SCIENTIFIC LETTERS

Econometrics Letters Volume (2), 2, 2015, October.

Estimating the attributes of willingness to pay for a community based health insurance scheme in Odisha state, India[1]

Denny John[2]
Vijender Kumar[3]

Abstract

This paper aims to quantify, using an utility maximization approach, the extent to which an attribute affects the decision making process at individual as well as group level for a community based health insurance scheme launched among tribal populations of Madan Rampur block in Kalahandi district, Odisha. Analysis has been performed using mixed logit modeling incorporating conditional as well as multinomial logit models because of the dependency of both the choice specific and the individualistic attributes of the choice maker on the decision making process. The price of the health care insurance plan has been taken as the choice specific attributes, while the gender ratio of group, average age along with male, children, working and literacy population percentage have been taken as group-specific attributes. This choice modelling provides a tool for community based health insurance (CBHI) schemes' efficient designing, evaluation and implementation in low- and middle-income countries.

Keywords: Discrete choice analysis, Community Based Health Insurance (CBHI), India, Choosing Health plans All Together, Utility Approach, Willingness-to-Pay, Criteria for Decision-Making Under Risk and Uncertainty,

JEL Codes: C25; C35; I1.

[1] Name and full location of the department and institution where work was performed: Project Implementation unit, Micro Insurance Academy, New Delhi-110024, and Research unit, Micro Insurance Academy, Micro Insurance Academy, New Delhi- 110024.

[2] MBA, MPH, FRSPH, Tutor-Health Economics, People's Open Access Education Initiative, 34 Stafford Road, Eccles, Manchester, UK M30 9ED Mob: +919987021553, Email: djohn1976@gmail.com

[3] Vijender Kumar, MA (Economics), Consultant, PART Pvt. Ltd, Kamla Nagar, New Delhi, Mob: +919873805308, Email: vijender1232@gmail.com

1. Introduction

Community financing for health is a mechanism where a households in a community finance the current costs associated with a given set of health services, and at the same time are expected to gain participation in its management and organization of the health services (Carrin, 2005). Community based health insurance (CBHI) is a common denominator for such voluntary health insurance schemes that are run on a non-profit basis using the basic principle of risk-sharing. Over the last two decades or so, CBHI is an evolving phenomenon that helps the urban and rural poor and informal populations in various developing countries in Asia, Africa and Latin America, for smoothening the risk and income over a period for a community.

CBHI schemes help reduce the financial risk associated with health expenditure by pooling the health risks and its redistribution in order to lessen its impact. For the sustainability of such a scheme it is important to deal with factors like moral hazard and adverse selection (Binswanger, 1980). The higher involvement of the people in the community associated with its design and management is also a crucial element for sustainability of a scheme. CBHI schemes in low and middle-income countries ought to be designed in quite different manner when compared to high income countries, as the members of such schemes are usually poor and have incomes near to subsistence levels in most cases.

Willingness-to-pay (WTP) studies for CBHI schemes in the past have used revealed preferences, contingent valuation method, bidding game and dichotomous choice techniques (Dror, 2012). Revealed preferences try to evaluate the WTP by using some proxy related to the health care expenditure while contingent valuation method finds its ground in artificial market creation, making it difficult for illiterate and innumerate individuals to answer. Bidding game has a drawback of 'starting point bias' which can influence final WTP. Dichotomous choice technique has a 'yes saying' bias. Each of these methods have some pros and cons, but while these methods focus only on the value of WTP, the discrete choice analysis evaluates the component wise distribution of the WTP along with the WTP for extent of an attribute. Along with this, the other benefit that the study of discrete choices of stated preferences has is in its applicability to the health care sector where actual data is not available (Mandy, 2004). Discrete choice analysis gives us liberty to analyze the features of the multi-attribute health care plans along with the willingness to pay.

The study of discrete choices in low- and middle-income countries (LMICs), have been applied within the health sector to elicit job preferences of health workers (Blauuw, 2010; Chowdhury, 2010; Mangham, 2008; Rockers, 2012), hospital quality assessment (Hanson, 2005), priority setting in resource allocation (Baltussen, 2006), maternal health issues (Kruk, 2010) and health system reforms (Kruk, 2011), and health insurance (Becker, 2008; Hershey, 1984; Van den Berg, 2008; Vroomen, 2011). Our review found only two studies using discrete choice methodology for in community based health insurance schemes (Abiiro, 2014; Robyn, 2012). While Abiiro (2014) presented a documentation of a rigorous process of developing attributes and attribute levels for the design of a DCE to elicit community preferences for a potential CBHI scheme in rural Malawi, Robyn (2012) conducted a DCE to examine CBHI provide payment attributes that influence health workers' stated preferences for payment mechanisms.

Where planning for health services is conducted or implemented, a wide range of information about the preferences that people make is required. It is important to know which aspects of the health services people find significant and how their choices are influenced. The use of discrete choice analysis leads us to analyze the attributes that influence the willingness to pay (WTP) of individuals and/or groups for each aspect of the health services along with their innate characteristics (Kuwawenaruwa, 2011). This makes alternative product design and preference elicitation approaches that rely on market-oriented strategies, less feasible in generating timely data to support the design and implementation of CBHI interventions in such contexts (Kjaer, 2005). In this paper we aim to investigate people's preferences for a community based health insurance (CBHI) scheme by measuring the impact of attributes that are an integral part of these benefit plans and the extent to which individuals are willing to trade-off one attribute against another. Study at attribute level helps us to design the health care benefit packages more efficiently, much closer to the actual needs of the community involved in the design[4].

This paper tries to model the process of such a decision making in a low income level setting for CBHI scheme by finding the impact of different attributes, whether it be the health care plan specific or the ones pertaining to individuals/groups making choices, to overall choice of a benefit package.

2. Methodology

2.1 Data sources

The data used in this paper comes from three field datasets; the first dataset is part of the baseline information survey (conducted in May-June 2013) which explored the healthcare utilisation, morbidity, and costs of healthcare in the 3 blocks of Kalahandi district, Odisha State. The second dataset consists of the details collected of the groups with whom the CHAT process was conducted which was conducted from September, 2012 to October 2012. The third dataset consists of enrolment data for the packages formed after CHAT. This enrolment dataset provides details of enrolee, such as sex, age, income level, package selection etc. For our analysis the enrolment from its launch (from November 20th, 2012) to April 30th, 2013 has been taken.
The data sources and the attributes of the discrete choice analysis have been broadly explored in following paragraphs.

A 'Baseline Survey' conducted in the villages of M Rampur, Norla and Kesinga, for collecting the data on medical expenditure in last 365 days and the frequency of healthcare events, was used to calculate the premium and to make the benefit packages. The survey was conducted in the randomly assigned sample weighing 10% of the total household population of 3

[4] In 2012, Micro Insurance Academy (MIA) procured funds from UK Department for International Development (UKAID), for implementing a community based health insurance scheme (CBHI) in 178 villages belonging to 3blocks (i.e. Madan Rampur, Norla and Kesinga) of Kalahandi district, Odisha, India (See Figure 1). The CHAT (Choosing Health-plans All Together) simulation was used to comprehend requirements and expectations of the community as part of the implementation of the CBHI scheme in terms of premium and benefit package selection. MIA in cooperation with Mahashakti Foundation, Kalahandi. Odisha and Catholic Health Association of India (CHAI), Secunderabad, launched the scheme to cover 84 villages on November 22nd, 2013 after rounds of discussions and feedback incorporated, under the supervision of MIA staff during group level CHAT process.

blocks of Kalahandi district. Every tenth household was interviewed in each village of the block consisting of 178 villages in the field. After this survey, a quality check was deployed for 5% of the already surveyed sample to check for the consistency and authenticity of data. A total of 2764 different households were surveyed for baseline across the 3 blocks. Ethical consideration was conducted through Institutional Ethics Committee for protocol and verbal informed consent of participants.

Table 1: Five benefit packages formed prior to CHAT

	1.	2.	3.	4.	5.	6.	7.
Pack 1	3,500 15,000	**Free**					361
Pack 2			100 500	200 1,000	500		297
Pack 3	2,000 8,000	**Free**		100 1,000		100	281
Pack 4	1000	**Free**		100 1,000		100	192
Pack 5	1000			200 1,000		100	152

1. **Hospitalization (Max Limits, INR per event)** *Hospitalization: includes all cases of more than 24 hours*
2. **Consultation#**
3. **Lab Test (INR per event)**
4. **Imaging (INR per event)***
5. **Wage loss* (INR)**
6. **Transport^ (INR)**
7. **Premium^ (INR)**

***Notes**: Pack indicates* **Package**

*Fixed wage loss benefit worth 500 INR for each hospitalization

^ Fixed transportation worth 100 INR for each hospitalization

Free consultation support in '*Nirmaya* Primary Care Clinic'

The data from the baseline survey such as costs of OPD, laboratory, radiology, drugs, hospitalization, and maternity, and frequency of events were subjected to a simulation exercise to elicit 5 benefit package options (Table 1). Using these benefit package options CHAT simulation exercise was later conducted in 84 villages with 264 groups in M Rampur block. In CHAT the requirements, expectations and WTP is analyzed via series of consultation with the local populations, after which health insurance packages are designed in the field with assistance from trained staff. Next, groups are formed and given some choices, out of which they select one as their group choice. In this study three different health care insurance packages selected as the group choices were presented (Table 2) out of which groups were asked to select one as their premium choice. The three different packages were different in the premium prices and the benefits being offered. This section of information provided us with the 'stated preferences' of the group. Detailed process of how CHAT is conducted is described elsewhere (Dror, 2006). When we took review about these five packages, it was observed that community wanted packages with smaller premium size along with hospitalization, and transportation benefits. Three benefit packages (Table-2) were selected as a result of group consensus and consultation from the trained staff of MIA incorporating requirements of community. In the field, as part of the implementation, CHAT (for pictorial version, see Figure1; for specification see Table 2) was

conducted among 264 groups consisting of 6 to 23 individuals having different age group members in 84 villages under the supervision of MIA (Micro Insurance Academy) training team and trained staff from 'Mahashakti Foundation' in M Rampur block from September 2012-October 2012. Overall, 264 groups purposively selected comprising of 2848 individuals (43% (n=1252) males and 57% (n=1646) females) participated in the CHAT process (Table 3).

Table 2. Health Insurance benefit plans' specification

	Package-1			Package-2			Package-3		
	pi	pf	pe	pi	pf	pe	pi	pf	pe
Hospitalization(ML)	2000	15000	500	2000	15000	500	2000	15000	500
Transportation					100 pi			100 pi	
Imaging				1000	3000ph	250	500	3000ph	125
Wage loss support				50 on 4th and 5th day of hospitalization			50 from 4th to 8th day of hospitalization		
DM*NHC*		20%			20%			20%	
Premium/Package cost	145 per person a year			180 per person a year			200 per person a year		

Note 1: pi = per incidence, pf = per family, pe= per event, ML= Maximum limits, ph=per household, DM*NHC*= Discount in medicines and 'Nirmaya' Health Clinic,

Note 2: *In Imaging first 250 INR will be paid by individual in every event in package-2 and similarly 125 INR in package-3. All values in Indian Rupee

The enrolment data from ***'Suchana'*** – a Management Information System (MIS) developed in-house by MIA consisting of information of insured persons under the CBHI scheme is the third data set used in this study, giving us the information about the 'revealed preferences'. A total of 4397 enrolments, 4371 enrolments between the period of November 22, 2013 and April 30, 2014, is being considered for our analysis here. Under personal attributes; income level, age, gender, years of schooling, land holdings, RSBY enrolment status, BPL enrolment status, house owning, condition of house, marital status and caste have been taken into consideration.

Table 3. Group Package in CHAT and during enrolments

Packages	**# of Groups**	**Groups (%)**	**# of Enroless**	**Enrolee (%)**
Package-1	90	34	1636	37.4
Package-1	14	61	2644	60.5
Package-1	160	5	91	2.1
Toltal	264	100	4371	100

'Census of India, 2011' data was used as a 'secondary source" for literacy rate of villages, male population, children population and the working people percentage giving a wide perspective about the villages.

2.2 Discrete Choice Analysis

In our case, we assume one of the choices as a base alternative and set the utility derived from it to be zero, which then works as a reference level for utility estimation for other alternatives. In the case of CHAT analysis, the price of the health care insurance plan i.e. the

premium and the maximum security limit for imaging facilities were taken as the choice specific attributes, while the gender ratio of group, average age along with male, children, working and literacy population percentage have been taken as group - specific attributes. For the case of the enrolment data analysis, the premium and the maximum permissible limit for imaging were taken as the choice specific attributes, while gender, age, marital status, years of schooling, caste, RSBY ('*Rashtriya Swasthya Bima Yojna'*) and BPL (*Below Poverty Line*) enrolment status were considered individual-specific attributes.

The package with the least premium and minimum coverage was chosen as base alternative. In the final model, the probability that the individual *i* chooses the alternative *j* in the conditional (multinomial) logit model is given by:

$$P\left(j\middle|C_n\right)=\frac{e^{U_{ij}}}{1+\sum_{\forall k}^{k\neq basealternative}e^{U_{ik}}} \tag{1}$$

The presence of *1* in the denominator of this probability signifies the zero utility assigned to the base alternative which is the value of the element of summation $\forall k$.

$$e^{U_{basealternative}}=e^{0}=1 \tag{2}$$

The equation 6 can be re-written in terms of systematic components of the utility function i.e.

$$P\left(j\middle|C_n\right)=\frac{e^{V_{ij}}}{1+\sum_{\forall k}^{k\neq basealternative}e^{V_{ik}}} \tag{4}$$

V_{ij} is thus assumed to be a linear combination of the set of attributes making it. For individual *i* and alternative *j*, V_{ij} may be defined as, (except for the base alternative for which V_{ij} is assumed to be zero)

$$V_{ij}=\alpha_j X_{ij}+\beta Z_l \tag{5}$$

The above equation can be summed over to all individual specific attribute and alternative specific attributes

$$V_{ij}=\sum_{\forall k}\alpha_j X_{ij}+\sum_{\forall l}\beta_l Z_l \tag{5}$$

where k is the number of individual specific attribute and l being the number of alternative specific attributes

3. Results

Out of the benefit plans developed as an outcome of CHAT, 61% of the members showed a very high preference for the second benefit package (Table 3) which was the second highest in

terms of premium and also the benefits. Similar results were observed at the time of enrolment, when again around 60% (see Table 3) of the individuals chose this package similar to the group CHAT.

CHAT data has been analysed using the Conditional (Multinomial) Logit approach involving the information including properties of the group along with the premium and maximum coverage limit for medical imaging. The working population information, children share in population and gender proportion has been taken to analyse if group's *stated preferences* are influenced by these factors. For the analysis purpose Package-1 has been assumed as the base category which is the package with minimum premium and so comprising minimum health benefits. The results of the Conditional (Multinomial) Logit regression are shown in Table 4.

The group CHAT data results shows that at group level the factors which seems to be statistically influencing group's decision are the coverage limit and the percentage of working population in a village. The coverage is statistically significant at 90% confidence level while proportion of working population is significant at 99.9% and 90% confidence level for Package 2 and Package 3 respectively (See Table 4).

Table 4. Mixed logit Regression results of CHAT revealed preferences

Choice	Variable	Coefficient	Z-val.	Prob.	Remarks
Package-1 {Base Alternative}	Imaging Coverage Limit	0.014	1.68	0.092	Significant*
	Premium	-0.119	-0.54	0.591	
Package-2	Imaging Coverage Limit	0.014	1.68	0.092	Significant*
	Premium	-0.119	-0.54	0.591	
	Sex Ratio	0.161	0.40	0.691	
	Average Age	-0.033	-1.37	0.171	
	Male %	-6.936	-1.10	0.273	
	Children %	-10.767	-1.43	0.153	
	Literacy %	-0.731	-0.34	0.733	
	Working %	-6.923	-4.38	0.000	Significant**
Package-3	Imaging Coverage Limit	0.014	1.68	0.092	Significant*
	Premium	-0.119	-0.54	0.591	
	Sex Ratio	-0.178	-0.21	0.831	
	Average Age	0.232	0.49	0.627	
	Male %	-1.171	-0.10	0.922	
	Children %	-1.295	-0.09	0.929	
	Literacy %	0.015	0.00	0.997	
	Working %	-5.889	-1.89	0.058	Significant**
Log likelihood	-190.3222				
Wald chi^2 (χ^2)	104.38 (Degrees of freedom = 14)				
Probability	0.000				

The enrolment data is an example of revealed preference (as opposed to *stated preference* in group CHAT) as these individuals paid the premium to get them and their family members enrolled which wasn't the case at time of group CHAT decision. Around 50% of the enrolled population belonged to OBC, followed by Scheduled Tribes at 29.7%, and the scheduled castes and general comprising of 16.7% and 6% respectively. The data of CBHI enrolment was also analysed using *conditional logit* model, and the likelihood maximization results of regression are shown in Table 5. In this regression the coverage limit of the health benefit plan along with premium turns out to be significant. In terms of individual specific attributes marital status, caste, income, wealth (land holding as a proxy), BPL[5] and RSBY[6] enrolment status turn out to be statistically significant in influencing the decision towards enrolment.

The next section of the paper deals with explanation of each of the result of these analysis and the impacts that it may have in influencing preferences.

4. Discussion

The result of group CHAT suggests that even in the low and middle income countries, illiterate and innumerate people are able to associate a positive utility to the benefit coverage in a CBHI scheme. This is exactly what we expected as, the higher the coverage limit, the lesser is one's one's burden for an improbable illness event in future. Other studies about insurance also explore similar results in hypothetical market situation (Manning, 1996)[7].

The coefficient of premium turns out to be negative and that of the coverage cap is positive which is exactly what we expect. This means that individuals are associating higher utility to greater coverage and lower utility to an increase in premium. Increase in premium is seen as a loss and thus fetches negative utility. The absolute value of coefficient for premium is around 24 times that of the coverage limit, which means that an increase of premium by one unit can be compensated by an increase of 24 units to the coverage cap for restoring the utility degraded by the increase in premium.

The positive coefficient associated with the imaging coverage limit suggests that even the illiterate and innumerate people involved as a subject seems to associate a positive utility to higher benefit coverage. Also as the hypothesis of non-zero coefficient for premium fails (probability of premium's coefficient being zero=0.59), it may be inferred as the dominance of societal attributes over individualistic attributes in case group decision as described by Goold (2004). This insignificance of premium may also be the result of the *stated preferences* and hypothetical market formation at time of CHAT.

The percentage of the working population seems to have negative impact on selection of package-2, package-3 at 99.99% and 90% significance level (Table 4) respectively. Package-3 has the maximum premium and highest health coverage out of the three insurance plans and our base alternative Package-1 has minimum premium and benefit coverage. The negative

[5] Below Poverty Line

[6] '*Rashtriya Swasthya Bima Yojna',* an medical insurance scheme by government of India for BPL families

[7] In regression results of CHAT, attributes like age, gender ratio did not turn out to be statistically different from zero. This means that the attributes pertaining to this group do not affect the preference. As the simulation - like group CHAT involves group decisions on insurance, our field experience also suggest that the decisions are based on interpersonal factors within a group rather than intrapersonal factors. The impact of premium turns out to be insignificant when a group decides around a benefit package rather than an individual, as societal elements are given more importance than the individual preferences.

coefficient of working population proportion means that the villages having higher proportion of their population involved in work are willing to pay less for a health benefit plan, which means they are less risk aversive when compared to the individuals who are unemployed (lower percent

Table 5. Conditional logit Regression results of CBHI enrolment

Choice	Variable	Coefficient	Z-val.	Prob.	Remarks
Package-1 {Base Alternative}	Imaging Cov. Lim.	0.0046591	5.76	0.000	Signif. **
	Premium	-0.1107615	-4.97	0.000	Signif. **
Package-2	Imaging Cov. Lim.	0.0046591	5.76	0.000	Signif. **
	Premium	-0.1107615	-4.97	0.000	Signif. **
	Age in Years	-0.001595	-0.58	0.564	
	Marital status	0.2267624	1.97	0.048	Signif. *
	Divorced/Wid.	0.0307924	0.14	0.892	
	Years of schooling	0.0341402	4.05	0.000	Signif. **
	Land holding	0.434112	2.13	0.033	Signif. *
	Income Level	0.1554861	7.95	0.000	Signif. **
	BPL Card holding	-0.5727669	-6.91	0.000	Signif. **
	RSBY enroll. Stat.	0.2655929	2.86	0.004	Signif. **
	House owning	-0.3780462	-1.43	0.153	
	SC	-0.1805616	-0.87	0.382	
	ST	-0.7618243	-3.79	0.000	Signif. **
	OBC	0.608224	0.31	0.755	
	'Kacha' house	-0.5737001	-7.27	0.000	Signif. **
Package-3	Imaging Cov. Lim.	0.0046591	5.76	0.000	Signif. **
	Premium	-0.1107615	-4.97	0.000	Signif. **
	Sex	-0.3815209	-1.60	0.111	
	Age in Years	0.0061434	0.69	0.488	
	Marital status	-0.3173681	-0.94	0.349	
	Divorced/Wid.	1.022235	1.94	0.052	Signif. *
	Years of schooling	0.0858068	3.32	0.001	Signif. **
	Land holding	0.0586411	1.29	0.196	
	Income Level	0.2255186	4.44	0.000	Signif. **
	BPL Card holding	-0.53004	-1.90	0.058	Signif. *
	RSBY enroll. Stat.	-0.4731724	-1.19	0.236	
	House owning	0.5445986	0.82	0.413	
	SC	-0.7828266	-1.81	0.071	Signif.
	ST	-1.792943	-4.14	0.000	Signif. **
	OBC	-0.8797833	-2.36	0.018	Significant
	'Kacha' house	0.7074185	2.62	0.009	Signif. **
Log likelihood	-2890.392				
Wald chi^2 (χ^2)	1521.82 (Degrees of freedom = 30)				
Probability	0.000				

of working population). This is consistent with the theory (Sennen, 2012) that the poor in extreme poverty are more risk aversive, which means that communities with lower percent of working population are more inclined towards Package-2 and Package-3, –as they provide higher protection.

The results of the enrolment regression (Table 5) show that both the premium and the benefit coverage limit have significant (at level of 99.9%) impact when individuals make choices. On one side, the premium fetches negative utility, while the coverage, on the other side, brings positive utility. The reverse signs of the coefficients of the premium and the benefit coverage signify the substitutability rate of the benefit coverage against the premium, which in this analysis turns to be around 24. This substitutability means that people give 24 times more weightage to premium than to the benefit coverage in their utility.

The impact of the marital status is significant at 95% confidence level for Package 2, with a positive coefficient, which means that married individuals are more risk aversive when compared to the unmarried ones. This impact may be the result of higher responsibility and higher aversion among married individuals. But the impact of marital status is not observed for the most expensive Package 3 which means that married personnel tend to be more risk aversive but the impact of high premium overcomes this factor for Package 3 and other factors like income, landholding etc. dominates the choice making process.

The income level shows the present income, while land holdings signify wealth status of an individual; it is therefore expected that both of them should influence the choice. It is thus important to use both of them in the analysis. The coefficients of income and landholding are both positive for Package 2 and Package 3, which indicates that the rich individuals opt for a benefit plan with higher premium due to the affordability of these higher premium packages as higher income means higher cash inflow and easy affordability of benefit packages with higher benefits (all benefit plans had per person annual premium less than or equal to 200 INR). The impact of landholding is estimated to be positive and significant for Package 2 implying that more wealthy individuals go for a higher premium benefit plan but as the wealth doesn't contribute to the cash holding; it is the present income which determines the affordability of the most expensive Package 3.

Awareness is also a crucial factor which may influence decisions for a health insurance plan in a community having no prior information about insurance. Education level is a proxy to awareness and understanding of insurance. The results for years of schooling shows positive coefficient for both Packages 2 and 3 at confidence level of 99.9%. The coefficients are 0.034 and 0.085 for Packages 2 and 3 respectively, which means that higher the education level higher is the chance of the individual of choosing Package 2 or 3 over Package 1. Also, the higher value for Package 3 indicates that, if all other values are kept equal, there is a higher chance of shift from Package-1 to 3 compared to the shift from Package-1 to 2, if years of schooling are increased.

Similarly, higher risk aversion is showed by the individuals living in *'kacha'* house. These are the individuals who don't have sufficient money to build home properly and hence they show very high risk aversion. The coefficient for Package 3 is 0.70 at a significance level of 99% which means these people are opting for a costly benefit plan or in other words they give more importance to the huge loss at time of illness compared to others. But the coefficient pertaining to Package 2 is negative and significant at 99% confidence interval which signifies that they are less willing to choose Package 2 over Package 1. The possible reason may be that '*kacha'* house dwellers are much more risk aversive and they prefer the best benefit Package 3 but the ones

who cannot afford this costly package are forced to opt for the cheapest benefit plan making Package 2 a mediocre choice.

One more interesting result that comes out of this analysis is the package selection pattern of the widowed/divorced group. This is the group having limited sources of earning as in most of the families males are the sole earner of family. But there seems to be different package preferences when this sub-group is compared to entire sample. 44% of the widowed/divorced population opted for Package-1, 51% for Package-2, and only 5% for Package-3. For this subgroup the preference for package-3, having highest premium and benefit package is around two and a half times when compared to overall sample. The positive coefficient for Package 3 at confidence level of 95% indicates the higher risk aversion nature of the poorest of the poor as suggested by literature (Manning, 1996).

The BPL card enrolees are less risk aversive and just a possession of BPL card shows their preference for the health benefit plan having least benefits. The RSBY enrolee has an advantage over others of having an alternate medical insurance to help them out. This makes them a little bit more secured against health issues and thus giving a dis-incentive for going for a large benefit plan. People enrolled in RSBY are the ones that are having some prior knowledge about insurance so they choose a better plan. RSBY enrolees prefer to go for Package 2, which shows their awareness of the importance of such a benefit package. Only a BPL card holder can register for RSBY, which means that all RSBY enrolee are living below the poverty line and even though opting for the Package 2 rather than going for the minimum premium. This shows that even the poor are insurable and they can make justified choices if they are given chance for such a decision.

The coefficients belonging to scheduled castes (SC), scheduled tribes (ST) and other backward classes (OBC) turn out to be negative and significant for benefit plan with maximum coverage and are negative and significant for scheduled tribes in Package 2 analysis. This means that the scheduled tribe has Package-1 as their best choice which is the package giving minimum health benefit. In our sample, scheduled castes constituted the highest percentage with 51%, and 30% respectively with BPL card, and RSBY card, whereas scheduled tribes at 75% constituted the highest with 'Kaccha' houses (See Table 6). Their socio-economic deprivation influence their choice making process which results into lack of willingness to go for a high premium health benefit plan.

Table 6. Access to amenities (a caste wise distribution) in enrolled populations

Amenities	**General (n=266) (%)**	**SC(n=728) (%)**	**ST (n=1287) (%)**	**OBC (n=2080) (%)**	**Overall (%)**
BPL Card	20	56	51	33	42
RSBY Card	4	30	29	15	21
'Kachha'[1] House	41	67	75	42	56

Note: Kachha houses are made up of mud, bamboo, leaves by the villagers in villages. These *houses* are not strong.

In summary, the attributes of age, gender do not affect the preference; whereas percentage of working population in family, being married, income, education, widow/divorced, RSBY show being positive influence towards higher benefit packages. In comparison, 'Kacha' housing, BPL

card possession and caste status such as SC/ST/OBC are attributes of risk averse towards benefit package selection.

5. Conclusion

This paper has presented a discrete choice analysis on *revealed* and *stated preferences* with a purpose of measuring the willingness to pay along with its component-wise distribution in a low income level study setting of block M Rampur, Odisha. The study reiterates that the uneducated and innumerate poor are also able to make a justified decision. This analysis was aimed on getting the empirical value for the extent to which different attributes influence the choice decision of an individual. The findings of the group decision suggest the societal element to be dominant and least significance to prices at time of group decision. As the premium and plan's benefits are interdependent and our results signify their influence in the decision making, a discrete choice analysis can land up as an important tool for designing, evaluating and redesigning of community based health insurance schemes for an increased social welfare and wellbeing. Our study demonstrates that it is feasible to elicit community preferences for health insurance among tribal populations, most of whom are illiterate. It will be useful for policy makers to understand that involving communities and understanding their preferences would be useful for designing pro-poor health insurance policies which are voluntary in nature, in countries such as India.

References

Abiiro, G.A., Leppert, G., Mbera, G.B., Robyn, P.J., & De Allegri, M. 2014. Developing attributes and attribute-levels for a discrete choice experiment on micro health insurance in rural Malawi. BMC Health Services Research, 14: 235.

Adamowicz, W.,Louviere, J. & Williams, M. 1994. Combining revealed and stated preference methods for valuing environmental amenities, Journal of Environmental Economics & Management, Vol. 26, 271-292.

Baltussen, R, Stolk E, Chisholm D, Aikins M. 2006. Towards a multi-criteria approach for priority setting: an application to Ghana. Health Econ, 15:689-696.

Becker, K., & Zweifel, P. 2008. Age and choice in health insurance: evidence from a discrete choice experiment. Patient, 1:27-40.

Ben-Akiva, M. & Lerman, S.R. 1987. Discrete choice analysis: theory and application to travel demand, MIT Press, MA, USA.

Ben, A., & M, Boccara B. 1994. Discrete choice models with latent choice sets. International Journal of Research in Marketing, Vol. 12, 9-24.

Binswanger, H.P. 1980. Attitudes toward Risk: Experimental Measurement in Rural India, American Journal of Agricultural Economics, Vol. 62, 395-407.

Blaauw, D., Erasmus, E., Pagaiya N., Tangcharoensathein, V., Mullei, K., Mudhune S., & Lagarde, M. 2010. Policy interventions that attract nurses to rural areas: a multicountry discrete choice experiment. Bull World Health Organ, , 88:350-356.

Bryan, S. & Dolan, P. 2004. Discrete choice experiments in health economics: For better or for worse?, The European Journal of Health Economics, Vol. 5, 199-202.

Carrin, G., Waelkens, Maria-Pia., & Criel, B. 2005. Community-based health insurance in developing countries: A study of its contribution to the performance of health financing systems. Tropical Medicine and International Health. Vol 10, No. 8, pp 799-811.

Chowdhury, M.E., Johnson, J.C., Gyakobo, M., Agyei-Baffour, P., Asabir, K., Kotha, S.R., Dzodzomenyo, M. 2010. Rural practice preferences among medical students in Ghana: a discrete choice experiment. Bull World Health Organ, 88:333-341.

Danis, M., Binnedjik, E., Vellakkal, S., Ost, A., Koren, R., & Dror, D.M. 2007. Eliciting Health Insurance Benefit Choices of Low Income Groups, Economic and Political Weekly, Aug 11, 3331-3339,

De Bekker-Grob, E., Ryan, M. & Gerard, K. 2010. Discrete choice experiments in health economics: a review of the literature, Health Economics, 21(2), 155-172.

Dror, D. & Koren, R. 2012. The elusive quest for estimates of willingness to pay for health microinsurance: Protecting the poor-A microinsurance compendium, Volume II, 156-173

Dror, I. 2007. Demystifying Micro Health Insurance- Choosing Health Plans All Together (CHAT). Microfinance Insights, Vol. 4, pp. 17-19.

Dror, D.M., Koren, R., Ost, A., Binnedjik, E., Vellakkal, S., & Danis, M. 2007. Health insurance benefit packages prioritized by low-income clients in India: Three criteria to estimate effectiveness of choice. Social Science and Medicine, 64, 884-896.

Dror, I. 2007. Demystifying micro health insurance package design: Choosing Healthplans All Together (CHAT). Microfinance Insights, Issue September, 17-19.

Goold, S.D., Green, Stephen A., Biddle, A. & Benavides E. 2004. Will insured citizens give up benefit coverage to include the uninsured?, Journal of General Internal Medicine, 19(8), 868-874.

Hanson, K., McPake, B., Nakamba, P., & Archard, L. 2005. Preferences for hospital quality in Zambia: results from a discrete choice experiment. Health Econ, 14:687-701.

Hershey, J.C., Kunreuther, H., Schwartz, J.S., & Williams, S.V. 1984. Health insurance under competition: would people choose what is expected? Inquiry, 21:349-360

Kjær, T. 2005. A review of the Discrete Choice Experiment-with Emphasis on its Application in Health Care. Denmark: Syddansk Universitet.

Kruk, M.E., Paczkowski, M.M., Tegegn, A., Tessema, F., Hadley, C., Asefa, M., & Galea, S. 2010.Women's preferences for obstetric care in rural Ethiopia: a population-based discrete choice experiment in a region with low rates of facility delivery. J Epidemiol Community Health, 64:984-988.

Kuwawenaruwa, A., Macha, J., & Borghi, J. 2011. Willingness-to-pay for voluntary health insurance in Tanzania, East African Medical Journal, Vol.8, No. 2.

Lancaster, K. 1966. A New Approach to Consumer Theory, The Journal of Political Economy, 74(2),132-157.

Madden, G. & Simpson, M. 1997. Residential broadband subscription demand: an econometric analysis of Australian choice experiment data, Applied Economics, 29, 1073-1078.

Mandy, R. 2004. Discrete choice experiments in health care, British Medical Journal, 328 (7436), 360-361.

Mangham, L.J., & Hanson, K. 2008. Employment preferences of public sector nurses in Malawi: results from a discrete choice experiment.Tropical Med Int Health, 13:1433-1441.

Manning, W. & Marquis, S. 1996. Health insurance: The trade-off between risk pooling and moral hazard, Journal of Health Economics, 15, 609-639.

McFadden, D. 1974. Conditional Logit Analysis of Qualitative Choice Behavior. In P. Zarembka (ed.), Frontiers in Econometrics, pp. 105-142. Academic Press, New York.

Robyn, P.J., Barnighausen, T., Souares, A., Savadago, G., Bicaba, B., Sie, A., & Sauerborn, R. 2012. Health worker preferences for community-based health insurance payment mechanisms: a discrete choice experiment. BMC Health Services Research, 12: 159.

Rockers, P.C., Jaskiewicz, W., Wurts, L., Kruk, M.E., Mgomella, G.S., Ntalazi, F., Tulenko, K. 2012. Preferences for working in rural clinics among trainee health professionals in Uganda: a discrete choice experiment..MC Health Serv Res, 12:212.

Rosalie, V., Emily, L. & Jordan, L. 2002. Discrete choice experiments to measure consumer preferences for health and healthcare, Expert Rev Pharmacoecon Outcomes Res., 2(4), 319-326.

Sennen, H. & Peter, B. 2012. Assessing effectiveness of a community based health insurance in rural Burkima Faso, BMC Health Services Research, 12 (363).

Van den Berg, B., Van Dommelen, P., Stam, P., Laske-Aldershof, T., Buchmueller, T., Schut, F.T. 2008. Preferences and choices for care and health insurance. Soc Sci Med, 66:2448-2459

Vroomen, J.M., & Zweifel, P. 2011. Preferences for health insurance and health status: does it matter whether you are Dutch or German? Eur J Health Econ, 12:87-95.

Appendix

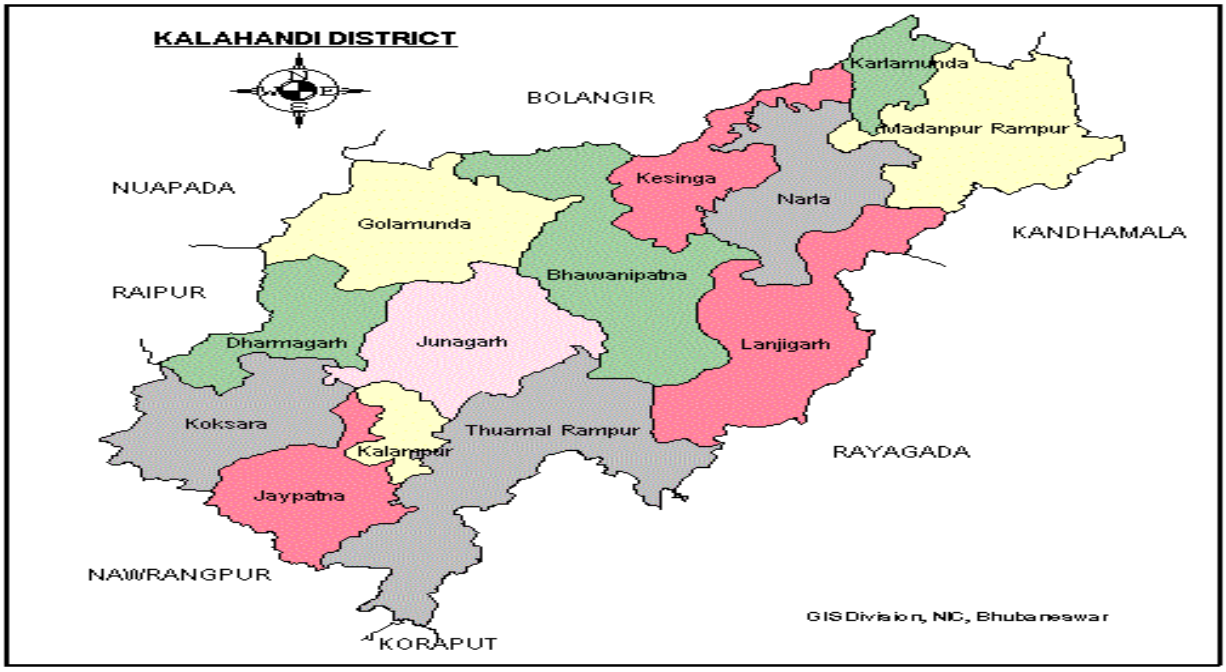

Figure 1. Map of Kalahandi district