HEALTH CARE SWITCHING BEHAVIOUR OF THE PATIENTS IN NEPAL: AN ORDERED LOGIT MODEL ANALYSIS

*Shiva Raj Adhikari, PhD**

Abstract

Analysis of health care utilization is becoming ever more difficult as consumer preferences change rapidly and the health care market becomes more complex. A number of studies primarily focused on demand for health care with first consultation of health care providers; however, the consumers have made several visits to the providers without referral from the first provider. The paper utilizes the ordered logit model in compensated demand function with example of Kala Azar (KA) care to understand the demand for health care in switching behaviour of the consumer. The individuals have adopted switching behaviour to minimize the cost of health care; however, due to the treatment failure; the total cost of care has increased with number of visits. Information and service obtaining costs have robustly determined the switching behaviour. The total cost of health care increases with the increase in events of switching behaviour that reduces the economic welfare of the household. The demand analysis of health care, which captures the multiple care seeking events, is appropriate for producing better information for policy maker.

***Key terms**: Kala Azar, switching behaviour, cost minimization, compensated demand, Nepal*

1. INTRODUCTION

Analysis of health care utilization is becoming ever more difficult as consumer preferences change rapidly and the health care market becomes more complex. Nevertheless, the importance of analysis of health care utilization to design evidence based health policy is increasing in developing countries. A considerable amount of researches in developing countries has been conducted in the area of utilization of health services (Gertler & van der Gaag ,1990; Mwabu et al., 1993; Bolduc et al., 1996; Yip et al., 1998; Morey et al., 2003; Dzator & Asafu-Adjaye, 2004; Borah, 2006; Brown &Theoharides, 2009, among others). These studies primarily focused on demand for health care with first consultation of health care providers; however, the consumers make several visits to the providers without referral from the first provider (Gertler, et al., 2000; Nyamongo, 2002). A number of qualitative studies for example, Nyamongo, (2002) have systematically explored the sequential health care utilization patterns. Sequential utilization of health care services is not new in the literature. A number of studies on doctor shopping or hospital shopping or switching behaviour have

* *Mr. Adhikari is Associate Professor of Economics at Patan Multiple Campus, Tribhuvan University, Nepal*

been found in the literature (Boscarino and Stelber, 1982; Savigny et al., 2004; Aikins, 2005). Surprisingly, demand analysis based on sequential visits is rarely found in the literature. The demand analysis based on first consultation of health care providers has a number of limitations, for example, it underestimates the cost of health care services and it does not fully capture the health care utilization patters. One of the primary challenges in developing countries is that public health care services are underutilized and the poor people, compared to the better off, are less likely to utilize the services even though the public health services are targeted to them (O' Donnell, 2007). In this situation, designing health policy based on first consultation of health care services might not produce reliable results.

The paper seeks to provide new insights into the pattern of health seeking behaviour to capture the multiple care seeking of events with example of Kala Azar (KA) care. The objective of this paper is to investigate the various steps of decision-making behavior of the people to identify the effective health care of KA through the use of sequential visits to different health care providers. The paper utilizes the concept of compensated demand function because people want to minimize the cost of health care through switching behavior. KA related diagnosis and treatment services are provided at free of cost at the district hospitals; however they have to pay obtaining cost of services in terms of travel cost, travel and waiting time, that is why, expected health care cost would be high (Adhikari, 2011). Consequently, the switching behaviour for KA care has been increasing. In addition to this, access of information has primary role to reduce switching behaviour or to increase the utilization of free health care services. The switching behaviour increases both the cost and time for the household, increases the risk of diseases to the communities and reduces the allocative efficiency of public resources due to under-utilization of health services.

2. EALTH SYSTEM AND KALA AZAR CARE

Nepal's health care system is hierarchically structured, which could be compared to five –layer pyramid: self care at family level, primary care at below district level, primary care at district level, secondary care and tertiary care, from bottom to top level respectively. Self care is the practice of activities that individuals initiate and perform on their own behalf in maintaining health and make decisions about their health. Primary care at below district level (PCBD) includes sub-health post (SHP), health post (HP) and primary health care centers (PHCC). They provide primarily clinical and preventive services. Primary care at district level includes district hospitals and district public health offices. District hospital provides inpatient, emergency and outpatient services whereas the district public health offices are primarily responsible for preventive care. Secondary care is provided by zonal and sub regional hospital with various degree of specialization and services focusing on curative care. Finally, tertiary care is at the top level of health service pyramid that includes central hospitals, university hospital and large private hospitals. They provide higher degree of specialist services. Public health care providers dominate health care market. However, private health care providers

are in increasing trends. People are receiving various degrees of services from private health providers including private clinic run by the doctors and private hospital and nursing homes among others. Traditional healers, drug stores among others are also playing the role of health care provider in Nepal.

Visceral leishmaniasis, locally known as KA, a neglected tropical disease has been re-emerging as significant health problems in Nepal after its first occurrences in the 1980s, which threatens almost one quarter of the country's population (Bista et al., 2005). The burden of KA falls disproportionately on rural and the poorest segment of the population (Adhikari, et al., 2009). Like in other developing countries, people have choices of health care providers with various degree of quality of care in rural and urban areas; however, qualified health care providers from both public and private sectors are concentrated in urban areas. Diagnosis and treatment services for KA are heavily subsidized by the Government of Nepal and are available only in the public (district and zonal) hospitals. Very few diagnostic services, but not treatment services, for KA are supplied by the private providers. There are at least two reasons that create less incentive to the private providers to provide KA care: first, KA is disease of the poor who do not have better capacity to pay for treatment and public hospitals provide these services free of cost to the people. PCBD provide curative and preventive services free of cost with good coverage in the rural areas. The referral system from PCBD to the district or zonal hospitals has been proposed in the policy (Thapa, 2007), however in practice this has rarely been materialized due to various reasons for examples, there is no incentive system to the PCBD providers to operationalize the referral system; there might be overburden of work to the PCBD providers that discourages them practicing the referral system; it consumes additional time, or people do not follow the referral system in decision making to choose the health providers.

In the event of an illness, majority of individuals seek some type of treatment. The consultation of health care services among the alternatives depends upon the type of illness, access to service provider, time and money prices of health services, economic status of the individual/household, among others. Personal preference is for shopping around among the best available choice, which refers to the people looking for treatment that acts quickly and will cure their illness rapidly. The disease is common but the diagnosis and treatment services are available in limited health facilities, consequently, there are higher possibilities of multiple visits to find the effective care for KA (Adhikari, 2011).

3. VARIABLES AND DATA SOURCES

Sample Size and Data CollectionThe data for this paper were collected from six public hospitals in KA endemic districts (5 out of 12 districts), where diagnosis and treatment services for KA are available. All patients (or caretakers or their representatives or responsible members of the household who were in the hospitals) hospitalized

during study period (October 2008 to December 2008) were respondents of the study; however, all respondents were not captured due to various reasons such as, they were not interested to participate in the study, they could not provide the required information, among others. Eventually, the author collected required information from 367 respondents; however non-response rate was 3.68 percent. Recent official records have shown that in an average 1500 KA cases have appeared in Nepal. The Government of Nepal assumed that less than 5 per cent KA subjects have not consulted health care providers for KA treatment. The sample size thus is representative of population of KA.

Focus group discussions (FGD) in KA endemic areas were conducted adopting the standard guidelines (Finch and Lewis, 2003) to explore the treatment seeking behavior of the people, access of information and health care services, sources of income, socio economic variables, diseases and perceptions among others before designing instruments for data collection. The author developed detailed questionnaire to capture the cost, sources of income, household (HH) size, individual characteristics, and information related KA among others. The author trained two researchers: an experienced researcher who was working in the same hospitals ensured standardized performance by sharing between each other. The author closely observed daily activities of KA patients, caregivers and other members of the HH when he or she was in hospital at least 13 days. The author developed good relation with them and had many informal meetings when they had free time. The author followed an approach similar to Attanayake et al. (2000), during the free time, that the researchers, informally, move on to more detailed discussions about agriculture, harvesting, livestock, outside work during the off time of agriculture work, individual occupation of HH member and other possible sources of income that help to receive more accurate information on HH income. The author developed a roster on daily basis for each patient to collect the cross sectional data related medical costs, travel costs, food costs, borrowing loans and other costs borne by the HHs in the course of KA treatment and socio-economic characteristics of the HHs and individual were also obtained, through administration of a pre-designed and pre-tested questionnaire to the HH head as a financer, adult patient, or caretakers, to all, as far as possible to minimize the recall bias.

The author collected data from the hospital to minimize the recall bias and to avoid the problem of self reported illness (Akin et al., 1998). On the other hand, there might be questions in collecting socio economic data in the hospital that are not directly related to hospital or treatment. In this regards, several procedures and triangulation methods that comprises of iteration process of finding reliable data have been adopted to insure the validity and reliability of collected data. The author adopted participatory activities in order to maximize validity of data. If any missing or incomplete or doubtful data were found, the author conducted interview again to the same respondent or other member of the same household. A codebook was created to manage the quantitative data. Survey data were double-checked before and after being entered on daily basis

into the Census and Survey Processing System (CSPro.3) software package onto the computer. SPSS version 18 and STATA 10.2 were used for data management and analysis.

3.1 Model specification

The fundamental questions are that how individuals perceive the allocation of cost among the health care providers and why those providers are chosen for the multiple visits. Consumers are rational and have alternatives to choose type and place of health care services. Based on their health status, the consumers are capable to decide whether to make visit to another provider or not or they can decide themselves how many visits to make in different providers to improve their health. By understanding, the utility depends on improvement in health and consumption of goods and services other than health care. The individuals visit the providers until their health does not improve. Therefore, health production is related to entire visit to the health providers; however, utility is independent of number of visits, but related to improvement in health. Therefore, the health production function is composed of choice of available providers and numbers of visits to the various providers to improve health and characteristics of the consumers. The individual does not make a plan to visit various providers, but s/he thinks about the possibilities of multiple visits because of uncertainty in health improvement. Therefore, s/he prepares for allocation of budget for available choices of health providers.

The concept of behavioural model, in this study, is derived from the previous works, such as Borah (2006), Dzator and Asafu-Adjaye (2004), Bolduc (1996), Ching (1995), Mwabu et al. (1993), Gertler, and van der Gaag (1990), among others. Utility depends upon the health and consumption of goods other than health care based on the idea developed by Grossman (1972). In the event of an illness from KA, the expected utility of individual is conditional on receiving care from the medical care provider (j) depends upon expected improvement of health status (H) and upon consumption of goods other than medical care (C) that can be expressed by:

$$U_{ij} = U(H_{ij}, C_i) \cdots\cdots\cdots \quad (1)$$

i= 1,2,…..n ; j= 0,1,2,…..J

H_{ij} is the expected improvement of health status of individual i after consulting medical care j.

C_i is individual's consumption of other goods and services. It is assumed that the utility function satisfies the following conditions:

$$U_c > 0, U_{\mathbf{c}} < 0, U_H > 0, U_{\mathbf{H}} < 0$$

The paper supposes that the health status of the individual with KA depends on the type of treatment services (M) received. Further, his innate resistance to KA, which in turn depends on the individual's socioeconomic characteristics (X), determines the individual's health. In other words, quality of providers or improvement of health may vary with characteristics of both health care provider and individual. The health production function, thus, can be written as:

$$H_{ij} = H\ (M_{ij}, X_i) \cdots\cdots\cdots\cdots (2)$$

The health production function exhibits $H_m > 0, H_{mm} < 0$. Y_i is annual household income. k_{ij} indicates total prices of medical care including price of services, travel cost, monetary value of travel and waiting time and q_i is the price of consumption of composite goods other than medical care (C_i). Thus, the full budget constraint is faced by the individual is,

$$Y_i = k_{ij} M_{ij} + q_i C_i \cdots\cdots\cdots (3)$$

Again, the total price (p_{ij}) of obtaining KA care from provider *j* can be expressed as

$$p_{ij} = k_{ij} M_{ij} \cdots\cdots\cdots\cdots (4)$$

Setting the price of the composite goods (numeraire good), q_i equal to unity, and it is assumed that the sum of consumption and price of health care must be less than or equal to household income. Hence, the budget constraint becomes,

$$C_{ij} = Y_i - p_{ij} \cdots\cdots\cdots\cdots (5)$$

Under these assumptions, the indirect utility function of the consumer can be written as in terms of health status and budget constraint, from equations (1) and (5), it gives

$$U_{ij} = U(X_{i;} Y_i - p_{ij}) \cdots\cdots\cdots\cdots (6)$$

The random utility models (RUMs) introduce the concept that choice behavior is fundamentally utility maximization problem. The indirect utility function depends on the factors that are partially observed by the researcher.

$$U_{ij} = V_{ij} + \varepsilon_{ij} \cdots\cdots\cdots\cdots (7)$$

where, V_{ij} depends upon the deterministic components of the utility and ε_{ij} represents unobserved factors from the researcher prospective. The discrete choice model is conditional on receiving health services and random elements ε_{ij} enters linearly into the

conditional indirect utility function and non-linearly into the conditional expenditure function. There is constant marginal rate of substitution between health and income, the meaning is that there is no income effect in choice of health care providers. Income itself cannot appear as an explicit variable in the discrete choice model under no income effect assumption. Therefore, log of the consumption other than medical care enters into the utility function as quadratic function. Hence, the indirect utility function is:

$$V_{ij} = \beta_{0j} + \beta_{1j}\{\ln(Y_i - p_{ij})\} + \beta_{2j}\{\ln(Y_i - p_{ij})\}^2 + \beta_{3j}X_i + \varepsilon_{ij} \quad \text{..... (8)}$$

The functional form for the prices and income is quadratic in the logs net income from equation (8) :

$$f(Y - F_j) = \beta_1\{\ln(Y - F_j)\} + \beta_2\{\ln(Y - F_j)\}^2$$

In the discrete choice model, the observed choice depends on the difference in utility and not on the level of utility per se. The function will be very similar across options as costs are small relative to income resulting that complication will occur in the process of optimization(Sahn et al,2003). The function comes close to:

$$f(Y - p_j) = \beta_1\{\ln(Y - p_j)\} + \beta_2[\ln(Y - p_j)]^2$$

$$= \beta_1 \times \{\ln(Y) + \ln(1 - p_j/Y)\} + \beta_2 \times [\ln(Y) + \ln(1 - p_j/Y)]^2$$

$$= \beta_1 \times \{\ln(Y) + \ln(1 - p_j/Y)\} + \beta_2 \times [\ln(Y)^2 + 2\ln(Y)\ln(1 - p_j/Y) + \ln(1 - p_j/Y)^2]$$

$$\approx \beta_1 \times \{\ln(Y) - p_j/Y)\} + \beta_2 \times [\ln(Y)^2 + 2\ln(Y)(p_J/Y)]$$

Both ln(y) and its square are constant across the choices; the difference in utility will be given two coefficients of interest:

$$\approx \beta_1 \times \{-p_j/Y\} - \beta_2[2\ln(Y)(p_j/Y)] \quad \textbf{..... (9)}$$

The reduced form of the model that allows utility to vary by the alternatives can be written as:

$$V_j = \beta_{0j} - \beta_{1j}\{p_j/Y\} - \beta_{2j}\{2\ln(Y)(p_j/Y)\} + \beta_{3j}X + \varepsilon_j \quad \text{.....(10)}$$

This model can be applied for estimation of demand for health on the basis of the first visit to the provider (Gertler et al., 1987; Sahn et al., 2003).

The paper assumed that the consumer has consulted more than one health care provider to find the effective treatment of KA. If there are multiple visits to the different providers other than public hospital (that is switching behaviour), the utility function can be derived in similar ways to the first consultation, second consultation and so on.

It is assumed that if the consumer directly consulted the public hospitals as the first consultation, switching behaviour is equal to zero, and a number of consultations other than public hospitals are the events of switching behaviour. For events of switching behaviour by individual, the equation similar to equation (10) can be written as,

$$V_{0j} = \beta_{0j} - \beta_{1j}\{p_{0j}/Y\} - \beta_{2j}\{2\ln(Y)(p_{0j}/Y)\} + \beta_{3j}X + \varepsilon_j$$
$$V_{1j} = \beta_{0j} - \beta_{1j}\{p_{1j}/Y\} - \beta_{2j}\{2\ln(Y)(p_{1j}/Y)\} + \beta_{3j}X + \varepsilon_j$$

.....……..

…….....……

$$V_{nj} = \beta_{0j} - \beta_{1j}\{p_{nj}/Y\} - \beta_{2j}\{2\ln(Y)(p_{nj}/Y)\} + \beta_{3j}X + \varepsilon_j$$

The cost will be subject to change with the events of switching behaviour and health care alternatives and utility is maximum attainable in the alternatives. Now it becomes dual problem where determining variables are utility and prices but not the alternatives, price. Therefore, the objective function is switching behaviour that is monotonically associated with total cost of health care. The dual function, thus, is cost minimizing demand function, which is known as Hicksian or compensated demand function. The cost function and indirect utility function are intimately related. Utility maximization and cost minimization must imply the same choice (Deaton & Muellbauer, 1980).

However, the derivation of compensated variation is slightly different in discrete choice models compared to the continuous choice model. For example, if the price of a good falls, according to continuous choice theory the compensating variation is equal to the change in cost of buying the good, however in the discrete choice model, compensating variation is equal to the change in its cost times the probability of selecting it (Hanemann, 1982). As already mentioned, discrete choice model is conditional on receiving health services and random elements ξ_j enters linearly into the conditional indirect utility function and non-linearly into the conditional expenditure function. Under this assumption, ordinary demand functions coincide with compensated demand function (Hanemann, 1982). This allows for further interpretation of the

model. The individual does switching behaviour to minimize the cost of health care, however consulting to other than public hospitals result in treatment failure because KA diagnosis and treatment services are only available in the public hospitals. The objective function is cost minimization; however, the individuals make more visits to the health providers due the perceived quality of services that is unobserved part of the discrete choice model. In this case, switching behaviour has negative association with cost of each consulting health care provider and positive association with total cost of health care of KA. Thus, the cost minimization demand function can captures more than one consultation of health care providers and total cost of health care.

$$Q_k = \alpha_{0k} - \alpha_{1k}\{P_k/Y\} - \alpha_{2k}\{2\ln(Y)(\sum P_k/Y)\} + \beta_{3k}X + \varepsilon_j \ldots\ldots (11)$$

The variable of interest is the number of events of switching behaviour that the consumers will complete before consulting the public hospital. If the individual has visited to the public hospital at the first visit, the switching behaviour is equal to zero. If the individual visits first time to the health care provider other than public hospital, the switching behaviour is equal to one. If the individual has consulted two providers before visiting to the public hospital, the switching behaviour is equal to two. This procedure creates natural order such as 0,1,2,3 … N; however, difference between one and zero; and two and one are not equal (i.e., 1-0 ≠ 2-1). The paper applied ordered logit model that is derived from the RUMs to analyze the cost minimization demand function. Ordered logit model can be expressed in terms of an underlying latent variable L*. Here this can be interpreted as the individual's "events of switching behaviour". The higher the value of L*, the more likely they are to report a higher number of events of switching behaviour. The explanatory variables are introduced into the model by making the latent variable L* a linear function of the X's. In the logit model, the error term is logistically distributed on ordered alternatives. For every low L*, total cost is low; for L* > α_1, total cost increases to fair; for L* > α_2, it increases further and so on if there is additional event of switching behaviour. Following Cameron and Trivedi, (2005), the model can be written as

$$L_{i=j} \quad \text{if } \alpha_{j-1} < L_i^* \le \alpha_j \quad j = 1.....m$$

Where, $L_i^* = \chi_i'\beta + \varepsilon_i$

Where, $\alpha_0 = -\infty$, and, $\alpha_m = \infty$

$$\Pr(L_i = j) = \Pr(\alpha_{j-1} < L_i^* \le \alpha_j)$$

$$= \Pr(\alpha_{j-1} < X_i'\beta + \mu_i \le \alpha_j)$$

$$= \Pr(\alpha_{j-1} - X_i'\beta < \mu_i \le \alpha_j - X_i'\beta)$$

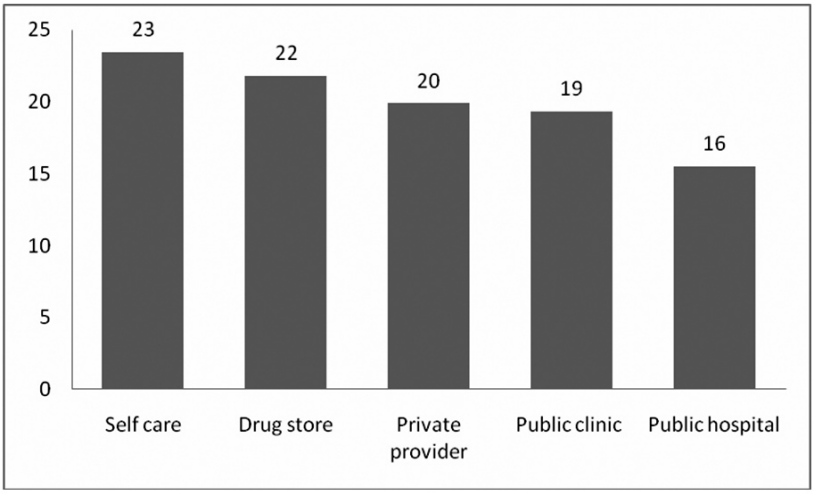
$$= \Psi(\alpha_j - X_i'\beta) - \Psi(\alpha_{j-1} - X_i'\beta)$$

Where, Ψ (.) is cumulative distribution function of μ_i . The regression parameter β and (m-1) threshold parameters $\alpha_1\alpha_2.....\alpha_{m-1}$ are obtained by maximizing the log-likelihood. μ is logistic distributed with $\Psi(\alpha_j - X_i'\beta) - \Psi(Z) = \varepsilon^z/(1+\varepsilon^z)$.

a. Variable Definitions and A Priori Expectations

There are five choices of health care providers: self care, drug store, private clinic or hospital, public clinic and public hospital and their percentage distribution based on first visits are presented in the following figure 1. The paper hypothesized that first visited health care providers have effect on events of switching behaviour. If the health care alternative provides better suggestion to the individual for diagnosis and treatment of KA, events of switching behaviour will be decreased, otherwise vice-versa. The suggestions from the self-care will coincide with the decision of individual to consult the health care providers. The paper therefore uses three dummy variables: drug store, private provider and public clinic as explanatory variables to analysis demand for health care.

Figure 1: Choice of Health care providers in the first health seeking effort



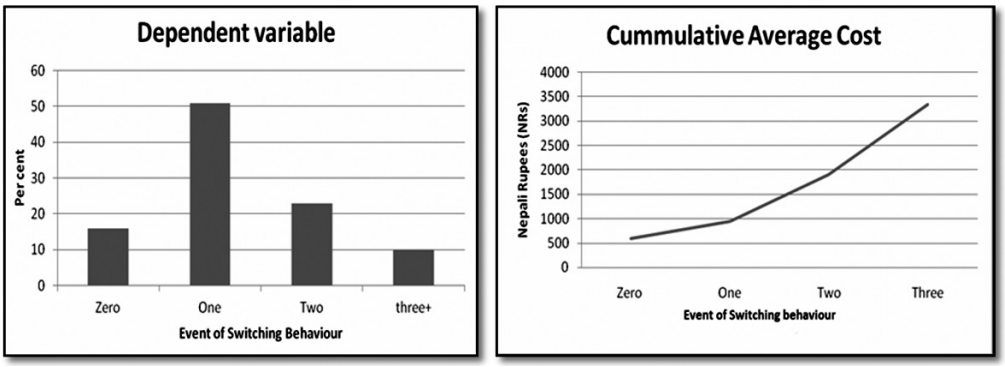
Among the 367 subjects, 16 percent visited to public hospital, 19 percent visited to public clinic (SHP,HP and PHCC), 22 percent visited to private hospitals of clinics and 23 percent subjects used home treatment within the period of two weeks after having sign and symptoms of KA at the first consultation of health care provider. In the first consultation, only 16 percent individuals found effective care for KA. Remaining 86 percent individuals had to make at least second consultation. In the second

consultation, 51 individuals found effective care of KA. Again, 33 percent individuals were trying to find effective health care provider. In the third consultation, 23 percent individuals visited to public hospital that meant they found proper health of KA. 10 percent individuals were still in searching effective health care providers. Eventually, after fourth or fifth attempts to health care providers, they found effective health care providers. This suggests that health care utilization pattern shows multiple attempts, as it is not completed within the first consultation.

In the public hospital, diagnostic and treatment services are provided free of cost, however individuals have to pay associated cost of treatment and medicine and travel cost. At the first consultation to the health care providers, the direct payments included treatment cost, medicine cost, consultation fee and travel for each provider: average cost for public hospital was NRs 527, average cost for public clinic was NRs 238, average cost for private provider was NRs 663 and average cost for drug store was NRs 288. There is no direct payment for self care. Non-monetary cost, opportunity cost of travel time and waiting time for all providers have to be paid. However, people have to scarify more opportunity cost for public hospitals. The paper used both direct payment and opportunity cost for estimation of cost of services.

The dependent variable is events of switching behaviour. There are four dependent variables: zero-switching behaviour, one-switching behaviour, two- switching behaviour and three-switching behaviour. The paper came across the individuals who have made more than five attempts to approach health care provider other than public hospital in one episode of KA, however we used data up to three events of switching behaviour to make adequate sample size for analysis.

Figure 2 (a) and (b): Events of switching behaviour and Total cost



Based on the economic theory, the paper hypothesized that switching behaviour for health care of KA depends upon the household income (or total cost of care),

prices of health care providers, information about KA and household and individual characteristics. A priori, the paper expects a negative relationship between prices of each event of switching behaviour. But, it is hypothesized that the events of switching behaviour have positive association with total cost of care. The interactions between price and total cost with income have been presented in the summary results (table 1). The total cost of care is equal to or less than household income therefore; it can be treated as proxy variable of income.

Table1: Summary results of the explanatory variables

Variables	Category	**Mean**	**Std. Dev.**	**Min**	**Max**
Price variable	Continuous	0.076	0.069	0.002	0.367
Total cost variable	Continuous	1.548	1.424	0.045	8.244
Visit to Drug store	Dummy	0.218	0.413	0.000	1.000
Visit to Private provider	Dummy	0.199	0.400	0.000	1.000
Visit to Public clinic	Dummy	0.193	0.396	0.000	1.000
Caste (Dalits)	Dummy	0.490	0.501	0.000	1.000
Household size	Continuous	6.583	2.416	2.000	20.000
Age of patient	Continuous	23.676	16.514	2.000	80.000
Age squared	Continuous	832.520	1026.651	4.000	6400.000
Sex (male)	Dummy	0.578	0.495	0.000	1.000
Marital status (married)	Dummy	0.526	0.500	0.000	1.000
Education (years of schooling)	Continuous	3.757	3.837	0.000	15.000
Information about KA	Continuous	9.172	12.034	-20.000	36.000
Health status (healthy days per)	Dummy	336.003	9.652	285.000	352.000
Perception on KA (risk)	Dummy	0.559	0.497	0.000	1.000

Access to health information is an important factor that allows him or her to make better decisions about medical care (Kenkel, 1990). Information index, therefore, has been developed that reflects signs and symptoms of disease, access of information, transmission and preventive knowledge on KA, among others. The index reflects to thirty eight questions, and the value ranging from 38 for complete information and -38 for complete misinformation. The range of information can be ± 38 however we found -20 to +36 in the real situation. The paper used highest education in term of completed years of schooling of family members because education has spillover effects to make better decision for health care utilization and most of the patients were illiterate. The paper hypothesized that education and information will have positive impact on better decision making to choose the standard care of KA and they have negative association with switching behaviour. HH size affects the production and consumption of HH. Similarly HH size may have effects on demand for health care. Literature suggested

that poor people have higher number of HH size resulting the effect may be positive. Caste has been grouped into two categories: dalit and non-dalit. Dalit means lower occupational caste. Dalits have limited access of development opportunities due to the structural factors of the society. The paper expects that the events of switching behaviour are more prevalent in Dalits. Health status of the individual is measured in terms of number of healthy days in the year after having KA. The paper expects that there will be negative relationship between events of switching behaviour and health status because the individual who is in better health status has time to get more information and can make better decision for health care. Risk perception about KA is a dummy variable. The individual who feels risk of KA is more likely to visit modern care, but it is not clear whether they will choose standard care of KA or not. Therefore, the risk variable will not have clear direction with events of switching behaviour. Theoretically, there exists a u-shaped relationship between health care use and age (Akin et al., 1985). Age reflects experiences as well as the values and norms of the society. Age may be one of the factors to determine the choice of the providers. Other individual characteristics such as gender and marital status may have effects on demand for health because societies or cultural practices show gender discrimination in developing countries. However, there is no theoretical background about direct effects of these variables. These variables generally represent as a taste in the utility function as the channels of the effects are vague, thus the paper cannot predict the effects.

4. EMPIRICAL RESULTS

The paper analyzes the demand for health care based on switching behaviour using ordered logit model. Ordered logit models do not suffer from problem of independence of irrelevant alternatives (IIA) as multinomial logit model but they have a 'parallel regression' or 'proportional odds' assumption. It means that the slope coefficients are identical across each regression (Long and Freese, 2003). Before discussing the interpretation of results, the paper did formal test for proportional odds. The results allow us to analyze data through ordered logit model; test was statistically significant at 1 percent level. In interpretation of the results, the paper focused on at least three types of variables; main variables, confounding variables and control variables, and the paper will discuss accordingly. The result suggests the negative association between switching behaviour and price variables. The probability of switching behaviour increases as to minimize the cost of health care providers. However probability of switching behaviour increases the total cost of care. It is clear that people want to minimize cost of care through consultation of different providers however due to the lack of effective care, eventually; total cost of care has been increased. The choice of provider: drug store, private provider and public clinic might be the confounding variables in this analysis. All providers are responsible to increase the switching behaviour, for example, there is probability of increasing the events of switching behaviour with increase in consulting drug store. It means health care providers are less likely to provide better information for KA care to the people. Remaining variables; particularly individual and household characteristics, could be treated as

control variables. As expected, Dalits are more likely to visit to seek for effective health care of KA. The household size also robustly determines the switching behaviour.

This is meaningful analysis because KA care services are only available in the public hospital. Good health status reduces the switching behavior, in contrary the individuals who know KA is a risky disease do more shopping to get effective health services. The information, most important policy variable as well, has power to reduce the switching behaviour. The people who have information about signs and symptoms of KA, access and availability of services for KA, do not do shopping; they go the public hospital for treatment.

Some other but important variables, such as age, sex, education, marital status have no effects in increasing or decreasing switching behaviour because they are not statistically significant, although some variables have expected sign for example, male. But education has unexpected sign.

Table 2: Cost minimization demand function

Variables	**Coefficients of ordered logit**		**Marginal effects**	
	Coefficients	Std. Error	dy/dx	Std. Error
Price variable	-681.647*	93.620	-93.341*	24.100
Total cost variable	39.567*	5.383	5.418*	1.405
Visit to drug store	3.620*	0.669	0.290***	0.114
Visit to private provider	3.027*	0.723	0.246**	0.108
Visit to public clinic	4.237*	0.705	0.301**	0.115
Caste (dalit)	0.700**	0.423	0.096	0.063
Household size	0.190**	0.085	0.026***	0.015
Age of patient	0.043	0.068	0.006	0.010
Age squared	-0.001	0.001	0.000	0.000
Sex (male)	-0.224	0.418	-0.030	0.057
Marital status (married)	-0.033	0.772	-0.005	0.106
Education	0.064	0.059	0.009	0.009
Information about KA	-0.075*	0.020	-0.010**	0.005
Health status	-0.466*	0.053	-0.064**	0.023
Perception on KA (risk)	0.919**	0.447	0.131***	0.076
/cut1	-154.974	17.708		
/cut2	-144.863	16.897		
/cut3	-132.290	16.054		

P<0.01; **P<0.05; ***P<0.10

Approximate likelihood-ratio test of proportionality of odds across response categories:

chi2(30) = 82.00 Prob > chi2 = 0.0000

a. Elasticity

The elasticity measures the sensitivity analysis of demand for health care of KA that provides percentage change in price that leads to change in demand for health care services, however marginal effects are independent of percentage interpretation. The results demonstrate that demand for health care is quite sensitive with prices. If the price increased in one percent, then that leads to almost nine percent decrease in demand for health care. KA is disease of the poor. Poor are more sensitive to prices therefore they want to reduce their cost of health care through switching behaviour. The discrete choice model captures the quality of services as unobserved part of the utility function. Due to the quality services, total cost of care increases with increase in the switching behaviour. The total cost of care is also more sensitive with switching behaviour. If there is one percent increase in switching behaviour that leads to ten percent increase in the total cost of health care.

Table 3: Elasticities

Variables	Elasticity
Price	-8.53**
Total cost	10.03**

**P<0.05

5. DISCUSSION AND CONCLUSIONS

Better understanding of the underlying process of demand for health care is quite important for producing desired outcomes from the public intervention in the health sector. When the individuals got sick due to KA, they have to decide whether to seek medical care. The medical care is one of the inputs to improve the health status, while the cost of medical care reduces the consumption of other goods and services. The individuals have, therefore, intended to minimize the cost of medical care. They choose one of the health care providers from the available set of alternatives including self-care. The most important issue is that the individual not only have to decide whether to seek care but also what type of care they wish to demand. But there is no certain of expected health outcome from the choices (Arrow, 1963). There are possibilities of visiting different health providers to find the effective care subject to cost constraint. It is important to analyze decision-making process in several steps to look at the utilization patterns of health care services. Multiple care seeking events and switching between the types of providers are common in the developing countries (Mwabu et al., 1993; Savigny et al., 2004), not only due to the uncertainty of health outcomes but also supply constraints.

It is assumed in the first consultation of demand analysis that utilization is satisfied demand, it is independent with supply. Indeed, the reality is different, due the

supply constraints; utilization is not equal to demand. There are many factors that make supply constraints, for example, limited opening time for outpatient services, limited services available in the rural health care providers, or essential health services concentrated to one provider located to urban area have made supply constraints. The public hospitals have provided services at free of cost because the patients are willing to travel to more distant hospital to receive earlier treatment. But, travel time is quite high to reach the public hospital from the remote village. They have intended to consult in the public hospitals but due to limited opening time for outpatient care, eventually they have consulted other providers. In this case, demand is not equal to utilization of services and if the paper analyzes the demand for health care based on first visit to the health care provider, that will produce partial information and health care cost will be under estimated. But due to third party payment, the situation is different in developed countries; people have a propensity to bypass rural hospitals in favor of larger urban hospitals to consume additional services (Varkevisser and van der Geest, 2007; Escarce and Kapur, 2009).

The paper contributes to the demand for health care literatures through introducing the method of capturing the multiple care seeking events. The paper have applied theoretical framework of demand for health as proposed by Gertler and van der Gaag (1990), but with three major differences: first, this study covers the events of switching behaviour, second, this study uses cost minimization demand function- duality of utility maximization, third, this study utilizes ordered logit model. This method is able to produce additional pieces of information for policy makers and researchers and helps better understanding of patterns of health care utilization. Specially, the paper explores the answers of policy related questions, for example, what are the barriers to utilize the free care services; what are the effects of limited choices of effective care; what are the factors to increase the cost of care; what are the policy options to mitigate the existing problems.

The paper has empirically examined the pattern of utilization of health care. People intend to minimize the cost of medical care; however, due to the quality of care, they do switching behaviour. The events of switching behaviour have direct positive relation with the total cost of medical care. Although public hospital provides free services due to the limited access and choices of effective health care of KA, in terms of total medical care people are paying more. The out of pocket payment for KA is, therefore, higher than other tropical diseases and it has greater catastrophic and impoverishing impacts on household (Adhikari et al., 2009).

The body of literatures demonstrated that poor people are more sensitive with prices. The paper find that KA services are more elastic because KA is disease of the poor and more than 90 percent KA household are below poverty line (Adhikari, et al., 2009). The price elasticity is quite high in this study in comparison with general health care, for example Borah (2006) in India, however, if the results compare with specific

services, for example child health services, Ching (1995) and Sauerborn et al., (1994), it is almost similar. One should be careful to compare the price elasticity with other studies because most of the studies used time price only, some of the studies used user fee only, but the paper have used total price of health care including user fee, travel cost, monetary cost of waiting and travel time to analyze the demand for health care. The price elasticity is reasonable and based on actual prices.

The paper finds that information has greater power to make better decision to utilize the health services. The paper finds the result similar to Kenkel (1990) that health information increases the utilization of health care facilities. Sufficient health information has greater role in decision-making process and may help to increase the individual welfare (Thomson and Dixon, 2006). In the absence of sufficient information, the patients make bad decision to choose the health care providers that reduces individual welfare and increase the economic costs. The body of literature has suggested that socio-demographic variables comprised of age, household size, education, caste, beliefs perception about disease among others show the conflicting results regarding the influence on the utilization of health care services (Akin, et al., 1998; Borah, 2006). The results depend upon the study nature, coverage and region of the studies, etc. The variables closely related to poverty for example, caste, household size have negatively associated with utilization of public hospital and positively associated with switching behaviour. But other variables such as, education, gender have no effects on health care utilization. Most of people with having KA are illiterate; therefore education has no role in decision-making process.

The individuals who visited to drug store, private provider or public clinic at the first time are more likely to make multiple care seeking events. It seems that health care providers are not helping to make the better decision to find the effective health care of KA. There is referral system proposed in the policy among the government financed health care providers however it does not seem effective.

All these situations push us to conclude that there is provision of exemption for poor in the public hospital; however, most of the poor are less likely to visit public facilities. The similar study has supported the results that the poorest income quintile group is most likely to seek treatment in the informal sector in Nepal (Sharma et al., 2004).

Although public hospitals have provided services at free of cost however there are rooms for reducing prices (cost) KA care, for example, expansion of KA care up to PHCC that reduces the travel cost and travel time, introduction of demand side financing to encourage use of public hospital services who got KA. There is evidence of introduce demand side financing increasing health care utilization in developing countries (Ensor and Cooper, 2004).

In conclusions, the paper extended the conventional empirical method of analyzing the demand for health care in developing countries, like Nepal. This approach covers the multi stage decision-making behavior to utilize the health care services for KA. This approach explored an interesting story on the services provided at free of cost in the public hospital and also how the people are doing switching behaviour to find the effective/ free health care services. This analysis has produced the pieces of information on the factors determining the demand for health care but also how the out of pocket payment has been increasing in the developing countries although government is still investing huge amount of money in the health sector. Limited choices of health care services and lack of information are the primary factors to increase the switching behaviour and out of pocket payment. Expansion of the services for KA or introducing demand side financing for the neglected tropical diseases, like KA are the appropriate policy options for producing better results.

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