Available online at www.sciencedirect.com
ScienceDirect
Health Policy xxx (2006) xxx–xxx
HEALTH POLICY
www.elsevier.com/locate/healthpol

Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India

David Mark Dror [a,*], Ralf Radermacher [b], Ruth Koren [c]

[a] *Erasmus University Rotterdam/MC, Institute for Health Policy and Management, The Netherlands*
[b] *Department of Cooperative Studies, University of Cologne, Germany*
[c] *The Sackler Faculty of Medicine, Tel Aviv University, Israel*

Abstract

This study, conducted in India in 2005, provides evidence on Willingness to pay (WTP), gathered through a unidirectional (descending) bidding game among 3024 households (HH) in seven locations where micro health insurance units are in operation. Insured persons reported slightly higher WTP values than uninsured. About two-thirds of the sample agreed to pay at least 1%; about half the sample was willing to pay at least 1.35%; 30% was willing to pay about 2.0% of annual HH income as health insurance premium. Nominal WTP correlates positively with income but relative WTP (expressed as percent of HH income) correlates negatively. The correlation between WTP and education is secondary to that of WTP with HH income. Household composition did not affect WTP. However, HHs that experienced a high-cost health event and male respondents reported slightly higher WTP. The observed nominal levels of WTP are higher than has been estimated hitherto.

Keywords: India; Willingness to pay; Bidding game; Contingent valuation; Health insurance; Micro health insurance; Rural populations; Low-income populations

1. Introduction

In view of the high out-of-pocket spending level for healthcare, and the desire to improve the effectiveness and equality of healthcare financing and the quality of the care given, policy-makers in India have turned their attention to proposals for health insurance for the poor [1]. At central government level, the National Rural Health Mission put forward proposals to support community-based health insurance by subsidizing the premium of the poor [2]. And at state level, several governments have signed agreements with commercial insurers to cover certain segments of their population for certain cost-generating illnesses.[1] These recent

* Corresponding author. Tel.: +41 78 790 6789; fax: +41 22 788 2288.
E-mail addresses: daviddror@socialre.org, d.dror@erasmusmc.nl (D. Mark Dror), ralf.radermacher@uni-koeln.de (R. Radermacher), rkoren@post.tau.ac.il (R. Koren).

[1] For example, Assam, Jammu & Kashmir, Punjab and Kerala have such contract with ICICI; Karnataka signed with United India. Gujarat launched a maternity benefits scheme for BPL women. Other States are in the process of negotiating agreements, e.g. Uttaranchal (with ICICI).

0168-8510/$ – see front matter © 2006 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.healthpol.2006.07.011

developments occur on the backdrop of very low penetration of health insurance in India in general, and in rural areas or among people at the "Bottom-of-the-Pyramid" (BoP) in particular.

We assume that health insurance is likely to develop on a voluntary basis in India, with clients having to pay a premium. Hence, it is essential to obtain reliable information on the amounts that potential clients would be willing to pay, and the major determinants influencing this choice. For many clients – including BoP groups – health insurance is likely to develop through grassroots organizations such as "micro health insurance units" (MIUs).[2] Thus, the purpose of this study is to add knowledge on the *maximal* WTP among rural and BoP persons in India, and identify the major determinants influencing their choice.

This study is based on evidence gathered in 2005 in seven locations where MIUs are in operation. The seven locations are situated in four Indian states: Tamil Nadu, Karnataka, Maharashtra and Bihar.[3] The household (HH) survey that provided the dataset we analyze here formed part of the EU-funded project "Strengthening MIUs for the Poor in India". To the best of our knowledge this is the first survey relating to several locations where MIUs operate, enabling us to conduct a comparative analysis between an insured cohort to an uninsured cohort and across locations.

Previous sources of information on WTP for health insurance in India include a few articles. Mathiyazhagan [3] reports the results of a survey conducted in 1998 in Karnataka where the average WTP of replies of 1000 rural HHs for a fictitious health insurance package was INR 163.48 per HH per year, with only 8% willing to pay between INR 481 and INR 600. A second source is a baseline study conducted in 2001 by Karuna Trust in one district in south Karnataka (near Mysore) and in one district in the north of the state (near Belgaum) prior to the launch of insurance operations; the average WTP per HH per year was, respectively, INR 111 and INR 290 [4]. Based on this survey, Karuna Trust fixed the premium at INR 150 for a HH of five per year. Both these surveys posed an open-ended question, which does not give respondents an anchor for the choice of WTP. A study in Delhi by Gupta [5] found an average WTP of INR 220 for adults and INR 93 for children. Finally, another scheme, Uplift Health (located in Pune, Maharashtra) conducted focus group discussions in 2002 to inquire on the WTP of prospective members, which led it to establish a premium of INR 50 per person per year (applied uniformly to all ages and both sexes) [6,7].

These findings, reported in previous studies, followed different elicitation methods, were based on smaller total samples, and were too dated to serve as the basis for an updated estimate of WTP among rural and BoP persons. Hence the necessity to conduct this study.

2. Methods

2.1. Sampling

We conducted a HH survey in seven locations in India where MIU operate. Sampling followed a two-stage process: in the first stage, we selected seven locations purposively, from among schemes that agreed to participate, and which were located in several states (Maharashtra, Karnataka, Bihar, and Tamil Nadu). In the second stage, several villages (or urban areas) within each location were included (243 villages/areas in total), and at each village about 10 insured HHs, plus about 10 uninsured HHs were selected randomly. We surveyed some 350 insured and 350 uninsured HH per location, and obtained 4931 responses in the survey. Out of the entire sample of 4931 HHs, 3683 randomly selected HHs responded to this study of WTP, of which 3024 were valid responses.

[2] The subject matter of this article does not require a detailed description of the MIUs; readers wishing to know more about MIUs in India in general may wish to peruse reference [46]. Some essential information on the MIUs covered by this study is provided a bit later.

[3] A few pointers on the operation of the MIUs in question are provided: (i) BAIF, Pune district, main benefits hospitalization and reduced costs for primary health; annual health insurance premium INR 80 per person. (ii) Uplift Health, Pune, main benefits hospitalization and compensation for wage loss due to illness ("sick pay"), annual premium INR 50 per person when whole household joins, else INR 100. (iii) Karuna Trust, Mysore and Belgaum district, main benefit sick-pay, annual premium INR 22 per person. (iv) Yeshasvini Trust, Bangalore, main benefits surgeries and OPD, premium INR 120 per person. (v) DHAN Foundation, Theni district, main benefits hospitalization and consultations, INR 150 for a family of five or Rs. 100 for individuals. (vi) Nidan, Patna, main benefits hospitalization, annual premium of INR 100/225, depending on coverage. (vii) VHS, Chennai, main benefits hospitalization and consultations, premium dependent on income; for individuals between INR 35 and 200, for households between INR 80 and 350.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

Table 1
Respondents with an opening bid of INR 320 per person

Location	Total	Insured	Uninsured
BAIF	403	207	196
Uplift	404	207	197
Karuna Trust	424	196	228
Yeshasvini Trust	323	167	156
Nidan	493	243	250
Dhan	480	244	236
VHS	497	249	248
	3024	1513	1511

Different HHs were given three versions of the benefit package, identified here as versions 1,[4] 2[5] and 3.[6] One thousand two hundred and eighty HHs were presented with version 1 (but only 1059 replies were valid); 1219 HHs were presented with version 2 (996 replies were valid); 1184 HHs were presented with version 3 (969 replies were valid). The distribution of these valid answers by geographical location is as follows (the areas are identified by the name of the MIUs in the location).

The numbers in Table 1 indicate only minor discrepancies between locations and no bias in the distribution between insured and uninsured respondents.

2.2. Elicitation method

We set out to evaluate the maximum WTP among rural and BoP segments by recording respondents' WTP for a hypothetical package. This method is called 'contingent valuation' because replies are contingent on the scenario offered. Essentially this method entails a utility change valued in money, determined by the maximum amount that respondents agree to pay for a certain product (in other cases this was equated to the minimum they are willing to accept in order to forgo the product) [8]. In the last 15 years, much has been published on the pros and cons of different variants of contingent valuation [9–22]. It is claimed that questions referring to a starting price have yielded better results than open-ended questions [23]. The most basic method is the 'take-it-or-leave-it' (dichotomous choice) where respondents can either agree or disagree to a proposed price. We decided against using dichotomous choice because it requires a very large sample size for obtaining reliable results [24] and tends to produce higher WTP estimates than other methods [18]. We opted for an alternative elicitation called the 'bidding game', considered more reliable than dichotomous choice [25]. The bidding game draws its name from the process whereby the respondent is presented with a price, which is increased each time the respondent accepts the bid, and lowered each time the respondent rejects the bid. We used a variant of this method, described in the next section.

2.3. Unidirectional bidding only

Variance in responses has been reported to emanate to some extent from selection by respondents of an opening bid from a random list of bids [26,27]. We wished to obtain an estimate for the maximal willingness to pay and reduce the variance between responses. Therefore, we deviated from the bidirectional bidding model used by Dong et al. In our experiment, respondents were invited to determine their WTP in Rupees (INR) by reference to a relatively high opening bid; if the respondent declined the amount, the interviewer lowered the bid by INR 20, until the respondent accepted the bid. The accepted bid was recorded as the WTP level.

2.4. The questionnaire

The questionnaire of the HH survey included sections on HH demographics, education, income, healthcare utilization and expenditure. In introducing the section on WTP, interviewers explained the essentials of insurance, notably that it entailed prepaying premiums in order to be eligible for pre-defined benefits; that premiums are not repaid when no-claims are payable. The purpose of the explanation was to avoid confusion with

[4] Version 1 included the following benefit types: "Hospitalisation/Domiciliary hospitalisation expenses incurred for medical or surgical treatment for illness/disease and injury up to INR 5000 per year and person and reimbursement of costs for prescribed drugs up to INR 1000 per year and person".

[5] Version 2 included the following benefit types: "Hospitalisation/Domiciliary hospitalisation expenses incurred for medical or surgical treatment for illness/disease and injury up to INR 5000 per year and person AND reimbursement of costs for general practitioners up to INR 1000 per year and person".

[6] Version 3 included the following benefit types: "Reimbursement of costs for prescribed drugs up to INR 1000 per year and person AND reimbursement of costs for general practitioners up to INR 1000 per year and person".

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

savings products, which might elicit a different level of WTP. After the explanations were read out, respondents engaged in the "bidding game" to establish WTP.

2.5. Opening bid

The opening bid was paired with a benefit package (details given in footnotes 4–6). We selected a reference price of INR 320 per person, which is higher than the cost of packages on the market. As the package was available only to entire HHs, the opening bid was equal to the number of persons in each HH multiplied by the reference price.

2.6. Analysis of the data

We analyzed the data using linear multiple regression on the households' willingness to pay, by applying a standard model of the form

$$\text{WTP} = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n$$

In which α represents the intercept (constant), and β the coefficients of the explanatory variables x.

Parameters that significantly affect WTP were analyzed further through bivariate correlation analysis.

3. Findings

3.1. Effectiveness of the bidding game

Some scholars claimed that the bidding game may suffer from interviewer bias [28] that can sometimes be grouped with other socially indicated biases called "warm glow" [29,30]. The bias would exist when respondents accept an amount closer to the opening bid than they would actually do in reality.

We thus wished to assess whether we had an effective bidding process. For this purpose, we compared the reported WTP values with the opening bids. In this study, the lowest quartile is willing to pay between 0% and 23.4% of the opening bid, the highest quartile between 78.1% and 100%. The median willingness to pay is 44.6% of the opening bid and the mean WTP is 51.2% ± 0.6% (mean ± S.E.M.) of the opening bid. The wide range of the answers and the marked difference between the opening bid and the accepted bids strongly indicates that "warm glow" was not an important factor in this study.

3.2. Multivariate analysis

The WTP values that were obtained through the bidding game were subjected to multivariate analysis. The results are presented in Table 2. The table contains information about the significance of the impact of the different variables on WTP (please note the level of significance noted next to each number). The standardized coefficients of variables β show the strength of the association between the dependant variable (WTP value) and the independent variables. Some variables were numeric; others were represented by a proxy (0, 1), and this is denoted in the table.

The results in Table 2 were further explored with a view to gaining deeper insight of the meaning of the revealed relations between dependant and independent variables. These detailed findings are described below, with a reference to the multivariate regression analysis in each case.

3.3. Sensitivity to package composition

We looked at WTP values obtained in response to the three versions of the benefit package. The regression (Table 2) does not reveal any significant impact of the version presented on the value of WTP. This is also illustrated in Fig. 1, where the distributions of the WTP values are hardly distinguishable for the three options proposed. It should be recalled that every HH was presented with only one package; thus, it seems that the

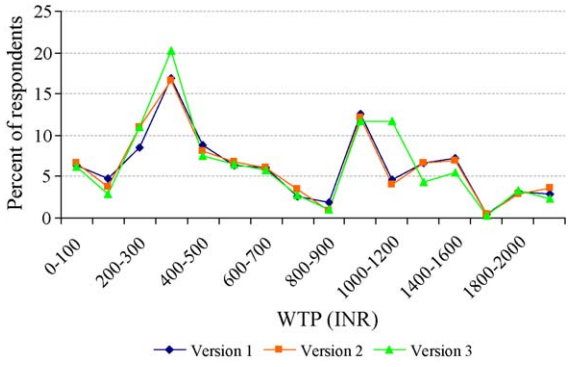

Fig. 1. Distribution of WTP for three packages.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

Table 2
Multivariate analysis of WTP values

Parameter	Value	Unstandardized coefficient *B*	S.E.	Standardized coefficient β
α intercept (constant)		298.209***	64.144	
Benefit package presented (version 3 ref.)				
Benefit package presented (Version 1)	P	−0.254	22.781	0.000
Benefit package presented (Version 2)	P	0.876	23.121	0.001
Insurance status	P	54.628***	19.255	0.045
Self-assessed understanding of insurance	P	−39.702*	21.654	−0.032
No. of household members	Num	61.124***	6.565	0.194
Household income	Num	0.002***	0.000	0.139
(Household income)^2	Num	−1.75E−009***	0.000	−0.100
Education (ref.: no schooling)				
Primary school	P	−41.471	32.242	−0.023
5th to 8th class	P	16.519	26.771	0.012
9th to 10th class	P	16.468	29.101	0.011
11th class or above	P	75.188**	37.029	0.036
Gender of respondent (Male)	P	73.413***	20.778	0.060
Age of household head	Num	−1.645*	0.983	−0.031
Ratio of age under 5 and total HH members	Num	33.474	76.364	0.007
Ratio of age above 55 and total HH members	Num	−51.385	61.870	−0.014
Distance to preferred primary health facility	Num	0.555	0.553	0.017
Distance to preferred hospital	Num	−0.508*	0.296	−0.029
Recent incidence of hospitalization	P	102.545***	21.940	0.085
Region: BAIF	P	380.789***	48.605	0.216
Region: Uplift	P	240.551***	38.165	0.136
Region: Karuna Trust	P	−212.181***	37.084	−0.122
Region: Yeshasvini Trust	P	−110.412***	39.303	−0.057
Region: Nidan	P	−306.386***	81.107	−0.188
Region: DHAN	P	−181.374***	38.621	−0.105
Interaction variable: BAIF, income	Num	0.001	0.000	0.044
Interaction variable: Nidan, household size	Num	120.361***	12.305	0.494

$^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$; $R^2 = 0.34$; $N = 2830$. Model Test: F-value = 55.535, $p \leq 0.01$, standard residual mean = 0.000, standard deviation = 0.995. P, proxy (dummy) variable (0, 1); Num, numeric value.

focus of respondents was more on the question of the amount than on the question of alternative insurance products.

In view of the similarity of the responses to the three versions, we aggregated the replies to all three packages also in the bivariate analysis.

3.4. Insurance status and the distribution of nominal WTP values

We looked at WTP values, in INR, for the insured and uninsured cohorts separately. The regression results reveal a highly significant but modest positive association between being insured and willing to pay for health insurance. This effect is illustrated in Fig. 2;

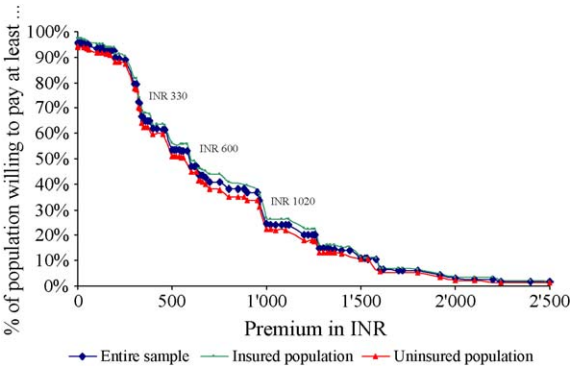

Fig. 2. Distribution of WTP in INR per HH per year.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

Table 3
The effect of insurance status on WTP

Location	WTP insured		WTP uninsured		Percent difference (%)	p (t-test)
	Mean	S.E.M.	Mean	S.E.M.		
BAIF	1193	38	1026	34	14.00	0.0011
Uplift	911	30	919	37	−0.92	N.S.
Karuna	503	28	495	27	1.68	N.S.
Yeshasvini	617	34	578	28	6.28	N.S.
Nidan	1244	54	1058	49	14.97	0.0114
DHAN	492	25	426	27	13.39	N.S.
VHS	683	35	622	31	8.87	N.S.

the pattern of the distribution of the two series of WTP is very similar, although nominal values accepted by the insured cohort are slightly higher than those accepted by the uninsured cohort. This small difference does not seem material, although statistically significant ($p < 0.0002$, t-test and $p < 0.0005$ by the non-parametric Mann–Whitney test and Table 2).

The impact of insurance status was checked further for each region separately, in order to ascertain the potential impact of insurance by the different schemes on WTP. The WTP values of insured cohorts are slightly higher than of uninsured cohorts in six out of the seven locations, yet the difference is significant only in two schemes and never exceeds 15% (Table 3).

As the bidding game elicited responses to a hypothetical benefit package that none of the MIUs offered, we would not have expected any difference between the insured and uninsured cohorts. The small positive difference recorded, nevertheless, may well reflect a more trusting predisposition among the insured toward insurance. In view of the small difference, we combined the WTP values of insured and uninsured in the analysis that follows, and this is also shown in Fig. 2.

The multivariate regression (Table 2) also revealed a marginally significant negative association between self-declared understanding of insurance principles and WTP. This small effect could be accidental or it may indicate that understanding of insurance is not synonymous with buying into the financial transaction.

3.5. The distribution pattern of WTP

The data presented in Fig. 2 reveals that about 70% of the population was willing to pay INR 330, about half the population was willing to pay INR 600, and 25% of the population was willing to pay up to INR 1020 per HH per year.

WTP was obtained in conjunction with the opening bid, which has been relative to HH size. It has been argued that selection of the opening bid may influence respondents' WTP and thus creates a bias [14,31]; or that an anchoring number can introduce bias into the choice of respondents [32,33,26]. With the view to checking possible bias due to HH size (which determined the opening bid in this study, and bearing in mind that the average HH size in our sample was 4.6 persons) we checked the distribution of WTP in a sub-sample of HHs composed of 5 persons, where the opening bid was identical for all respondents. We found that the distribution of this sub-sample is remarkably similar to that of the entire sample (about 70% of the population was willing to pay INR 341, about half the population was willing to pay INR 600, and 24.4% of the population was willing to pay up to INR 1200).

3.6. The distribution of WTP expressed as percentage of HH income

The literature offers several references that WTP is related to HH income [3,26,34,35]. One way of neutralizing the impact of HH income would be to express WTP as a percentage of HH income. In our HH survey, the question on income referred to all sources of income, both cash and kind. The values obtained in this study are shown in Fig. 3. As can be seen, about two-thirds of the entire sample (66.6% of the population) were willing to pay just under 1% of annual HH income; about half the sampled population was willing to pay up to 1.35% of annual HH income; 30% of the population were willing to pay about 2.0% of HH income. The small difference observed between the

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

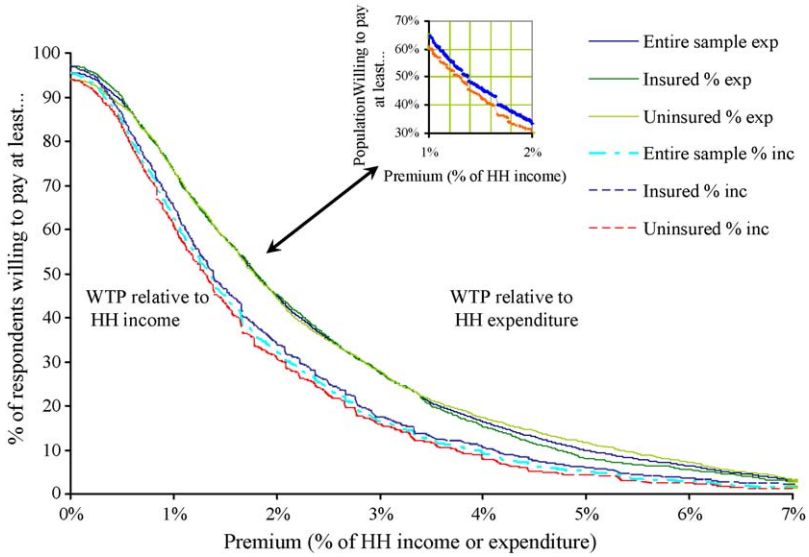

Fig. 3. Distribution of WTP as percentage of HH expenditure and as percentage of HH income.

insured and uninsured cohorts is statistically significant ($p = 0.006$ by t-test and 0.008 by the non-parametric Mann–Whitney test).

3.7. The distribution of WTP expressed as percentage of HH expenditure

It is also accepted in the literature that income might be prone to seasonal fluctuations and other "noises" due to in-kind income; these could possibly create a reporting-error or recall-bias but – according to Friedman [36] – it is assumed that households smooth their expenditure over time. Therefore, it is common practice to use HH expenditure as an alternative proxy for HH economic status. In this study, we have juxtaposed WTP to non-health HH expenditure. We use non-health HH expenditure (rather than total HH expenditure) to avoid bias emanating from unavoidable or inelastic health-related costs. As can be seen in Fig. 3, the values of WTP expressed as percentage of HH non-health expenditure are higher than those values when expressed as percentage of HH income. About two thirds of the entire sample were willing to pay 1.2% of HH expenditure for health insurance; about half the populations was willing to pay 1.8% of annual HH expenditure; 30% of the sampled population were willing to pay 2.8% of annual HH non-health expenditure. Interestingly, the small differences between the insured and uninsured cohorts, observed when WTP is expressed in nominal terms and as percentage of HH income, disappears when WTP is expressed as percentage of HH expenditure.

3.8. Correlation between WTP and HH size

In our version of the bidding game, the opening bid was directly proportional to the number of HH members (INR 320 times the number of HH members). This formulation of the opening bid seems realistic for an environment in which health insurance does not include a formal intention to operate income redistribution; yet it introduces a possible limiting factor in the form of the total financial burden on the HH. As could be expected, the multivariate analysis (Table 2) revealed a highly significant positive association between WTP and HH size. We also checked the association between the number of HH members and the WTP per HH member, in order to assess the notion that WTP *per individual* decreases as HH size increases. WTP per HH member was obtained by dividing the declared WTP by the number of HH members. Indeed a significant negative correlation ($p < 10^{-4}$) was obtained between

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

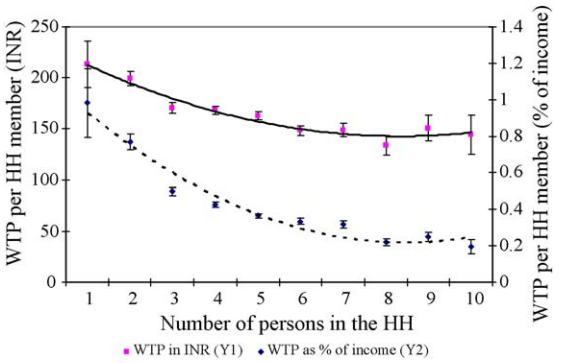

Fig. 4. The relationship between WTP per HH member and HH size.

the two parameters. Interestingly, the curve describing this relationship is not linear but flattens when the number of HH members exceeds six, with the *minimal WTP per HH member* being, on average, around INR 150 for large HH (Fig. 4). The significance of the deviation from linearity was examined by fitting the data to a polynomial equation of the second degree; the resulting equation was: Normalized willingness to pay = constant $- b_1 \times$ HH members $+ b_2 \times$ (HH members)^2, where constant $= 229 \pm 10$ ($\pm$S.E.M., $p < 0.0001$), $b_1 = 19.9 \pm 3.6$ ($p < 0.0001$), $b_2 = 1.16 \pm 0.29$ ($p = 0.0001$).

The data in Fig. 4 is shown as mean $\pm$ S.E.M. for each HH size, but curve fitting was done using the original data for each HH. When WTP values are expressed as percentage of income, the pattern was similar but the decrease in WTP per HH member with increasing HH size in small HHs was sharper than that observed with nominal WTP. The parameters are as follows: constant 0.971 ± 0.038, $b_1 = 0.164 \pm 0.013$; $b_2 = 0.0088 \pm 0.0011$; p-values are all smaller than 0.0001.

The high significance of the quadratic terms attests to the curvature of the regression lines and supports the notion of a residual willingness to pay per HH member that remains relatively constant even in large HHs.[7] This means that nominal WTP will increase with HH size but less than linearly.

3.9. Correlation between WTP and income or expenditure of HHs

In many WTP studies, a positive correlation between WTP and HH economic status has been shown [3,26,34,35,37,38]. The multivariate analysis (Table 2) confirmed that this is valid in our study as well. Interestingly we find a highly significant and strong positive association with HH income, but a significant and negative association with the quadratic expression of HH income [(Household income)^2] indicating that the relationship between WTP and household income is less than linear. We further examined in detail the correlations between the two proxies described above (HH income and HH non-heath expenditure), as well as the correlation of either parameter with WTP. The results are presented in Table 4.

The first row of the table confirms a highly significant correlation between the two proxies of the economic status of the HH. Furthermore, as also seen in Table 2, a positive and highly significant correlation exists between nominal WTP and economic status of the HH, regardless of the proxy used (HH income—line 2, or HH expenditure—line 4 of Table 4). It is interesting to note however that the correlation between nominal WTP and HH income *per person* is negative and insignificant (line 3 of Table 4). This indicates that the economic unit relevant for determination of WTP is the HH rather than single individuals. The relevance of the HH as the reference unit comprises two features: first, the wealth of a HH is a function of certain economies of scale that the HH can affect but not necessarily each of its component individuals with a pro-rated share of HH income; secondly, in this study of WTP we inquired about HH decisions on the use of HH income, but have no basis to surmise what individual choices would resemble the HH choice.

On the other hand, the correlation between WTP expressed as percentage of either income or expenditure with the two proxies for economic status is negative and significant, indicating that poorer HHs are prepared to pay a higher percentage of their income than richer HHs for the same health insurance as revealed in the multivariate analysis as well.[8]

[7] We excluded from the figure, 40 HHs with more than 10 members (10–13) because their small number, less than 20 per each group, created a very large S.E.M.; however, these HHs were included in the regression calculation.

[8] All the correlations that were significant in Table 4 were also significant when assessed for the sub-sample HHs containing five members.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

Table 4
Correlations between WTP and the economic status of HHs

Variable 1	Variable 2	r (Pearson)	p	n[a]
HH income	HH non-health expenditure	0.4585	$<2 \times 10^{-6}$	4931
WTP (in INR)	HH income	0.1703	$<2 \times 10^{-6}$	3024
WTP (in INR)	HH income per person	−0.010	NS	3024
WTP (in INR)	HH expenditure	0.1673	$<2 \times 10^{-6}$	3024
WTP (% of income)	HH income	−0.3004	$<2 \times 10^{-6}$	2784
WTP (% of income)	HH expenditure	−0.1353	$<2 \times 10^{-6}$	2784
WTP (% of HH expenditure)	HH income	−0.088493	$<2 \times 10^{-6}$	2968
WTP (% of HH expenditure)	HH expenditure	−0.35908	$<2 \times 10^{-6}$	2968

[a] The valid sample for analysis of WTP as % of HH income is due to the following reasons: (i) some HH did not provide reliable info about income; (ii) some HH reported WTP as higher than 10% of either income or expenditure; these replies were considered unreliable and were excluded from the analysis.

As can be seen in Fig. 3 WTP expressed as percentage of expenditure is higher than when expressed as percentage of income. Both distribution patterns seem very similar. Yet the normalization with respect to reported HH income yields lower values of WTP. Thus, as a measure of prudence, we conduct the analysis by reference to the more conservative parameter.

Fig. 5 provides the graphic illustration of the association between WTP and HH income in this survey, where WTP is expressed both nominally and as percentage of income. The entire sampled population (composed of insured and uninsured alike) was divided into five income ranges, and for each range, the median WTP was calculated. It is evident that nominal WTP increases with nominal income. However, the opposite trend is observable when WTP is expressed as percentage of HH income. The two trends seen here are a quantitative illustration of the significant correlation of the data in Table 4 (Please see Table 4 line 3 for *nominal* and line 7 for percentage of *income*). Incidentally,

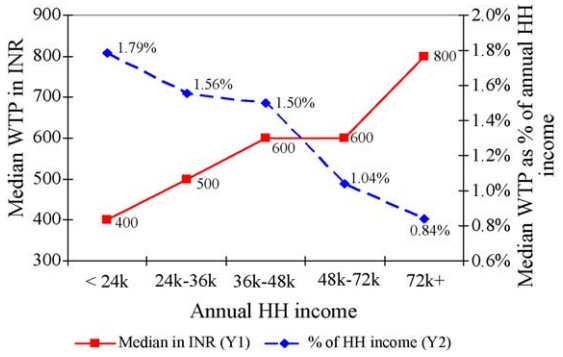

Fig. 5. Relationship between WTP and HH income.

the same correlations remain significant when we look only at the sub sample of HH = 5.

3.10. Correlation between WTP and educational level of HHs

Following reports about a positive influence of education on WTP for health insurance [3,26,39], we included this parameter in the multivariate analysis. As can be seen in Table 2, there was a significant but modest association between education of the HH head and WTP. We confirmed this finding by a non-parametric (Spearman) correlation performed on the entire data set, and the result is shown in third row of Table 5. However, when WTP is expressed as percent of income or as percent of expenditure, the correlation with education vanishes (fourth and fifth rows of Table 5). At the same time, HH income and expenditure are positively correlated with education level (first and second rows of Table 5). Taken together, these findings strongly suggest that the correlation between WTP and education is secondary to the correlation of WTP with HH income or expenditure.

3.11. Association between WTP and gender

According to our survey replies the entire sample in all seven locations consisted of male HH heads; consequently, it was impossible to examine whether an association might exist between the gender of HH heads and nominal WTP in this sample. At the same time, not all respondents were also the HH heads. Therefore, an attempt was made to assess the association between WTP and men's versus women's responses.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

Table 5
Correlations between WTP and the education of HH heads

Variable 1	Variable 2	*r* (Spearman)	*p*	*n*
HH income	Educational level of HH head	0.113	<0.0001	3003
HH exp	Educational level of HH head	0.136	<0.0001	3003
WTP nominal	Educational level of HH head	0.128	<0.0001	2968
WTP% of HH income	Educational level of HH head	0.028	NS	2766
WTP% HH expenditure	Educational level of HH head	0.010	NS	2947

The multivariate analysis (Table 2) reveals an association between WTP and the respondents' gender, in which men were presumably prepared to pay more [40]. This finding was further explored by looking at the effect of gender on WTP in the various survey sites. The results are given in Table 6.

The data by location suggests that distinctions in levels of WTP by gender are rarely apparent. For example, when WTP is expressed as percentage of income, males are willing to pay more than females in three locations, females are willing to pay more than males in another three locations, and in one location there is no difference. The differences in location-specific replies are significant only in two cases. And when WTP is expressed in INR, females are wiling to pay more than males in only one location (BAIF), where the difference may be a bias due to the very small sample of male respondents.

3.12. Differences in WTP due to other demographic criteria

The multivariate analysis revealed marginally significant association between age of HH head and WTP. However, we found no association between WTP and the ratio of under-5 or over-55 in the sampled HH. Dong et al. [26,41], in their study in rural Burkina Faso reported that the age of the respondent negatively influenced WTP. Other studies also refer to the influence of age on WTP for health insurance [3,39].

3.13. Differences in WTP due to distance from providers

In the multivariate analysis (Table 2) there is a marginally significant negative correlation between distance to hospital (measured by travel-time) and

Table 6
Association between respondents' gender and WTP

Location	Gender	WTP (INR)				WTP (% of income)			
		n	Mean	S.E.M.	Significance of difference	*n*	Mean (%)	S.E.M. (%)	Significance of difference
BAIF	Male	22	1027	81	NS	19	1.39	0.17	$p = 0.007$
	Female	381	1117	27		342	1.94	0.07	
Uplift	Male	233	948	32	NS	215	2.12	0.10	$p = 0.04$
	Female	171	870	35		156	1.85	0.08	
Karuna	Male	246	517	27	NS	245	1.16	0.06	NS
	Female	178	473	27		176	1.35	0.09	
Yeshas	Male	192	619	31	NS	192	1.11	0.06	NS
	Female	131	568	30		131	1.26	0.08	
Nidan	Male	98	1266	92	NS	92	2.65	0.20	NS
	Female	395	1121	40		383	2.64	0.10	
DHAN	Male	282	498	25	$p = 0.013$	276	1.44	0.09	NS
	Female	198	405	28		192	1.31	0.11	
VHS	Male	279	678	31	NS	202	2.17	0.15	NS
	Female	218	620	35		163	1.91	0.13	

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

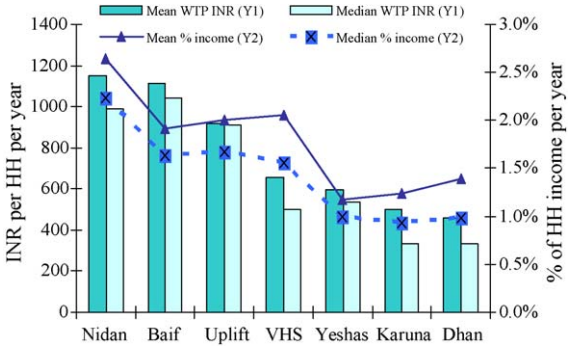

Fig. 6. Differences in WTP by locations.

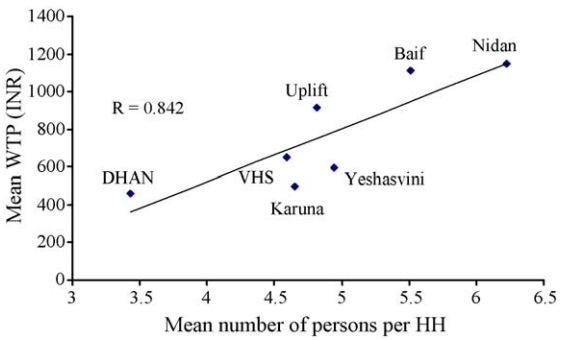

Fig. 7. Correlation between mean WTP and mean HH size.

WTP. On the other hand, no such correlation was found between WTP and the distance to primary care facility.

3.14. Differences due to recent exposure to high medical costs

We also assessed the possible effect of a recent experience of a health-related high-cost event on WTP. This was done by using information about incidence of hospitalizations in the last 2 years. The multivariate analysis (Table 2) confirms that HHs who experienced a hospitalization in the last 2 years were willing to pay more. This insight follows and strengthens the finding by Mathiyazhagan [3] that recent incidences of hospitalization tended to increase WTP. Dong et al. [26] found a negative relationship between the number of episodes and WTP, but showed that *recent* medical expenditures influenced HHs WTP positively.

3.15. Differences between locations (heterogeneity)

The multivariate analysis demonstrates clearly and significantly the large impact of location on WTP. The heterogeneity between locations seems quite consistent when mean and median values, both in INR and as percentage of HH income, are looked at. This is shown in Fig. 6.

We explored several possibilities to explain this heterogeneity. We examined whether HH size (which is positively correlated with WTP, as stated above) can account, at least partially, for the observed differences in WTP across the seven locations. For this purpose, we examined the correlation between the mean HH size and the mean WTP in bivariate analysis for all locations and this relation is illustrated in Fig. 7. This correlation is very strong ($r = 0.842$) and highly significant ($p = 0.0175$), suggesting that HH size is indeed a major cause for the variance in WTP among the different locations (in the regression the high β value for household size and of the interaction variable already suggested this). However, some marked differences between locations are not explained by differences in HH size.

We also checked whether rural versus urban location affected WTP; five locations were mainly rural, and two locations mainly urban. The data do not indicate that urban/rural difference is a major determinant of WTP, all the more so as the two urban sites (Uplift and VHS) differ markedly in their respective WTP levels.

Neither do differences in HH income in the different locations explain the remaining differences in WTP. For instance, Uplift and Yeshasvini have very similar HH sizes (respectively, 4.81 and 4.94 persons per HH) and quite similar median HH income (INR 47,000 in Uplift and INR 50,000 in Yeshasvini), yet WTP is almost double in Uplift than in Yeshasvini. The main conclusions of these findings on heterogeneity are supported by the multivariate analysis. We included in that regression model two interaction variables to highlight possible regional differences (one interaction variable for the region with highest income, and one with the region with the biggest household size). We found that the interaction with the region with the highest HH size was highly significant, confirming that this parameter contributed to the heterogeneity; while the interaction with the region with the highest income was not significant in this model.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

4. Discussion

The median WTP values found in this study are about INR 600 per HH per year, with 25% of the studied population willing to pay INR 1000 or more (Figs. 2 and 3). WTP per person per year reaches INR 213, INR 199 and INR 168, respectively, for HHs composed of one, two and four persons. The value of WTP per person drops as HH size increases, but this decrease levels-off at around INR 150, when HH size included six persons or more (Fig. 4).

It is interesting to assess WTP also in relative terms, since such values are more relevant when compared to other findings, or in other locations and across other income groups. This study focuses on people in the informal economy, whose HH income is difficult to estimate reliably. For this purpose, we used two proxy variables, namely declared HH income (which includes income from all sources both cash and kind) and declared non-health HH expenditure.[9] Results obtained by reference to both proxies were quite similar, and enhanced the confidence in the findings. The median WTP level expressed as percentage of HH income is 1.38% among the insured cohort and 1.27% among the uninsured cohort. The mean is 1.79% (S.E.M. $\pm$ 0.02, $N = 2784$). And when expressed as percentage of HH non-health expenditure, median WTP is 1.79% and mean is 2.32% (S.E.M. $\pm$ 0.035, $N = 2968$).

As far as the impact of HH income on WTP, it has been shown that the more affluent HHs are willing to pay a higher nominal amount for health insurance. On the other hand, when WTP is looked at as percentage of income the trend is reversed: the richer the HH the lower the WTP expressed as percentage of income (Fig. 5). The correlation between WTP as percentage of income and HH income is -0.3004 ($p < 0.001$) (Table 4). Still, the disparity in median nominal income is a factor of 5.4 (from INR 15,960 in band 1 to INR 86,000 in band 5, see Fig. 5), more than double the disparity in WTP, which is a factor of 2.12 (from 1.79% in band 1 and 0.84% in band 5). This illustrates that the sampled population is more homogeneous in its expressed WTP than it is in reported income. This finding suggests that respondents accepted a WTP bid by reference to the nominal cost of care rather than by reference to their income.

When WTP per person is expressed as percentage of HH income *per person*, single-person HHs were willing to pay 0.98% of annual HH income p.p., compared to 0.77% p.p. in a two-person HH, 0.50% p.p. in a HH composed of three persons, 0.43% p.p. in a HH composed of four persons, 0.37% p.p. in a HH composed of five persons and 0.32% of annual HH income per person in a HH composed of six persons or more. The decline in WTP expressed as percentage of HH income per person is sharper than the nominal drop.

Another finding that suggests that respondents take into account nominal cost of care is the leveling-off of the WTP of large HHs at around INR150 per person (shown in Fig. 4). If the HH wishes to procure services for all HH members, notably those who do not contribute to HH income, it can do so only if its WTP would still be relevant in the context of what services cost. This implies that larger HHs agree to spend more of their total income on health. This is an important insight especially in the context of rural and BoP India. It suggests that respondents understood and accepted the full consequence of our version of the bidding game, in which entire HHs were assumed to be insured en bloc, and in which the opening bid was directly proportional to HH size. The sophistication of understanding such a complex paradigm is impressive.

This is the first reported WTP study that used the bidding game in India. Previous studies in India, referenced earlier, have posed an open question. The bidding game is a more reliable method in that it offers respondents an anchor from which to determine their choice. We intended the opening bid to be too high, and we expected most respondents to reject it. This is indeed what the findings confirm. Additionally, the spread of accepted bids suggests that the bidding process was effective, which gives the WTP values obtained more credence. As the bidding starts from a high opening bid and is reduced as necessary (using the unidirectional descending bidding method), it is assumed that the accepted bid is the maximal WTP. Yet a word of warning is due: declared WTP levels would usually differ from the real value that the same HHs will actually pay when offered a concrete product [42].

Regarding the similarity of responses to the three versions of the benefit package attached to the opening bid, this finding should not be construed to suggest that

[9] We used non-health HH expenditure in order to enable respondents to express choice of spending (health expenditures being unavoidable, it does not reflect such choice).

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

respondents are indifferent to the composition of the benefit package. In fairness, respondents did not have the opportunity to choose one package over another. We conclude that the bidding game as used in this study is not an adequate method to distinguish between the WTP for different packages offered. The replies simply suggest that respondents prefer to be insured rather than remaining uninsured (at the given value), and our findings indicate that this bidding process was driven by the price rather than by package-composition. It may be worthwhile to study the impact of involving clients in benefit package design on higher willingness to join insurance, and possibly also the impact of responsiveness to the perceived priorities of the respondents on WTP levels.

Differences in nominal WTP levels between insured and uninsured cohorts were surprisingly small, notwithstanding statistical significance for the whole sample and in two locations. This small difference suggests that insured households do understand that their WTP can procure better insurance. However, it does not support the assertion that affiliation to the MIUs had a marked impact on WTP for health insurance in general. Does this mean that the small difference in WTP reflects dissatisfaction of affiliated members with their MIU or its benefit package? One possible explanation for the small gap could be that the benefit packages offered by the MIUs did not reduce out-of-pocket payments sufficiently, because most packages did not cover benefits that generate much cost (e.g. outpatient drugs). At the same time, one should recall that respondents were not told (and could not be told) that the package tagged to the bidding game was going to be offered by the MIU or by any other insurer.

Unlike HH size, which was a strong determinant of WTP, education seems to have a slighter effect, and is probably secondary to the effect of income. Similarly, various demographic parameters did not affect WTP (composition of the HH) or only marginally so (age). This differs somewhat from findings by others about a positive influence of education on WTP for health insurance [3,26,39]. The gender of the respondent effected WTP but this seems to be influenced by regional differences as well; local comparisons hardly yielded significant results.

The association between proximity of providers and WTP, reported by Dong et al. [26] was marginally significant in this study as well. And respondents' recent experience with an illness that caused hospitalization had a significant positive effect on higher levels of WTP. This finding could be due to loss aversion,[10] described by Kahneman and Tversky [43], and the wish to avoid repetition of the financial loss could motivate respondents to pay for health insurance.

Further, WTP levels differ markedly across the seven research locations. HH size may account for most of the difference, but does not explain it in full. Nor does HH income or rural-urban location of the community explain the residual differences. Local or cultural issues may explain part of those residual differences. For example, subsidization of the premium, practiced in Yeshasvini Trust and Karuna Trust (both in Karnataka) for 2 years from launch [44,45], may have generated discontent or non-renewal of affiliation when the subsidy was reduced and premiums were raised (which occurred incidentally when this survey was underway). The relative lower WTP values recorded in these locations may well reflect a reference by respondents not only to the opening bid but also to the subsidized premium. Such 'double anchoring' did not exist in places where the premium of the MIU had never been subsidized, e.g. Uplift Health (Maharashtra) and Nidan (Bihar).

Finally, the information on WTP can be juxtaposed to applicable premium levels for benchmarking only (as premiums do not reflect WTP, let alone maximal WTP). KKVS, a mutual scheme in Tamil Nadu linked to DHAN foundation, collects INR 150 per HH per year for a benefit package limited to reimbursement of 80% of the cost of hospitalization [46]. In Maharashtra, BAIF charges INR 250 per individual covering life and health, of which about INR 110 is for health, covering hospitalization up to INR 5000 and an annual health check-up [47]. Informal-sector clients can avail

[10] Loss aversion refers to situations when the person can win OR lose (e.g. lottery). According to the Prospect Theory (Kahneman and Tversky [43]) losses and disadvantages have a greater impact on preferences than gains and advantages. Hence, it is consistent that people who had experienced loss (in our context, high-cost due to hospitalization) reported a higher preference to pay for health insurance (presumably the mechanism to prevent the repetition of the loss) compared to people who did not experience such loss in the past and were less willing to join the insurance. This should not be confused with Risk aversion, which is described by the Expected Utility Theory as the situation that individuals are willing to pay more than the probability would warrant, because they want a sure gain rather than an uncertain gain.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

of *Jan Arogya Bima*, a scheme offered mainly to the low-income population by the four former subsidiaries of the General Insurance Corporation (NIC, UIIC, NIA and OIC) at a premium of INR 70 for an adult and INR 50 for each dependent not exceeding 25 years of age. The insured maximum benefit is INR 5000 [48,49]. Nowadays, this policy is sold to community-based organizations through group policies. This premium amount is just over half the price of the more comprehensive "*Universal Health Insurance*", launched by the central government as part of the 2003–04 Union budget, for "below poverty line" (BPL) people and in tie-up with public sector insurance companies. The premium varies according to family size: INR 365 per year for an individual, INR 553 per year for a family of up to 5 members and INR 730 per year for a family of up to seven members. The scheme covers hospitalization expenses up to INR 30,000 per family, sick pay and accidental death of the household head [50]. Initially each BPL family received a reduction of INR 100, paid by central government irrespective of family size; the subsidy amount was raised to INR 200, INR 300 and INR 400, respectively, for the three premium levels. This short review shows that at the low end, premiums hover around INR 30 per person per year (Karuna Trust) or INR 32 [3], at the mid-range at INR 50 [6], INR 50[11] [51][12] to INR 70 [48,49] and at the high end at INR 110 [47]. All premia were charged for partial packages that are not easily comparable to each other or to the hypothetical benefit packages that were attached to our bidding game. This overview exemplifies two issues: (i) the fragmentation in insurance products; (ii) the wide range of prices aimed at the same population may reflect the paucity of information among policymakers and insurers how much the target population would be willing to pay.

5. Conclusions

This study of WTP provides field evidence that rural and BoP population segments in India would agree to pay for health insurance at least 1.35% of median HH income per household per year, or at least 1.8% of median non-health HH expenditure per HH per year.

The nominal levels of WTP identified through this study are much higher than has been known hitherto; we submit that nominal WTP levels stated in this article are conservative estimates, bearing in mind that small HHs are willing to pay up to INR 230 per person per year, and large HHs, while willing to pay a decreasing amount per person, nevertheless, agree to pay about INR 150 per person when household size counts six persons and above.

The WTP values reported here are higher than previous reports in the literature and higher than premiums charged by many schemes today. For example, median nominal WTP levels confirmed in this study are about four times higher than those reported by Mathiyazhagan [3], or more than three times higher than premium levels applied in certain MIUs (e.g. Karuna Trust [44], Uplift Health [6]) and about thrice the premium of the *Jan Arogya Bima* [48,49]. Therefore, the results of this study suggest a considerable and largely untapped potential to raise revenues for health insurance from the underserved population segments surveyed in this study.

A policy objective of extending health insurance that includes raising revenues for healthcare financing would gain from shifting the subscription unit from single individuals to entire HHs en-bloc. In this study, the questions posed and the replies received about WTP refer to the entire HH rather than to single individuals. And with nominal WTP values that increase with HH size, it stands to reason that respondents prefer to insure the entire HH, and this must also be the aim of the insurer. The likely effect of subscribing entire HHs en-bloc, in addition to raising more resources, would be that the cost of the pure risk should drop because the risk of adverse selection should diminish.

In summary, this study set out to deliver the evidence on *maximal* WTP among rural and BoP population segments in India and identify the major determinants influencing their choice. In most other studies of WTP, it has been established that WTP is positively correlated with income. In fact, this is one of the criteria to evaluate methods for WTP estimation. In our study, the same positive correlation has been established with nominal WTP but with a negative correlation when WTP is expressed as percentage of income. Consequently, we deduce that poorer people

[11] Calculated for a family of five, 248/5.

[12] The subsidized premium for the *Universal Health Insurance* per individual is INR 165; however, most of those who signed up to this insurance were neither individuals nor BPL.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

are willing to pay a higher percentage of their income as health insurance premiums.

We found a positive association of WTP with education, but this relation also vanishes when WTP is expressed as percentage of income. HH size is found to be the most dominant determinant influencing WTP levels; but when we look at WTP per HH member, it decreases with HH size but only down to a limiting value. This strongly suggests that respondents understand that the level of coverage is linked to the level of the premium, and that reasonable coverage commands a certain level below which the payment cannot drop.

In addition, persons insured by MIUs accepted higher WTP levels than uninsured, even though respondents were not given the option to choose the composition of the benefit package attached to their bids. We feel that this study, using the bidding game, was conclusive in determining WTP levels in the investigated context.

Acknowledgements

We gratefully acknowledge funding received by the European Union within the EU-India Economic Cross Cultural Programme (ECCP). Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) kindly provided additional funding to enlarge sample size of the household survey. We recognize input received from Parul Khanna and Neelam Mishra (BIMTECH) and Eva Heyblom (Erasmus University Rotterdam/MC). We thank Trea Laske-Aldershof, Ph.D. (Erasmus University Rotterdam/MC) and Barbara Hanel (Friedrich Alexander University Nürnberg Erlangen) for statistical advice.

References

[1] Indian Ministry for Health and Family Welfare. Financing and Delivery of Health Care Services in India. Background Papers of the National Commission on Macroeconomics and Health, New Delhi; 2005.
[2] National Rural Health Mission. National Rural Health Mission (2005–2012)—mission document. Indian Journal for Public Health 2005;49(3):175–83.
[3] Mathiyazhagan K. Willingness to pay for rural health insurance through community participation in India. International Journal of Health Planning and Management 1998;13:47–67.
[4] Centre for Population Dynamics. Community Health Insurance—Organisation of a Pilot Project. Bangalore, n.d.
[5] Gupta I. Private health insurance and the willingness to avoid health costs results costs: Results from a Delhi study. Discussion Papers no. 15. Institute of Economic Growth: New Delhi; 2000.
[6] Leist H, Radermacher R. Brief Technical Report on Swasthyapurna Mutual Health Fund. Eschborn: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ); 2004.
[7] Hay F-X. Personal communication, scheme manager in Uplift Health.
[8] Diener A, O'Brien B, Gafni A. Health care contingent valuation studies: a review and classification of the literature. Health Economics 1998;7:313–26.
[9] Morrison GC, Gyldmark M. Appraising the use of contingent valuation. Health Economics 1992;1:233–43.
[10] Johannesson M. The contingent valuation method—appraising the appraisers. Health Economics 1993;2:357–9.
[11] Gafni A. Willingness-to-pay as a measure of benefits. Relevant questions in the context of public decision making about health care programs. Medical Care 1991;29:1246–52.
[12] O'Brien B, Gafni A. When do the dollars make sense? Toward a conceptual framework for contingent valuation studies in health care. Medical Decision Making 1996;16:288–99.
[13] Drummond MF, O'Brien B, Stoddart GL, Torrance GW. Methods for the economic evaluation of health care programmes. 2nd ed. Oxford: Oxford University Press; 1997.
[14] Klose T. The contingent valuation method in health care. Health Policy 1999;47:97–123.
[15] Carlsson F, Martinsson P. Design techniques for stated preference methods in health economics. Health Economics 2003;12(4):281–94.
[16] Cookson R. Willingness to pay methods in health care: a sceptical view. Health Economics 2003;12(11):891–4.
[17] Ajzen I, Brown TC, Carvajal F. Explaining the discrepancy between intentions and actions: the case of hypothetical bias in contingent valuation. Personality and Social Psychology Bulletin 2004;30(9):1108–21.
[18] Ryan M, Scott D, Donaldson C. Valuing health care using willingness to pay: a comparison of the payment card and dichotomous choice methods. Journal of Health Economics 2004;23(2):237–58.
[19] Whynes DK, Wolstenholme JL, Frew E. Evidence of range bias in contingent valuation payment scales. Health Economics 2004;13(2):183–90.
[20] Bayoumi AM. The measurement of contingent valuation for health economics. Pharmacoeconomics 2004;22(11):691–700.
[21] Onwujekwe O. Criterion and content validity of a novel structured haggling contingent valuation question format versus the bidding game and binary with follow-up format. Social Science & Medicine 2004;58(3):525–37.
[22] Smith RD. Sensitivity to scale in contingent valuation: the importance of the budget constraint. Journal of Health Economics 2005;24(3):515–29.
[23] Donaldson C, Thomas R, Torgerson DJ. Validity of open-ended versus payment scale approaches to eliciting willingness to pay. Applied Economics 1997;29:79–84.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011

[24] Alberini A. Testing willingness to pay models of discrete choice contingent valuation survey data. Land Economics 1995;71:83–95.
[25] Dong H, Kouyate B, Cairns J, Sauerborn R. A comparison of the reliability of the take-it-or-leave-it and the bidding game approaches to estimating willingness-to-pay in a rural population in West Africa. Social Science & Medicine 2003;56(10):2181–9.
[26] Dong H, Kouyate B, Cairns J, Mugisha F, Sauerborn R. Willingness to pay for community based insurance in Burkina Faso. Health Economics 2003;12(10):849–62.
[27] Dong H, Mugisha F, Gbangou A, Kouyate B, Sauerborn R. The feasibility of community-based health insurance in Burkina Faso. Health Policy 2004;69(1):45–53.
[28] van Exel NJA, Brouwer WBF, van den Berg B, Koopmanschap MA. With a little help from an anchor: Discussion and evidence of anchoring effects in contingent valuation. Journal of Socio-Economics 2006;35(5):836–53.
[29] Kahneman D, Knetsch JL. Valuing public goods: the purchase of moral satisfaction. Journal of Environmental Economics and Management 1992;22:57–70.
[30] Hackl F, Pruckner GJ. Warm glow, free-riding and vehicle neutrality in a health-related contingent valuation study. Health Economics 2005;14(3):293–306.
[31] Onwujekwe O, Nwagbo D. Investigating starting-point bias: a survey of willingness to pay for insecticide-treated nets. Social Science & Medicine 2002;55(12):2121–30.
[32] Tversky A, Kahneman D. Judgment under uncertainty: heuristics and biases. Science 1974;185:1124–31.
[33] Stalhammer NO. An empirical note on willingness to pay and starting-point bias. Medical Decision Making 1996;16(3): 242–7.
[34] Asenso-Okyere WK, Osei-Akoto I, Anum A, Appiah EN. Willingness to pay for health insurance in a developing economy. A pilot study of the informal sector of Ghana using contingent valuation. Health Policy 1997;42(3):223–37.
[35] van den Berg B, Bleichrodt H, Eeckhoudt L. The economic value of informal care: a study of informal caregivers' and patients' willingness to pay and willingness to accept for informal care. Health Economics 2005;14(4):363–76.
[36] Friedman M. A Theory of the Consumption Function. Princeton: Princeton University Press; 1957.
[37] Frick KD, Lynch M, West S, Munoz B, Mkocha HA. HH willingness to pay for azithromycin treatment for trachoma control in the United Republic of Tanzania. Bulletin of the World Health Organization 2003;81(2):101–7.
[38] Onwujekwe O, Hanson K, Fox-Rushby J. Inequalities in purchase of mosquito nets and willingness to pay for insecticide-treated nets in Nigeria: challenges for malaria control interventions. Malaria Journal 2004;3(6).
[39] Asgary A, Willis K, Taghvaei AA, Rafeian M. Estimating rural HHs' willingness to pay for health insurance. European Journal of Health Economics 2004;5(3):209–15.
[40] Dong HJ, Kouyate B, Snow R, Mugisha F, Sauerborn R. Gender's effect on willingness-to-pay for community-based health insurance in Burkina Faso. Health Policy 2003;64(2): 153–62.
[41] Dong H, Kouyate B, Cairns J, Sauerborn R. Differential willingness of HH heads to pay community-based health insurance premia for themselves and other HH members. Health Policy and Planning 2004;19(2):120–6.
[42] Blumenschein K, Johannesson M, Yokoyama KK, Freeman PR. Hypothetical versus real willingness to pay in the health care sector: results from a field experiment. Journal of Health Economics 2001;20(3):441–57.
[43] Kahneman D, Tversky A. Prospect theory: an analysis of decision under risk. Econometrica 1979;47:263–91.
[44] Radermacher R, van Putten-Rademaker O, Müller V, Wig N, Dror DM. Karuna Trust, Karnataka, India. Series: Good and Bad Practices in Microinsurance, no. 19. Geneva: CGAP Working Group on Microinsurance; 2005.
[45] Radermacher R, Wig N, van Putten-Rademaker O, Müller V, Dror DM. Yeshasvini Trust, Karnataka, India. Series: Good and Bad Practices in Microinsurance, no. 20. Geneva: CGAP Working Group on Microinsurance; 2005.
[46] Devadasan N, Ranson K, Van Damme W, Acharya A, Criel B. The landscape of community health insurance in India: An overview based on 10 case studies. Health Policy 2006;78(2–3):224–34.
[47] Radermacher R. Health insurance for the poor—examples from India. Unpublished monograph.
[48] Oriental Insurance Company. Jan Arogya Bima. http://orientalinsurance.nic.in/Policy_Details.asp?dept=48&poltyp=101 [1.3.2006].
[49] United India Insurance Company. Jan Arogya Bima Policy. http://www.uiic.co.in/janarogya.jsp [1.3.2006].
[50] Ahuja R. Health insurance for the poor in India. Working Paper No. 123, New Delhi: Indian Council for Research on International Economic Relations; 2004.
[51] Government of India. Budget 2004–2005. New Delhi; 2004.

Please cite this article as: David Mark Dror et al., Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, Health Policy (2006), doi:10.1016/j.healthpol.2006.07.011