further than their counterparts in the highest quartile. Interestingly but rather obviously, the study finds out that the poor tend to travel further for care than the less poor perhaps because they often need to go further to find good care at a price (normally at the point of service since their fare and time lost are normally undervalued, if valued at all) they are willing to pay.

Ngugi (1999) found that one of the major diseases in Kirinyanga district of Kenya was malaria. The assessment was based on community's experience with the disease arising from frequency of the attack to community members as opposed to laboratory diagnosis. Mothers played a big role in family health care in terms of income and cushioning in critical moments secured by her membership to social welfare groups. Teachers were also found to be a crucial factor in diagnosis especially for school going children. Amongst children, it was found that use of public facilities was the major choice for treatment seeking. Education was not found to influence the action taken in times of sickness. Membership to social welfare group rather than income was found to be a crucial factor that cushioned households in times of severe illness. Education level of the household head was found to be associated with the facility choice made with those with lower education level preferring public facilities (47%) more than those with higher levels (29%). Income group was proxied by economic activity and it was found to be a determinant of facility choice where by farmers preferred public facilities as compared to officers and businessmen that preferred non-public facilities.

Non-monetary factors have been found to determine demand for health care. By employing a utility maximization model and using a system of simultaneous equation to predict the demand for free and non-free medical care in New York, Acton (1975) found that non monetary factors such as travel time have a negative effect on the demand for health care and therefore reduce the amount of care demanded even where there are no monetary prices for care. The study also found out that a predicted negative effect of earned income on distance is not supported, but rather persons with high earned income are more likely to use the private sector, which is relatively less time intensive than the

public sector out-patients department (OPD). The study also found out that a negative effect of education on OPD visits and a positive effect on private-physician visits. However, the decrease in the number of OPD visits is only partly made up by increases in the number of private visits so that the net effect in visits produced by an increase in education is negative.

Uzochukwu and Obinna (2004) found out that in Nigeria, malaria was the one major disease affecting the population. The main method of diagnosis was one done at home by the patient and/or family members. Other means of diagnosis was found to be by laboratory tests, community health workers, family members and traditional healers. After diagnosis, 36% had the initial choice for treatment as patent drug dealers, 27.1% from government hospitals, 17.6% in health centers, 11.7% consulted traditional healers, 2.3% private clinics 1.9% from community health workers where as 3.4% had their treatment at home. The study found that much as private facilities were first choice for treatment, there was high level pattern of choice for public facilities as second choice with 71.4% of those who went to secondary facilities choosing public ones. The study found out that the richer households were more likely to use the BI (Bamako Initiative) health centers (where user fees were charged) and that a movement up the income quartile increased the likelihood of using the BI health centers. The least poor were more likely to use general hospitals where as the poorest quartiles were more likely to use patent medicine though there was no significant difference across quartiles. Summarily, the decision as to where to seek health care depends upon many factors including the availability of a provider within the community, reputation of the provider, perceived quality of the services the perceived cause of the disease, cost of treatment, and the arrangements for payment

In the Sudan, Malik et al (2006) found out that many mothers (60.4%) initially responded to fever by seeking advice from sources other than health facilities and 90% of these offered their children a drug. The study found out that mothers delay seeking health care from a health facility by 67.8 hours on average. The transfer of the sick child to a health facility was reported to be only a result of deterioration of the child's condition and the

decision was made by mothers. The options for treatment include visiting health workers, traditional medicine, use of herbs and self treatment. It was found out that health workers would also visit patients in their homes to administer treatment. In times of rainy season, a relative visits a health worker and describes the symptoms and the intensity of the disease and a health worker may accordingly give the relative a drug to administer to the patient. It is a common practice, the study finds out, to self treat. This is mainly attributed to the ability to recognize malaria, high cost of travel and in some cases, lack of health care facilities. The drugs, normally obtained from pharmacies and drug stores in nearby villages and cities were mainly chloroquine, aspirin and paracetamol.

In trying to find out the main determinants of seeking care between the different options in focus group discussions held with women in the area, it was found that severity of the disease, low coverage and/ or performance of health facilities, the expected cost and frequent use of traditional medicine and herbs were responsible for the decision and the pattern of health care seeking.

In a study done in Kenya, Chuma et al (2006) finds that the pattern of sickness varies from season to season with the wet season reporting high incidences of malaria cases. Worth noting is that the health care seeking pattern changes with seasons with more health care sought from government units in the dry season than private clinics and the reverse being true for the wet season. Households with younger children experienced the highest number of episodes, shops were the main source of treatment and least vulnerable households used more expensive private clinics more consistently than other households, who were more likely to use government hospital. The study finds that a bigger cost burden falls on the poor than the rich with the poor spending more than 10% of their expenditure on health care.

Deressa (2007), in Ethiopia, found out that 23% of people that reported symptoms associated with malaria were neither taken to any health facility nor received any form of home treatment. For those who went to health facilities, the first choice was predominantly community health workers followed by public health facilities and private clinics. Private clinics and public health facilities were the main source of anti-malarial

treatment by the majority of the patients during the second (41%) and third (35%) visits, respectively. Within 24 hours of onset, the only diagnosis available was largely by self and/or family members and 76% did not get any type of treatment or intervention within 24 hours but only waited for the next day to seek treatment. When the study compares to similar studies done in Uganda (Ndyomugenyi, 2007) and Kenya (Guyatt, 2004) in areas of similar transmission, home treatment was lower in Ethiopia than Uganda and Kenya.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The estimation of demand for treatment can be achieved by adopting a binary choice model that takes on the value of one when health care is sought and zero otherwise. This model has two major advantages; It fulfills the objective of analyzing situations whether health care is sought or not and can be relatively uncomplicated in estimation. However, a binary choice model has a shortcoming that in the current analysis, it does not enable the analysis of the different choices, which a sick individual makes, inherent in seeking treatment. Therefore, to analyze the choices made by an individual in seeking treatment for malaria, we adopt a multinomial logit approach which, in addition to analyzing whether health care is sought or not, also incorporates the decision to choose different modes of treatment.

Scott (1997) gives a basis on which the MNLM as a probability model can be derived. The derivation is as follows.

Let y be the dependent variable with J outcomes. Although the categories are numbered 1 to J , they are not assumed to be ordered. We assume $Pr(y = m | \mathbf{x})$ to be the probability of observing a particular outcome m given $\mathbf{x}$. The probability model for y can now be constructed as follows.

- Let $Pr(y=m | \mathbf{x})$ be a function of the linear combination $\mathbf{x}\beta_m$. The vector $\beta_m = \{ \beta_{0m} \dots \beta_{km} \dots \beta_{Km} \}$ includes intercept β_{0m} and coefficients β_{km} for the effects of x_k on outcome.
- Since probability can not be negative, we transform the vector $\mathbf{x}\beta_m$ by taking its exponent: $\exp(\mathbf{x}\beta_m)$. The non-negative result, though, violates the $\sum_{j=1}^J \exp(\mathbf{x}\beta_j) = 1$ probability rule.

- The third step, therefore, involves restrictions to make the probabilities sum to 1.

We therefore divide $\exp(x\beta_m)$ by $\sum_{j=1}^J \exp(x\beta_j) = 1$:

$$Pr(y=m | \mathbf{x}) = \frac{\exp(x_i\beta_m)}{\sum_{j=1}^J \exp(x_i\beta_j)} \dots\dots\dots (10)$$

This normalization ensures that $\sum_{j=1}^J Pr(m | \mathbf{x}) = 1$

The problem with the model in (10) is that it is not identified and therefore we cannot obtain a unique set of parameters that generates observed probabilities. This can be shown by multiplying equation 10 by $\frac{\exp(x\xi)}{\exp(\xi)} = 1$ which essentially keeps the value of probability unaltered.

$$\begin{aligned} Pr(y=m | \mathbf{x}) &= \frac{\exp(x_i\beta_m)}{\sum_{j=1}^J \exp(x_i\beta_j)} \times \frac{\exp(x\xi)}{\exp(\xi)} \\ &= \frac{\exp(x_i\beta_m + x_i\xi)}{\sum_{j=1}^J \exp(x_i\beta_j + x_i\xi)} \\ &= \frac{\exp(x_i[\beta_m + \xi])}{\sum_{j=1}^J \exp(x_i[\beta_j + \xi])} \dots\dots\dots (11) \end{aligned}$$

- Although the values of the probabilities have not changed, the original parameters β_m have been replaced by $\beta_m + \xi$. Thus, for every $\xi \neq 0$, there is a different set of parameters that results in the same prediction. Clearly, the model is not identified.
- In order to make the model identified, restrictions are imposed on the β s such that for any non zero ξ , the constraints are violated. This is achieved by constraining one of the β s to equal zero, such that $\beta_1=0$, or $\beta_2=0$, or $\beta_3=0$. The choice is

arbitrary. In the study, we set $\beta_j=0$. Clearly, if a non-zero ξ is added to β_j , the assumption that $\beta_j=0$ is violated.

- Adding this constraint to the model results in the probability equation given as:

$$\Pr(y_i = m | x_i) = \frac{\exp(x_i \beta_m)}{\sum_{j=1}^J \exp(x_i \beta_j)} \quad \text{where } \beta_j=0 \dots \dots \dots (12)$$

- Following Lindelow (2002), the results in this study are interpreted through the analysis of marginal effects and predicted probabilities. This is necessitated by the non-linearity of the model in the explanatory variables, such that the impact of the independent variables on the probability of seeking a particular type of care will depend on the value of those and other independent variables. The marginal effect of variable x on the alternative j refers to the change in the probability of individual i in choosing alternative j as a response to a change in x . Using the multinomial logit model functional form for $\Pr(y_i=j)$, Greene (2003) shows that;

$$\frac{\partial \Pr(y_i = j)}{\partial x} = \Pr(y_i = j) \left[\beta_j - \sum_{k=0}^J \beta_k \Pr(y_i = k) \right] \text{ for } k \neq j, \dots \dots \dots (13)$$

Where β_k are coefficients associated with the variable x . The marginal effect therefore depends on the values of all the independent variables, and the coefficients of each outcome. The marginal effects reported in this paper are calculated at the means of the explanatory variables.

3.1 Model specification

Following previous studies, in particular, Akin et al (1996), Lindelow (2002), Lawson (2004) and from theory, the empirical model to be estimated is specified as follows;

$$\begin{aligned} \text{Prov}_j = & \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Agesq}_i + \beta_3 \text{Maled}_i + \beta_4 \text{Rural}_i + \beta_5 \text{RegionCe}_i \\ & + \beta_6 \text{RegionE}_i + \beta_7 \text{RegionW}_i + \beta_8 \text{Spousehh}_i + \beta_9 \text{Childhh}_i \\ & + \beta_{10} \text{Relativehh}_i + \beta_{11} \text{Log expenditure}_i + \beta_{12} \text{Married}_i + \beta_{13} \text{Oncemarried}_i \\ & + \beta_{14} \text{Prim}_i + \beta_{15} \text{Sec}_i + \beta_{16} \text{Tertiary}_i + \beta_{17} \text{Hsize}_i + \beta_{18} \text{Dist}_i + \varepsilon \dots \dots \dots (14) \end{aligned}$$

The dependent variable: Provider choice

The dependent variable in the analysis is the revealed preferred health care facility that an individual i opted for. The study utilizes the survey question of which health facility the individuals suffering from malaria in 30 days preceding the interview first consulted. Malaria sickness considered in this study is self assessed. From thirteen treatment alternatives from which treatment for malaria was sought, for purposes of estimation, this study purposefully derives four categories namely; (1) Home care/no care (2) Private health provider or pharmacy, (3) Government facility and (4) Traditional healer.

$Prov_i$ can take any of the nominal values 1, 2, 3, 4. We represent these values as a choice set $\varphi = \{1, 2, 3, 4\}$ from which an individual is associated with only one element, j . The choice of j depends on individual and household specific characteristics that include age, education, sex, income, household size, distance to the facility, and area of residence, household headship and marital status; which make up the vector of regressors.

Independent Variables

Age refers to the age of the individual. In a model of health care seeking, the age variable is crucial as it, together with gender, proxies the morbidity status of an individual. It is a continuous variable and proxies the depreciation of health capital (Grossman, 1972), as well as the individual preferences towards health care.

Agesq refers to the square of the age variable. The expectation is that this variable assumes the sign opposite the age variable. This variable is used together with the age variable to capture the non linearity of age reflected by the hypothesized U-shape relationship between age and health care seeking. This relationship connotes that the amount health care sought reduces as an individual advances in age, up to a limit where the health stock of an individual reduces due to old age, and consequently increases for further advancement in age. This is because; it takes greater amounts of health care for a falling stock of health if an individual is to maintain a given level of utility from good health.

Maled is male dummy variable which equals 1 if the sex of the ill individual is male and zero otherwise. This variable captures the morbidity characteristics inherent in being male or female and thereby portraying a difference in their respective need for and use of health care. Lawson (2004) and several other studies have shown that demand for health care differs according to sex.

Rural is a dummy variable for place of residence and equals 1 if rural and 0 if urban.

RegionCe is a dummy variable for central region which equals one if the ill individual is from the central region and zero otherwise.

RegionE is a dummy variable for eastern region which equals one if the ill individual is from eastern region and zero otherwise.

RegionW is a dummy variable for western region which equals one if the ill individual is from the western region and zero otherwise.

Spousehh is the dummy variable for spouse which equals one if the ill individual is a spouse to the head of the household and zero otherwise. *Childhh* and *relativehh* are dummy variables representing whether an individual is a child or relative, respectively, to a household head. These variables capture whether an individual is household head or not and therefore the household headship becomes our comparison category. We expect the health care seeking decision to differ depending on whether one is household head or any of the other categories.

Childhh is the dummy variable for child which equals one if the ill individual is a child/grandchild/stepchild/ to the head of the household and zero otherwise.

Relativehh is the dummy variable for relative which equals one if the ill individual is a relative (niece/nephew/parent to the head of the household or the spouse to the head of the household (other than those already shown above) and zero otherwise.

Log expenditure is the log of mean monthly household expenditure. Expenditure, in this model helps in acting as a proxy for income/ welfare of a household. Stifel (2003) argues that the aggregate of a household's consumption expenditure is a preferred measure of welfare over income owing to the difficulties that surround income measurements in developing countries coupled with the seasonal variability of incomes and the large shares of incomes that are from self employment, in and outside agriculture. The household expenditure is divided by the number of household members to depict the average welfare status of a household. A log transformation is applied to the expenditure variable so as to harmonize it with other variables. According to Grossman (1972), consumers demand for health care should be positively correlated with income.

Married and *Oncemarried* are dummy variables that capture the marital status of an individual. *Married* is the 'married' dummy variable which is equal to 1 if an individual is married and 0 otherwise. *Oncemarried* is a 'once married' dummy variable which is equal to 1 if an individual is widowed/divorced/separated and 0 otherwise. Never married is the comparison category for this variable.

Prim, *sec* and *tertiary* are dummy variables that capture the level of education of an individual. They represent primary education, secondary education and tertiary education levels respectively and the reference category for this variable is 'Never went to school'. Education may affect the preferences of an individual as well as the knowledge of an individual health care type. Grossman (1927b) suggested that if those with more education were more efficient producers of health, education would have a negative coefficient. Several earlier studies (like Lindelow, 2002; Orbeta and Alba 1997) have found this variable to be an important determinant of choice of health care. However, this variable has a limitation since it assumes that the education level of an individual determines his/her health care seeking behaviour even for the incapacitated, the young and the elderly.

Hhsize represents the household size - the total number of people in a household. This variable can have either a positive or negative sign depending on the relative strength of the income effect of household size (Tembon, 1996).

Dist is the distance that an individual travels to the facility/provider of choice for malaria treatment.

We make use of a multinomial logit model to estimate equation (14). Since choice of the estimation procedure requires normalization of the parameters of one of the j 's in the choice set ϕ , we did this by setting the parameters for home/ no care option ($j=1$) to zero.

3.2 Data Source and Analysis.

The study makes use of the UNHS/2005 dataset conducted by the Uganda Bureau of Statistics (UBOS). The analysis is done in two parts. The first part is for descriptive statistics and the latter is econometric. In both analyses, the tool employed is STATA package version 9. Owing to the non linearity of the MNLM, estimation is done using the maximum likelihood method.

3.2.1 Testing for IIA

The application on a multinomial logit model on mutually exclusive and exhaustive outcomes depends on the IIA principle. A Hausman-based test for IIA was done carried out to find out whether the IIA rule holds.

3.2.2 Diagnostic Test

Examining the robustness of the model results is important in checking for any problems that might render the analysis less credible. One important test is examining how well the model fits the data. This test hypothesizes that all the coefficients in the model

$H_0: \beta_{1j} = \beta_{2j} = \dots = \beta_{Nj} = 0$, and is tested against the alternative;

$H_1: \beta_{kj} \neq 0$; for some k ; where $k = 1, 2, \dots, N$.

In maximum likelihood method of estimation, three classical tests; likelihood ratio, LaGrange multiplier and the Wald principles are employed. These tests, asymptotically, have the same distribution and are analogous to the F-test from linear regression. In this study, we adopt the log likelihood ratio which is the simplest of the three.

The significance of the individual coefficients will be tested by the use of the Wald test which is analogous to the t-test in linear regression. It tests the hypothesis that a coefficient is equal to zero, against the alternative that it is not equal to zero.

$$H_0: \beta_i = 0;$$

$$H_1: \beta_i \neq 0.$$

The test statistic is z - distributed as;

$$Z_0 = \frac{\hat{\beta}_i - \beta_i}{ASE(\hat{\beta}_i)},$$

where; $\hat{\beta}_i$ is the maximum likelihood estimator of β_i and ASE is the asymptotic standard error of the estimator. When $H_0: \beta_i = 0$ is true/holds, then

$$Z_0 = \frac{\hat{\beta}_i}{ASE(\hat{\beta}_i)}.$$

The results for the Wald test are reported as p-values in Stata.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents the findings of the study and consequently the interpretation regarding the socioeconomic determinants of health care seeking behaviour. Section 4.1 describes the statistical characteristics of the sample whereas section 4.2 looks at the econometric analysis of health care seeking behaviour.

4.1 Descriptive Analysis

The national household survey administered questionnaires to 42,227 individuals and 7,426 households. Of the total number of individuals, 7,912 reported having self-assessed malaria in the 30 days preceding the interview. However, it is only 7,181 individuals for whom provider choice information was available. The frequency, together with the provider choice for first consultation, is shown in table 4.1 below.

Table 4.1 Individuals with malaria and provider consulted

Sickness reported		Home	Private	Government	Traditional	Total
Fever (acute)	Freq	35	753	379	6	1,173
Fever (recurring)	Freq	23	395	196	3	617
Malaria	Freq	195	3,399	1,777	20	5,391
Total	Freq	253	4,547	2,352	29	7,181
	%(Row)	3.52	63.32	32.75	0.40	100

From the table, of the 7,181 malaria patients, 3.6% had treatment at home or none at all, 63% got medical attention from private providers, and 33% went to a government provider whereas 0.4% consulted a traditional provider. For purposes of this study, individuals are considered to have got malaria if their response for any of the three signs/symptoms of the sickness they suffered from, in the 30 days preceding the interview, included at least any of the following; malaria, acute fever and recurring fever. This is because fever is the commonest malaria symptom. In addition, most other

diseases that may induce fever tend to be identifiable apriori. Therefore, fever which has not been associated with any other disease leaves malaria as the most probable cause. Notably, the malaria considered in this study was self-assessed.

Table 4.2 shows the age distribution of individuals who suffered from malaria and the type of facility visited for treatment.

Table 4.2 Age distribution of the sample and type of provider consulted

Age group		Home	Private	Government	Traditional	Total
0-9	%(Row)	4.74	62.25	32.67	0.34	100
	%(Column)	60.87	44.47	45.11	37.93	45.23
10-19	%(Row)	2.91	66.27	30.35	0.47	100
	%(Column)	14.62	18.54	16.41	20.69	17.71
20-29	%(Row)	2.33	64.89	32.67	0.11	100
	%(Column)	8.30	12.84	12.50	3.45	12.53
30-39	%(Row)	1.92	65.71	31.82	0.55	100
	%(Column)	5.53	10.53	9.86	13.79	10.15
40-49	%(Row)	1.77	61.86	35.48	0.89	100
	%(Column)	3.16	6.14	6.80	13.79	6.28
50-59	%(Row)	3.72	61.16	33.88	1.24	100
	%(Column)	3.56	3.25	3.49	10.34	3.37
60-69	%(Row)	0.54	58.38	41.08	0.00	100
	%(Column)	0.40	2.38	3.23	0.00	2.70
Age $\geq$ 70	%(Row)	4.86	45.41	32.97	0.00	100
	%(Column)	3.56	1.85	2.59	0.00	2.58
Total	%(Row)	3.52	63.32	32.75	0.40	100
	%(Column)	100	100	100	100	100

The ages of the individuals are categorized according to age groups with class width of 10 years. For all the age groups, the type of facility visited was predominantly private

with the lowest utilization level of 45% by the ‘70 and above’ age group (being the only age group with less than 50% usage of private facilities) and the highest of 66% by individuals in the 10-19 age group. On average, private provider choice tends to increase with age up to 19 years, and falling for the age groups 30-39 and above. Government provider choice is highest for the 40-49 age group at 35% and lowest for the 30-39 age group, but the relationship between age and government provider choice does not depict any clear trend. Choice of traditional providers clearly increases with age up to the 50-59 age group after which it becomes nil.

With respect to sex distribution of the sample, females reported more malaria cases than males. 52% of the sample are females where as males are 48%. The provider choice by sex category is shown in table 4.3 below.

Table 4.3 Provider choice for malaria by sex

Provider	Male		Female		Total	
	Freq	Percent	Freq	Percent	Freq	Percent
Home	114	3.37	139	3.66	253	33.52
Private	2,206	65.23	2,341	61.62	4,547	63.32
Government	1,047	30.96	1,305	34.35	2,352	32.75
Traditional	15	0.44	14	0.37	29	0.40

Males sought health care from private providers at a rate slightly higher than females with 65% of males visiting private providers as opposed to 62% for females. However, it can be seen that private providers is a preference of both sexes over other providers.

Looking at the marital status of the sample, 27% of those who reported malaria were married, 6% were widowed/divorced/separated whereas 66% had never married. The provider choice distribution according to marital status of an individual is shown in table 4.4 below.

Table 4.4 Provider choice distribution across marital status of the individuals

Provider	Married		Once married		Never Married		Total	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Home	45	2.29	11	2.43	197	4.13	253	3.52
Private	1,263	64.37	255	56.42	3,023	63.53	4,541	63.31
Government	644	32.82	185	40.93	1,520	31.96	2,349	32.76
Traditional	10	0.51	1	0.22	18	0.38	29	0.40

An analysis of marital status shows that individuals from all the three categories seek health care from private facilities for at least 50% of the malaria cases. The ‘married’ and the ‘never married’ are leading in the utilization of private provider services with 64% each, followed by the divorced/separated/widowed with 56% utilization of private provider services. The married have the highest percentage of traditional provider choice (0.5%), and it is the only marital status category with traditional provider choice that is above the average for the entire sample (0.4%). The ‘never married’ portray the highest tendency to opt for home/no care, with their usage of home care standing at 4%, followed by the divorced/widowed/separated (2.4%) and then the married (2.3%).

The welfare of households is measured by the mean monthly expenditure of each household from which comes an individual that reported having had malaria. The mean monthly expenditure ranges from Ushs 3,057 for the least spending household to UShs 1,239,867 per month for the most spending household. Despite the high income range, 97% of the individuals come from households with mean expenditure of less than UShs 130,000 per month. This is an indicator that malaria is a poor man’s disease.

Table 4.5 shows provider choice variation with welfare of a household as measured by the mean monthly expenditure of a household. Let E be the mean household expenditure.

Table 4.5 Provider choice variation across households with different expenditure levels

Income group ('000' UShs)		Home	Private	Government	Traditional	Total
$0 \leq E < 20$	Freq	56	781	553	6	1,396
	%(Row)	4.01	55.95	39.61	0.43	100
$20 \leq E < 40$	Freq	46	1,354	639	6	2,045
	%(Row)	2.25	66.21	31.25	0.29	100
$40 \leq E < 60$	Freq	14	526	215	7	762
	%(Row)	1.84	69.03	28.22	0.92	100
$60 \leq E < 80$	Freq	9	222	99	0	330
	%(Row)	2.73	67.27	30.00	0.00	100
$80 \leq E < 100$	Freq	9	119	33	0	161
	%(Row)	5.59	73.91	20.50	0.00	100
$100 \leq E < 120$	Freq	1	77	30	0	108
	%(Row)	0.93	71.30	27.78	0.00	100
$E \geq 120$	Freq	5	167	37	0	209
	%(Row)	2.39	79.90	17.70	0.00	100

Access to private provider services is not a preserve of the well off since, as shown in table 4.5, even 56% of the lower income bracket sought medical attention from private facilities. Private providers, though, are more preferred the higher the income group. Usage of government facilities is higher the lower the level of household welfare.

On the regional level, from the sample, 35% are from the eastern region, 24% from central, 24% from western and 17% from northern. Regional distribution of the sample is shown in table 4.6 below.

Table 4.6 Provider choice according to geographical region

Region		Home	Private	Government	Traditional	Total
Central	Freq	58	1,211	479	4	1,752
	%(Row)	3.31	69.12	27.34	0.23	100
Eastern	Freq	75	1,665	738	10	2,488
	%(Row)	3.01	66.92	29.66	0.40	100
Northern	Freq	66	573	546	7	1,192
	%(Row)	5.54	48.07	45.81	0.59	100
Western	Freq	54	1,098	589	8	1,749
	%(Row)	3.09	62.78	33.68	0.46	100
Total	Freq	253	4,547	2,352	29	7,181
	%(Row)	3.52	63.32	32.75	0.40	100

Private provider choice is predominant in all regions. The central, however, leads with 69% whereas the north trails with 48%, also being the only region with less than 60% utilization of private provider services. The northern region, however, leads in utilizing government and traditional provider services with 46% and 0.6% of the people that reported malaria in the region having, respectively, sought first treatment from these providers.

From the perspective of residential substratum, 80% of people who reported malaria were from the rural where as 20% were from the urban.

Table 4.7 shows provider choice according to area of residence.

Table 4.7 Rural-urban substratum and provider choice

Provider	Urban		Rural		Total	
	Freq	Percent	Freq	Percent	Freq	Percent
Home	39	2.73	214	3.72	253	3.52
Private	985	69.07	3,562	61.89	4,547	63.32
Government	396	27.77	1,956	33.99	2,352	32.75
Traditional	6	0.42	23	0.40	29	0.40

Urban dwellers went for malaria treatment, 69% of the cases to private facilities, and 28% to government, 0.4% to traditional providers whereas 2.6% had health care at home or no care at all. The corresponding figures for the rural residents are 62%, 34%, 0.4 and 3.6% in utilizing services from private, government and traditional providers and home care respectively.

From the sample, the minimum household size is 1; the mean is 7 whereas the maximum is 33. Analysis of household size from which comes an individual who reported malaria with respect to provider choice is, in this study, undertaken through comparing the behaviour of the individuals from households of average size with those from smaller and larger households as shown in table 4.8 below.

Table 4.8 Average household size and provider choice for malaria treatment.

Household size		Home	Private	Government	Traditional	Total
Below mean	Freq	102	2,150	1,150	11	3,413
	% (Row)	2.99	62.99	33.69	0.32	100
At mean	Freq	34	524	309	6	873
	% (Row)	3.89	60.02	35.40	0.69	100
Above mean	Freq	117	1,873	893	12	2,895
	% (Row)	4.04	64.70	30.85	0.41	100

Total	Freq	253	4,547	2,352	29	7,181
	%(Row)	3.52	63.32	32.75	0.40	100

From table 4.8, above, 63% of the individuals from households of sizes below the mean seek treatment from private facilities compared to 60% and 65% private provider choice by individuals from the mean and ‘above mean’ household sizes respectively. There is, therefore, a tendency of private provider preference the larger the size of the household. The use of government provider service, on the contrary, tends to fall the larger the size of the household. Home care tends to increase with household size whereas traditional provider choice is highest for individuals from households of average size, followed by those from households that are larger, and then those from smaller than average households.

Table 4.9 shows the education level of the sample under study.

Table 4.9 Level of Education and Provider choice of sick individuals.

Level completed		Home	Private	Government	Traditional	Total
Incomplete Primary	Freq	88	1,863	932	9	2,892
	%(Row)	3.04	64.42	32.23	0.31	100
Primary	Freq	6	279	117	3	405
	%(Row)	1.48	68.89	28.89	0.74	100
Post primary	Freq	12	426	167	3	608
	%(Row)	1.97	70.07	27.47	0.49	100
Secondary	Freq	5	135	50	1	191
	%(Row)	2.62	70.68	26.18	0.52	100
Tertiary	Freq	4	78	22	0	104
	%(Row)	3.85	75.00	21.15	0.00	100
Never went	Freq	25	465	318	3	811
	%(Row)	3.08	57.34	39.21	0.37	100

From the table, we realize that no one of those who had tertiary education sought malaria treatment from a traditional provider but this category ranks highest in having care at

home / none at all. Individuals with secondary education rank highest (0.5%) in the utilization of traditional provider services. Private providers are the most preferred across all education level categories including, even, those who never went to school. However, those who never went to school make the least utilization of private provider services (57%). Individuals with tertiary education reported the highest usage of private facilities (75%) and lowest usage of government facilities (21%). In a nutshell, from the descriptive analysis perspective, individuals who never went to school exhibit no peculiar health care seeking behaviour different from those that attended school other than having the lowest usage of private provider services. However, this is just seven percentage points below the “Incomplete primary” category behind which it trails and seventeen percentage points below the highest private provider services utilizing category - those that have tertiary education.

4.2 Econometric Analysis

4.2.1 Diagnostic Tests

The Hausman test for IIA failed to accept the null that this assumption holds in our model. However, Amemiya (1981) argued that there is an inherent weakness in the multinomial logit model such that this assumption rarely holds. In addition, Cheng et al (2007) argue that tests of the IIA assumption that are based on the estimation of a restricted choice set are unsatisfactory for applied work. Presence of heteroscedasticity is circumvented by the *robust* estimation of the model. By analyzing a correlation matrix of all variables, there were no cases of high correlation between any pair of variables found, other than the *Age* and *Agesq* which is justified by the fact that the latter is directly derived from the former and therefore not threatening -for all intents and purposes. Therefore, multicollinearity was not found to be a problem in our model.

On the basis of the likelihood ratio statistic, the model passed the test for over all significance. That is to say, the model is well fitted. Significance of the likelihood ratio implies that there is at least one non zero regressor for the model and therefore, the probability of an individual seeking health care from any of the facilities is explained by at least one of the explanatory variables in the model

Significance of individual regressors is tested by use of the Z-statistic to see how different they are, statistically, from zero. On the basis of this statistic, the regressors are subjected to test of statistical significance. Where as some of the variables passed the test at the defined level of significance, others did not, as shown by the assigned asterisks and the discussion that follows hereunder. As pointed out earlier, the determinants of health care seeking behaviour will be interpreted through marginal effects. This is because estimated standard coefficients are not very meaningful in economic sense due to non-linearity of the multinomial logit model. The marginal effects are presented in table 4.10 (below).

4.2.2 Econometric Results

Table 4.10 shows the marginal effect coefficients and the standard errors for the model as well as the significance levels.

Table 4.10 Multinomial Logit Results (Marginal effects)

	Private		Government		Traditional	
	<i>P=0.675</i>		<i>P=0.324</i>		<i>P=0.0007</i>	
Variable	<i>Marginal Effects</i>	<i>Standard Errors</i>	<i>Marginal Effects</i>	<i>Standard Errors</i>	<i>Marginal Effects</i>	<i>Standard Errors</i>
Age	-.0027814	.00296	.0025546	.00296	.0002379	.00008***
Agesq	.0000166	.00003	-.0000144	.00003	-2.39e-06	.00000***
Maled	.0463168	.02598*	-.0462803	.02597*	-.0000672	.00051
Rural1	-.021957	.00939**	.0219206	.00939**	.00003	.00021
RegionCE	.1584136	.02986***	-.1576853	.02985***	-.0006643	.00047
RegionE	.1821307	.02761***	-.1815583	.02759***	-.000521	.00042
RegionW	.136067	.02866***	-.1352186	.02865***	-.0008058	.00049*
Spousehh	-.0298678	.03644	.0298405	.03643	-.0000114	.00055
Childhh	.0278745	.05385	-.0319335	.05386	.0039734	.00258
Relativehh	.1204175	.04398***	-.1241649	.04367***	.0036752	.00437
Log expenditure	.0735784	.01781***	-.734112	.0178***	-.0001146	.00037**
Married	.1058718	.05446**	-.1061665	.05447**	.0001417	.00036
Oncemarried	.0135066	.05557	-.0228356	.05556	-.0006059	.0004
Prim	.0135066	.02552	-.0172972	.0255	-.0000215	.00039
Sec	.0183435	.04203	-.0128369	.04201	-.0000775	.00064
Tertiary	.0590549	.05916	-.0566044	.05916	-.0023134	.001**
Hsize	.0096796	.00287***	-.0096752	.00287***	-8.73e-06	.000005

Distance	-.0098194	.00244***	.0098482	.00244***	.0000144	.000001
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*denotes significance at 10% **denotes significance at 10% ***denotes significance at 10%

4.2.3 Discussion of Econometric results

Health providers were purposefully categorized into four, namely; private, government, and traditional and home/no care. Home care is our comparison group and therefore its coefficients are normalized to zero. From the sample under study, the probability of an individual seeking first treatment for malaria from a private, government, traditional provider or at home is 0.675, 0.324, 0.0007 and 0.0003 respectively.

Though age tends to increase the probability of seeking health care for malaria from a government and traditional provider and reducing the probability of seeking health care from private a provider, the variable is only significant for the traditional provider. It has a positive sign implying that evaluated at the mean age; an increase in age of an individual by one year increases the probability of seeking health care for malaria treatment from a traditional healer, by 0.00024. The square for age is also significant for the alternative traditional provider but is negative. This implies that at higher levels of age, the probability of seeking health care for malaria treatment from a traditional provider reduces with further increase in age. The behaviour of the age variable in seeking malaria treatment for malaria from a traditional provider, in Uganda, follows a converse behaviour from the popular one, in health care seeking studies, pioneered by Grossman (ibid). This relationship between age and health care seeking for malaria treatment could be attributed to the *Homapak*⁸ strategy whereby homes are supplied with essential malaria drugs which may create a tendency for young children and very old individuals to mainly rely on home treatment as the initial health attention in cases of self/home assessment of malaria. This is because these age groups may rely on other household members for a decision to seek care from a non home alternative, since they are generally dependants, a situation that may materialize rather belatedly.

⁸ Involves availing to homes, a combination of drugs for defined malaria dosages as a way to reinforce home-based management of malaria fever.

The sex of an individual, in our regression, is captured by the male dummy. The marginal effect coefficient for this dummy is significant for both the private and the government provider type; positive for the former but negative for the latter. It is, however non significant for the traditional provider type. This could be interpreted that the probability is higher that males will seek malaria treatment from a private provider than females but lower for a male seeking malaria treatment from a government provider than for a female. There is, however, no significant difference in the probability of seeking malaria treatment from a traditional provider across sexes. The fact that males seem to have a greater access to quality (paid-for) health care for malaria treatment than females (from private provider) gives yet another dimension of gender inequality biased against the female gender.

The marginal effect coefficient for the area of residence (reflecting the rural-urban dichotomy) dummy is significant for the private and government provider types but not significant for the traditional. The effect is positive (0.219) for the government but negative (-0.219) for the private provider. This implies that chances are higher that an individual in an urban setting, compared with the rural counterpart, will seek malaria treatment from a private provider but lower in relation to seeking treatment from a government provider. From the results, a noteworthy dimension is that the difference in the probability of seeking malaria treatment from a private and government provider for an individual in an urban area on one hand, and another one in the rural area, on the other; is mutually offsetting. That is to say that, on average, the probability is higher, by 0.219, that an individual in an urban area will seek malaria treatment from a private provider over his/her rural counterpart but lower by the same amount for an urban dweller is seeking treatment from a government provider. These findings are supported by the likely higher incomes in urban settings that not only attract private providers to the area but also enable affordability-motivated higher preference for quality health care associated with private providers. On the contrary, rural areas tend to attract fewer private providers than urban areas due to low incomes.

There are four regions in Uganda namely; the northern, eastern, central and western region. For this analysis, we take the northern region to be the control region. This is because the area has suffered infrastructural and institutional breakdown due to the armed conflict that has ravaged the region for more than two decades. Econometric results show that the marginal coefficients, for regional utilization of health care for malaria treatment, are significant for the private and government providers across all regions but not significant for the traditional provider choice, save for the western region alone. The coefficients are positive for the private providers and negative for the government provider type. This implies that individuals in the eastern, central and western region, when compared to their northern Uganda counterparts, have higher probability of seeking malaria treatment from a private facility and lower probability of seeking health care from a government provider. People in the central region have the highest probability (0.138) of seeking health care for malaria from private facilities, followed by those from eastern (0.13) and then those of western (0.102) over those from northern in seeking malaria treatment from private providers. This could be because of the fact that, in northern Uganda, private providers may be fewer than other regions since, even, incomes are likely to be lower in this region than in other regions. Therefore, it's only practical that the major alternative for malaria for the people in the northern region is largely government. On the use of government facilities, the probability is lowest for the central region (by 0.137), followed by eastern (by 0.1294) and then western (by 0.102). On the use of traditional health care providers for malaria treatment, it is only the western region that has a significant difference in probability from that of the northern region. On average, the probability that an individual from the western region will seek malaria treatment from traditional health provider is lower than that of a northern Uganda counterpart (as well as other regions) by 0.0008.

Analyzing health care seeking behaviour for treatment of malaria from the perspective of household headship and the relationship of an individual therewith, the significant results we get are for a relative; from a private provider (positive) and government facility (negative) and non-head/non-spouse/non-child/non-relative (other) when seeking treatment from a traditional provider (positive). This implies it is only relatives of a

household head that portray behaviour in seeking malaria treatment that it is different from that of the head of the household. Being a relative to a household head is, therefore, associated with higher (by 0.12) probability of seeking treatment for malaria from a private facility and lower probability than the household head in seeking treatment for malaria from a government facility. Higher preference for private providers by relatives may be because relatives in a household may face lower spending obligations than household heads. Therefore, given an ability to earn, relatives in a household may dedicate more funds to paid for health care (private) than household heads.

The welfare of a household, in the present study is proxied by household expenditure. In this study, econometric results show that higher welfare of a household is associated with higher probability of seeking malaria treatment from a private facility and but lower probability of seeking malaria treatment from government and traditional providers. Evaluated at the mean level of expenditure, an increase in household welfare by one shilling increases the probability of seeking treatment for malaria from a private facility but reduces the probability of seeking treatment from government and traditional providers by 0.73% and 0.0001% respectively. Owing to better quality of health care expected in private facilities, individuals from households with higher welfare levels tend to demand health care from private providers and less from the government and traditional providers.

In this study, marital status of an individual is categorized into ‘never married’, ‘once married’ and “married” and ‘never married’ is our comparison category. Marginal effects coefficients are significant for the ‘married’ in seeking treatment from private (positive) and government (negative) but insignificant in choosing a traditional provider. The coefficients are also non significant across all alternatives for the divorced/separated/widowed individuals. This implies that, on average, being married is associated with higher (lower) probability of seeking treatment of malaria from private (government) provider compared to having never been married. On the other hand, being separated/widow/divorced is not associated with a difference in probability of seeking malaria treatment from those individuals who have never married.

The level of education is, in this study, purposefully categorized into those who never went to school, those who completed primary, those who completed secondary education and those who have tertiary education. For all the dummy variables that capture the level of education of an individual, it is only the tertiary one that is significant and negative for the traditional provider. This implies that there is no significant statistical difference in the malaria treatment seeking behaviour brought about by differences in education levels other than a reduction in the probability of seeking treatment from a traditional provider that reduces by 0.0023 if an individual possess tertiary level of education. This behaviour may result because the effect of the education level of an individual is overridden by other factors like income, area of residence and age that may be less correlated with education level in seeking treatment from a private or government provider but statistically reflects (negatively) on seeking the same from a traditional provider. Traditional medicine men/women are usually associated with the spiritual world deeply rooted in traditions and culture which individuals get more detached with the higher the level of education.

The study, also, investigates the effect of the size of a household, from which an individual comes, on malaria treatment seeking behavior. This variable has significant coefficients for the private (positive) and government (negative) provider types but is statistically not significant for the traditional healer. The household size coefficient suggests that at the mean size of household in this sample, an increase in the size of the household by one individual (for an extra person joining the household), increases (reduces) the probability of seeking treatment for malaria from a private (government) facility by 0.097. This seems to suggest that at the mean household size, an increase in the household size by one reduces the probability, for an individual in that household, of seeking treatment for malaria from a government facility by the same amount it increases the probability of going to a private facility as a result of the same change in the size of the household. This behaviour could be associated with inefficiencies in government facilities which lead to long waiting hours when seeking health care. This discourages members of large households especially in cases where parents (caregivers) have to

dedicate time between care giving and working so as to be able to fend for the large family. This creates a tendency whereby individuals from large households will mainly go to pharmacies/shops or private clinics, where care provision of health care is largely expeditious, so that they can spare some time to work for the large families.

Ease of physical access to a facility is, also, hypothesized to affect the probability of seeking care from a given facility. Physical access can be proxied by the distance/transport cost to a facility. In this study, we capture physical access by the distance to the facility that an individual went to for first health care attention of the malaria episode. The coefficient is significant for both private and government providers but positive for the latter and negative for the former. Results show that, evaluated at the mean distance travelled for malaria treatment seeking, an increase in the distance to the facility by one kilometre reduces the probability for seeking treatment from the private provider by 0.0126 and increases the probability by 0.1327 for the government providers of health care. The findings are supported by the fact that, generally, people bear long distances to seek health care in government facilities as opposed to private provider services. This is because of the fact that people, especially the poor, tend not to value time cost when seeking health care as long as the fee for service is nil/low. Much as physical access is a big issue to consider in health care provision policies, it hinders utilization of private provider services more than government ones. Long distance and travel time discourage seeking of health care (paid-for) and, therefore, reduces the probability of going to a private provider for treatment. Owing to low popularity of traditional health providers, and undesirability of home care in Uganda, private and government health care services tend to be close substitutes in the sense that shunning one on the part of patients, almost, means adopting the other. This situation is, however, likely to be applicable in switching from private to government than from government to private and could be the reason why distance is negatively related to seeking malaria treatment from private provider but positive for government providers.

4.3 Health care seeking behaviour according to formal-informal provider type

4.3.1 Results

Table 4.11 Multinomial Logit Results (Marginal effects for formal/informal provider categorization)

	Formal		Informal	
	<i>P=0 .997</i>		<i>P= 0.0026</i>	
Variable	<i>Marginal Effects</i>	<i>Standard Errors</i>	<i>Marginal Effects</i>	<i>Standard Errors</i>
Age	.0001127	.00013	-.0001127	.00013
Agesq	-1.45e-06	.00000	1.45e-06	.00000
Maled	-.0007765	.00121	.0007765	.00121
Rural1	-.0001319	.00045	.0001319	.00045
RegionCE	.0022389	.00114**	-.0022389	.00114**
RegionE	.0018626	.00104*	-.0018626	.00104*
RegionW	.002341	.00105**	-.002341	.00105**
Spousehh	-.0009142	.00194	.0009142	.00194
Childhh	-.0051403	.0049	.0051403	.0049
Relativehh	-.004968	.0058	.004968	.0058
Log	.0014275	.00082*	-.0014275	.00082*
Married	-.0035758	.00276	.0035758	.00276
Oncemarried	-.0018949	.00403	.0018949	.00403
Prim	-.0007853	.0012	.0007853	.0012
Sec	.0010886	.00201	-.0010886	.00201
Tertiary	.0102308	.00246 ***	-.0102308	.00246***
Hsize	-.000077	.0001	.000077	.0001
Costfee	-7.98e-08	.00000	7.98e-08	.00000
Distance	.0001603	.00014	-.0001603	.00014

*denotes significance at 10% **denotes significance at 10% ***denotes significance at 10%

4.3.2 Discussion

We notice, from table 4.11(above), that when seeking health care for malaria treatment; individuals' choice between formal and informal providers is influenced by region of residence, household welfare level and tertiary level of education only.

Individuals from northern region have lower probability, than their counterparts from the east, central and west, of seeking malaria treatment services from formal health care providers. The difference in probability of seeking treatment from formal providers is

approximately 0.002 for individuals from all other regions over their northern Uganda counterparts. This could be attributed to the war that has ravaged the northern region for two decades which dilapidated institutional and infrastructure both public/social and private. In addition, war situations scare trained service providers both private and government civil servants and the gap created encourages the local people to offer informal health care services. Malaria patients may also find themselves with informal service providers as the more affordable/convenient and/or the only alternative.

Household income/welfare is also another factor that influences individuals' choice between formal and informal health care for treating malaria in Uganda. Evaluated at the mean monthly household expenditure, an increase in average household welfare by one shilling increases the household individual's probability of choosing formal (over informal) health care for malaria treatment by 0.0014%.

Another factor that determines choice of malaria treatment between the formal and informal providers is level of education. However, it is only tertiary education level attainment that has significant influence on choice of formal/informal health care for malaria treatment since, from the results; individuals with primary and secondary level of education do not display a statistically significant difference from those that never went to school.

Aggregation of private and government providers into formal provider category for analysis of health care seeking behaviour between formal and informal health providers leads to fewer significant variables that influence formal-informal provider choice for malaria treatment. Whereas factors like sex, rural-urban residential status, relationship to the head of household, marital status, household size and distance determine health care seeking behaviour at individual provider level, their effect is not significant in determining choice between formal and informal health care providers.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The study undertook to investigate determinants of health care seeking behaviour for malaria treatment in Uganda by focusing on the behaviour of individuals who suffered malaria in terms of making the first consultation for a malaria episode. The response variable was discrete which, therefore, motivated the use of a logistic regression model- specifically a multinomial logit model.

This chapter lays down the conclusions based on the findings and offers policy recommendations that can be made in relation to the fight against malaria. Section 5.1 highlights the summary of findings chapter 5.2 highlights some policy recommendations where as section 5.3 gives the limitations of this study.

5.1 Summary of findings

In the first place, from the findings, it is important to note that the major sources of health care for malaria treatment in Uganda are the private and government providers in this order. The traditional provider option plays a minute role. It is evident that a change in probability of seeking treatment from a provider type is just the inverse but of equal magnitude between the private and government providers. We could, in a nutshell, conclude that the private and government providers tend to be perfectly substitutable in offering health care services for malaria treatment in Uganda.

Despite incorporating individuals who received drugs from a *Homapak* drug distributor, home care choice for malaria treatment accounts for less than 4% of the individuals that self-assessed malaria. Utilization of private provider facilities, in Uganda, for malaria treatment is found to overwhelmingly dominate government and traditional ones. Statistical analysis as well as econometric results shows that private providers remain the major source of the first consultation for malaria patients. It is predominantly private providers that offer first treatment for malaria.

Results show that household welfare is a major determinant of health care seeking behaviour for malaria treatment. Individuals from well-off households tend to seek malaria treatment from private facilities. The results further show that higher levels of welfare of a household increases the likelihood that an individual from that household will seek treatment from a private provider and reduces that of going to a government and traditional provider. Noticeable, too, is that choice of government provider services is higher the lower the level of household welfare.

The study found out that malaria treatment seeking behaviour is influenced by the sex of an individual. Male individuals have higher probability of seeking malaria treatment from a private provider and lower probability of seeking treatment from a government provider. It is therefore important that gender based affirmative action be incorporated in treatment policies to fight malaria. However, there is no significant difference between sexes in seeking malaria treatment from a traditional provider.

The study establishes that distance affects health care seeking behaviour for malaria treatment. Increase in the distance to a facility reduces the probability of seeking malaria treatment from a private provider but increases that of seeking treatment from the government provider. This implies that government providers could be out of physical reach compared to private providers and therefore going to a government facility is associated with bearing long distances to access basic treatment for malaria.

The study finds out that there are differences in the malaria treatment seeking behavior across regions. Specifically, individuals from northern Uganda, when compared to their counterparts in other regions, have lower chances of going to a private provider for malaria treatment.

Results also show that the education level of an individual has a very small role to play in determining health care seeking behaviour for malaria treatment in Uganda. A discrete categorization of education levels of individuals that suffered from malaria shows that it is only tertiary level of education that reduces the probability of health care seeking for

malaria treatment only from traditional providers. This is similar to what was found out, by Ngungi (ibid) in Kenya, that education did not influence the action taken in times of sickness.

Choice of health care for malaria treatment between formal and informal providers is influenced by region of residence, household welfare and tertiary education level attainment. Individuals from higher welfare households have higher probability of choosing formal over informal health care providers. Individuals with tertiary level of education have higher probability of choosing formal health care providers over informal ones whereas individuals with primary and secondary education level do not show a statistical difference, over those who never went to school, in choosing between formal and informal health care for malaria treatment. Individuals from northern Uganda show a lower probability than their east, central and western counterparts in choosing formal health care providers for malaria treatment. Aggregation of private and government providers into formal provider category for analysis of health care seeking behaviour between formal and informal health providers leads to fewer significant variables that influence formal-informal provider choice for malaria treatment. Whereas factors like sex, rural-urban residential status, relationship to the head of household, marital status, household size and distance determine health care seeking behaviour at individual provider level, their effect is not significant in determining choice between formal and informal health care providers.

5.2 Policy recommendations

Since private providers have been found to be the preferred source of malaria treatment, it is pertinent that the government puts in place policies that motivate, regulate and support private providers so as the latter can offer affordable and better quality health care. The government ought to consider private providers not only as partners but also as the most preferred option for treatment and therefore policies that are directed at the fight against malaria should intensify private – government partnership in health care provision.

From the findings, it is shown that individuals from poorer households have higher mostly opt for government provider for first treatment of malaria. This implies that improvement in quality of government facility may help promote access to health care of the less privileged and therefore a channel for equitable provision of health services. The study, therefore, concludes that equity issues of health care provision could be addressed by channeling essential malaria drugs through government facilities directed at benefiting the poor and the less privileged.

Based on the finding that male individuals have greater access to private providers than females, it gives cause to intensify campaigns that target females in provision of health care in general and malaria treatment in particular.

From the findings, it is found that distance to a health facility reduces the probability of seeking health care from private providers, it is important to realize that the government will increase utilization of health care; malaria treatment, in particular, by adopting use of health extension/community workers and encouraging home based management of fever for those unable to access government facilities due to long distance and also for handling emergencies. In addition, the government could consider a subsidy/incentive for private providers that relates to the distance of the providers away from a government facility. This will enable cheaper provision-and therefore access of essential treatment-from private providers for individuals further away from government health facilities.

About the regional disparities in accessing malaria treatment which puts northern Uganda in an unfair position to access private providers, it is paramount that government strengthens security in the region so that private providers may safely provide health care services in the region. Also, in addition to attracting private partners in provision of health care to the region, the government and Non- Governmental Organisations (NGOs) should favour health care budget allocations to the north, especially for malaria interventions.

As found out that the northern Uganda region has lower probability of seeking health care for malaria treatment from formal health providers, it is pertinent that formal health care providers, especially NGOs involved in the health care provision, put more attention to providing services in the region. This will improve access to formal health care which reduces the health risks that normally characterize the informal health care industry.

5.3 Limitations of the study

Despite investigating the health care seeking behaviour for malaria treatment, due to unavailability of data, the study was unable to incorporate provider characteristics like cost at point of service and quality of health care for an individual provider. Provider characteristics would help inform the extent to which individuals access better quality treatment for malaria.

In addition, since health care is not an end in itself but needed to improve health of an individual, practicality of health care seeking behaviour studies would be enhanced by analyzing the extent to which the services utilized improved the health condition of an individual. Unavailability of data on the condition of an individual after treatment, however, did not allow an effectiveness adjusted analysis of health care seeking behaviour, in this study.

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