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WILLINGNESS TO PAY FOR VOLUNTARY HEALTH INSURANCE IN TANZANIA

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ABSTRACT

Objective(s): **To assess how willing people would be to join a voluntary health insurance scheme and to see how they respond to changes in the benefit package. We also examined willingness to cross-subsidise the poor.**
Design: **Cross-sectional study.**
Subjects: **Two thousand two hundread and twenty four households comprising of 1,163 uninsured household heads asked about their willingness to pay for insurance in seven districts/councils (three urban and four rural) and 1,061 insured households were asked about their willingness to pay for insurance premiums for the poor in their community. Uninsured respondents were presented with two scenarios, the first reflected the current design of the Community Health Fund/Tiba Kwa Kadi (CHF/TIKA), the second offered expanded benefits, and included inpatient care in public facilities and transport.**
Results: **Only 30 % of uninsured rural households were willing to pay more than Tsh 5,000 the current premium level, their average amount was Tsh 10,741, while in urban areas one percent of households were willing to pay more than Tsh 5,000. There was very limited willingness to pay more than 5,000 Tsh, even with an expanded package in rural areas. Household from rural areas were more willing to cross-subsidise the poor, but contribution levels were higher in urban areas.**
Conclusion: **Communities need to be sensitised about the existence of the CHF/TIKA to encourage enrollment. Expanding the benefit package would further increase enrollment. However, few people would be willing to pay more than the current premium.**

INTRODUCTION

Increasingly moves are being made to expand health insurance cover in Africa as a means of reducing out of pocket payments as well as improving access to formal health care, in line with universal coverage objectives (1). However, the fragmentation of insurance schemes in many settings, along with limited regulation of the health insurance sector, has hampered expansion efforts in many countries (2). A particular challenge facing many lower income countries is how to expand coverage among the informal sector which constitute a large proportion of the population (3). With a few exceptions like Rwanda, it is notoriously challenging to achieve high levels of coverage among this group, as contributions are typically voluntary (4), and it is costly to shemes targeting the informal sector (5) and enforce contributions (4). Further, poorer segments of the informal sector often have limited understanding of the concept of risk pooling (6). Typically the benefit package offered to the informal sector is limited, to ensure that premiums remain affordable.

A further challenge, in the context of income constrained economies, is how to finance and sustain the expansion of health insurance, and to what extent mandatory insurance contributions from the formal sector can be used to cross-subsidise contributions from informal sector groups. A question of particular pertinence, therefore, when considering the goal of universal health coverage, is how willing individuals are to cross-subsidise poorer groups (7).

A number of studies have been carried out to assess willingness to pay (WTP) for community health insurance schemes to inform premium setting in rural and urban areas (8-10). WTP has also been used to explore altruism (selfless concern for the welfare of others) within the health sector (11). All of these studies employed the contingent valuation method to measure WTP. This is a survey-based method used for setting prices for a given service or placing monetary vales on goods and services not bought or sold in a market place (8). WTP was defined as the maximum amount a household or individual is hypothetically prepared to give up in order to benefit from health insurance or the amount that people value the health of others in the community.

However, to our knowledge, to date, no studies have examined the responsiveness of WTP to changes in the benefit package offered by an insurance scheme, and only one study has examined willingness to

cross-subsidise poorer groups in relation to insurance (7).

Against this background, the current study used the contingent valuation method to elicit household's willingness to join (WTJ) voluntary health insurance and their willingness to pay (WTP) for such a scheme among the uninsured in Tanzania, and examined how their willingness to join and pay varied according to the benefit package offered. The study also examined the willingness to cross-subsidise the poor among the currently insured.

MATERIALS AND METHODS

Study Setting: Tanzania has a highly fragmented system of health insurance. Numerous insurance schemes exist covering different segments of the population, with national coverage remaining low at around 13% in 2010 (12). The National Health Insurance (NHIF) is the largest scheme targeting the public formal fund sector. The NHIF is financed through mandatory payroll contributions amounting to 3% of salaries from the employee which is matched by the employer, and covers outpatient and inpatient health care from a large range of accredited health providers. The contributor, spouse and a maximum of four dependants are covered by this scheme. Dar-es-Salaam. There are a number of schemes covering the private formal sector, however, coverage among this group remains very low.

The Community Health Fund (CHF) which has been operating since 2001 for rural populations, and the *Tiba kwa Kadi* (TIKA) which has been implemented since 2009 in urban councils is a voluntary insurance scheme targeting the informal sector. The premium typically ranges from Tsh 5,000 - 15,000 per annum per household () and covers a couple and their children under 18 years. The scheme covers primary level public facilities and limited referral care in some districts (13). The government matches contributions made by CHF/TIKA members through a matching grant. High dropout rates and low enrolment have been among the challenges facing the CHF/TIKA in Tanzania (9), due to poor quality of health care in public facilities and limited access to referral facilities (13).

There is a huge discrepancy between the benefit package offered to NHIF members compared with CHF/TIKA members, as well as the amount of revenue generated by each scheme. While there is cross-subsidisation across NHIF members, there is no cross-subsidisation across the schemes. Nor is there cross-subsidisation across districts/councils for the CHF/TIKA.

There have been growing national commitments to scale up health insurance coverage in Tanzania, with the aim being to reach 45 % by 2015 (12). To facilitate insurance expansion, the NHIF has been given a mandate to oversee the management of the CHF/TIKA over the coming years and plans are being made to expand the benefit package available to CHF/TIKA members.

However, there are three points of uncertainty regarding how health insurance will evolve in the country: how willing people in urban areas will be to join voluntary insurance; how enrollment might increase in response to changes in the benefit package; and the acceptability and feasibility of cross-subsidisation between formal and informal sectors.

Data Collection: One thousand six hundread and sixty three uninsured and 1,061 insured household heads were interviewed in 2008. The survey was conducted in three urban councils (Morogoro, Ilala, and Kinondoni) and four rural districts (Kigoma, Kilosa, Mbulu and Singida). These districts/councils were selected purposively. The rural districts were selected such that they had a minimum level of CHF coverage (at least 10%), and to offer some geographical variation. In Mbulu and Singida districts the CHF benefit package included hospital care at designated district hospitals as well as public primary care, while in Kigoma and Kilosa districts the benefit package did not include inpatient care. A total of two councils in Dar-es-Salaam were selected as Dar-es-Salaam currently offers the greatest range of insurance options to its population. Morogoro was selected as a second urban site, as the TIKA was about to be introduced there, and the informal sector had no health insurance options at the time of the study, consistent with the majority of urban councils in the country.

The uninsured household heads were asked about their willingness to join (WTJ) the CHF/TIKA and how much they would be willing to pay (WTP) for such insurance. They were presented with two scenarios, the first reflecting the current design of the CHF/TIKA, the second offering expanded benefits, including inpatient care in public facilities and transport. In the case of the first scenario, all respondents were asked if they would be willing to pay the current average rural area premium (Tsh 5,000). In urban areas, the open-ended question format was used to elicit maximum willingness-to-pay, on the assumption that willingness-to-pay may be higher in these areas. Willingness to cross-subsidise questions were addressed to insured household heads. They were asked: *"Would you be willing to contribute to any health insurance scheme or to the council any amount of money so that the very poorest in your community can benefit from free care when they are sick?"*. Those who said "Yes", were asked to state how much they would be willing to pay per annum to protect the poor. Socio-economic and demographic data were obtained from all households. Households were ranked into five wealth groups (based on ownership of assets and housing characteristics) from poorest to least poor. Data analysis were done using STATA version 11.0.

Data Analysis: Bivariate analysis was done to assess the level of association between WTJ, WTP for

insurance and willingness to cross-subsidise the poor and household wealth and place of residence (urban/rural). Statistical significance was examined using *Pearson chi-square* (for binary or categorical variables) and the *Mann-Whitney U test* for continuous variables. In estimating determinants of actual WTP and willingness to cross-subsidise exploration of multiple models (two part model, the tobit model and the heckman-sample selection model) was done. The two part model performed best and is presented here. Hence, a logit model was used to assess the determinants of WTJ community health insurance and willingness to cross-subsidise the poor and an Ordinary Least Squares (OLS) log linear model was used to assess the determinants of the amounts people were WTP for insurance in urban areas, and the amounts people were willing to cross-subsidise in both rural and urban areas. These models were used to examine theoretical validity which assesses the extent to which the results are consistent with the following a *priori* expectations (Equation 1) (14). We hypothesised that willingness to pay would be affected by socio-demographic variables. Other variables which could affect WTP include: number of elderly in the household, previous care seeking behaviour and eligibility for exemptions (Table 3). We also included the type of insurance scheme as a variable in the cross-subsidisation model to assess whether members of the NHIF were more or less willing to cross-subsidise compared to CHF members.

Equation 1: Empirical Model of WTJ/WTP for Health Insurance

$$WTP = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_{n-1} X_{n-1} + \beta_n X_n \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

The dependant variable for the logit model was binary (1= willing to join insurance scheme/willingness to cross-subsidise, 0= not willing) and for the log linear model dependent variable was the natural logarithm of actual amount stated while α, was the intercept; β, were coefficients of explanatory variables X. Computation of marginal effects on logit models was undertaken.

We started by estimating the full model which contained all explanatory variables which might affect WTP for health insurance/ WT cross-subsidise. We also estimated a reduced model, using the backward elimination procedure in which we eliminated those variables with the highest p–value conditional on the p–value being bigger than some pre-determined level (p>0.60). The models were subjected to various diagnostic tests, for the logit model we used the *link test* for model specification while for log linear models the RESET test (15) was used to ensure the model was appropriately specified and to test for omitted variable bias (16). Other tests on the log liner model included Shapiro-Wilk W test which was used to test the normality of the error term; the Breusch-Pagan to test the null hypothesis that the variance of the residuals is homogenous and the VIF (*variance inflation factor*) was examined to check for the presence of multicollinearity (16).

RESULTS

Descriptive Statistics: The majority of the household heads were male (76%), aged 44 years, and 8% of household heads assessed their health status to be poor (Table 2). On average there were five members within a household. There were some differences in the characteristics of insured compared to uninsured household heads. The insured were more likely to be married, Christian, of higher wealth status, employed in the formal sector and have completed primary education than the uninsured (Table 2). The insured were also more likely to have sought care in the previous month (24% of the insured had an outpatient visit in the previous month compared to 13% of the uninsured), and they were less likely to be eligible for exemptions (8 % of the insured were eligible for exemptions compared to 19% of the uninsured) (Table 2).

Willingness to Join and Pay for Health Insurance: Table 3 shows uninsured respondents were significantly more willing to join health insurance in urban than rural areas at the proposed rate of Tsh 5,000 (93% compared to 74%) (p<0.001). Moreover, there was a significant difference in the proportion of households in urban and rural areas willing to prepay for voluntary health insurance across socio-economic groups (p < 0.05). Willingness to pre-pay was consistently higher among higher than lower wealth groups. The size of the proposed benefit package affected people's willingness to join in rural areas, with 78% being willing to join in Mbulu and Singida districts where inpatient care was covered compared to 72% in Kigoma and Kilosa districts where only primary care was covered (p < 0.1) (Table 3). However, there was relatively limited willingness to pay more than Tsh 5,000 in either setting (in urban areas, only a third of respondents were willing to pay more than Tsh 5,000 whereas only 1% were willing to do so in rural areas). Among those who were willing to pay more than Tsh 5,000 there was no difference in the average amounts stated (mean Tsh 10,741 (Median:10,000) in urban areas; mean Tsh 10,000 (Median 10,000) in rural areas) (data not shown). Were the benefit package to expand in Kigoma and Kilosa, 79% of respondents would have been willing to join the CHF. In contrast, in urban areas, the benefit package had little effect on people's WTJ. Further, there was very limited willingness to pay more than Tsh 5,000, even with an expanded benefit package (only 2% of respondents were willing to pay more than Tsh 5,000 in rural areas compared to 39% in urban areas) [Data not shown].

Determinants of Willingness to Join and Pay for Health

Table 1

Description of independent variables hypothesized to explain WTJ/WTP for insurance and willingness to cross-subsidise

Independent variables	WTJ/WTP for insurance	WT cross-subsidise
Gender	Male headed households will be more WTP and cross-subsidise than female headed households due to greater economic power.	
Married	Married household heads will be more WTJ/WTP and willing to cross-subsidise than single households because they can more easily mobilize resources and they are more likely to have children/family friends who will be in need of health care.	
Religion	No prior hypothesis	
Occupation	People with formal employment will be more WTJ/WTP and willing to cross-subsidise than others as they have a more sustainable source of income	
Self assessed Poor health (SAH[4])	People whose self assessed health is poor will be more WTJ/WTP because they are in greater need than those with good self assessed health. They are less likely to be willing to cross-subsidise the poor as they have to care themselves.	
	People whose self assessed health is average will be more WTJ/WTP as they are in greater need than those with good self assessed health. They are less likely to be willing to cross-subsidise the poor as they have to care for themselves.	
Education	People with formal education will be more WTJ/WTP as well as willing to cross-subsidise because they are more aware of the importance for health care.	
Dar es Salaam	Compared to rural households, households in Dar es Salaam will be more WTJ and WTP for health insurance because they are exposed to more accredited facilities, and have more economic activities where they earn income. They will be less willing to cross-subsidise the poor than those in rural areas as there is less solidarity.	
Morogoro	Compared to rural households, households in Morogoro will be more WTJ and WTP for health insurance because they are exposed to more accredited facilities, and have more economic activities where they earn income. They will be less willing to cross-subsidise the poor than those in rural areas as there is less solidarity.	
Dar es Salaam/ Morogoro	Compared to those in Morogoro, households in Dar es Salaam will be more WTJ and WTP for voluntary health insurance because of having more economic activities where they earn income.	
Exemption eligibility	Those who are eligible for exemptions will be less likely to join and pay for health insurance as well as cross-subsidising the poor, because they are less aware of health care costs.	
NHIF	NA	NHIF members are more willing to cross-subsidise than CHF members because they have a more sustainable income
Outpatient visit to a formal provider in previous month	An individual who had a recent outpatient visit is more likely to be WTJ/WTP for insurance as they are in need of care; also they might have been made aware of the insurance scheme by health care attendants. They will be willing to cross-subsidise the poor because they are aware of the costs of health care.	
Age	WTJ insurance is likely to increase with age due to greater need for care. However, WTP for insurance is likely to reduce with age due to lower income levels of the elderly. The elderly will be less willing to cross-subsidise the poor because of their own needs and income constraints.	

Income	Higher income levels lead to higher WTJ/WTP for insurance and willingness to cross subsidise the poor.
Household Size	Larger households will be more WTJ health insurance as the premium per person will be lower. They will be less WTP and willing to cross-subsidise the poor, due to the greater constraints on household income.
Above 59 years	Households with a larger number of elderly people will be more willing to join insurance due to their health care needs, but less willing to pay and less willing to cross-subsidise due to their more limited income.

Table 2

Demographic and socio-economic characteristics of the surveyed households

Variables	Measurement	Total n=2,222 %	Insured n=1,162 %	Uninsured n=1,060 %
Gender	1= male,	76.1	73.1	76.5
	0 = female	23.9	26.9	23.5
Married	1 = married	55.6	63.9	54.4
	0 = otherwise	44.4	36.1	45.6
Religion*	1 = Christian	51.2	73.8	48.1
	0 = Muslim, or Hindu/Buddhist or no religion	48.8	26.2	51.9
Occupation	1= formal [those with formal employment]	12.6	69.7	4.7
	0 = informal or no employment	87.4	30.3	95.3
Health Poor	1 = poor	7.6	4.8	8.0
	0 = otherwise	92.4	95.2	92.0
Health Average	1 = average	26.4	25.6	26.5
	0 = otherwise	73.6	74.4	73.5
Health Good (reference group)	1 = good	65.34	69.15	64.82
	0 = otherwise	34.66	30.85	35.18
Education	1 = completed primary education or above	84.9	93.7	79.2
	0 = No formal education	15.1	6.3	20.8
Dar es Salaam	1 = household is from Dar es Salaam	7.73	8.84	7.58
	0= otherwise	92.27	91.16	92.42
Morogoro	1 = Household is from Morogoro	16.98	10.34	17.90
	0= otherwise	83.02	89.66	82.10
Dar es Salaam/ Morogoro	1 = household from Dar es Salaam	31.29	46.09	29.75
	0= Morogoro	68.71	53.91	70.25
Rural (reference group)	1 = household from rural areas	75.29	80.82	74.52
	0= otherwise	24.71	19.18	25.48
Exemption eligibility	1= eligible for exemptions	17.4	7.9	18.7
	0 = not eligible for exemptions	82.6	92.1	81.3

Insurance cover	1= NHIF member		62.3	
	0 = CHF member		37.7	
Outpatient visit to formal providers in previous month	1 = households reported a visit	14.4	23.5	13.2
	0 = otherwise	85.6	76.5	86.8
Continuous variables		Mean (Standard Deviation)		
Age	Household age in years	44.08(14.2)	41(12.2)	44.38(14.4)
Income	Wealth index value (proxy of income)	0.245(3.0)	2.69(3.6)	-0.094(2.7)
Household size	Number of people who eat and sleep within the house	5.18(2.6)	5.22(2.9)	5.18(2.6)
Above 59 years	Number of people who are above 59 years in age in the household	0.4(0.6)	0.2(0.5)	0.3(0.7)

Table 3

Willingness to pre-pay Tsh 5,000 per household per year, by geographic location and socio-economic status among uninsured respondents

	Rural				Urban	Rural Urban comparison
Variables	Kigoma/ Kilosa	Mbulu/ Singida	p-value	Overall Rural		
Wealth	n	n		n	n	p-value
Groups	(%)	(%)	(%)	(%)	(%)	(%)
Q1 (Poorest)	32(70.1)	68(73.6)	0.477	101(72.0)	6(100)	0.015
Q2	45(72.2)	37(73.1)	0.605	82(72.5)	11(78.5)	0.002
Q3	43(65.8)	40(84.3)	0.038	80(71.4)	28(92.5)	0.001
Q4	43(74.4)	24(89.6)	0.152	66(77.5)	58(90.2)	0.001
Q5 (Least Poor)	22(79.0)	10(83.1)	0.650	33(80.1)	148(97.3)	0.001
Overall	193(72.3)	181(78.1)	0.080	371(74.3)	265(93.1)	0.001

Note to Table: Kigoma/Kilosa have a limited benefit package including primary care; Mbulu Singida have a broader package that includes inpatient care.

Table 4

Determinants of willingness to join (WTJ) and willingness to pay (WTP) for health insurance

Independent variables	Logit model - WTJ health insurance		OLS- log linear model WTP for health insurance in urban areas	
	Coefficients (SE)	Marginal effects (SE)	Full Model Coefficient (SE)	Reduced Model Coefficient (SE)
Gender	0.844 (0.27)**	0.139 (0.05)**	0.152 (0.09)*	0.121 (0.08)
Married	0.071 (0.27)	0.010 (0.04)	0.039 (0.08)	
Religion	0.505 (0.22) **	0.072 (0.03) **	-0.008 (0.07)	
Occupation	-0.553 (0.53)	-0.092 (0.10)	-0.086 (0.08)	
Health Poor	-0.278 (0.34)	-0.043 (0.05)	-0.079 (0.15)	
Health Average	0.283 (0.25)	0.038 (0.03)	0.105 (0.08)	0.100 (0.07)
Education	0.438 (0.28)*	0.068 (0.05)*	0.098 (0.11)	
Dar es Salaam	1.925 (0.51) ***	0.161 (0.03)***	0.132 (0.8)*	0.125 (0.07)*
Morogoro	1.411 (0.36) ***	0.152 (0.02) ***		
Exemption Eligibility	-0.400 (0.48)	-0.062 (0.08)	-0.070 (0.12)	
Outpatient visit to formal provider in previous month	0.270 (0.32)	0.036 (0.04)	-0.058 (0.08)	
Age	-0.004 (0.01)	-0.001 (0.00)	0.006 (0.00)*	0.002 (0.00)
Income	0.083 (0.05) *	0.012 (0.01) *	0.054 (0.01)***	0.052 (0.01)***
Household Size	-0.046 (0.04)	-0.007 (0.01)	-0.010 (0.01)	
Above 59 years	0.124 (0.23)	0.017 (0.03)	-0.042 (0.07)	
Number of Observation	757	256	257	
Wald chi²/F statistics	73.3***	4.74***	11.1***	
Pseudo/Adjusted R²	0.103	0.195	0.181	

Note *, **, *** shows significance at 10%, 5 % and 1 %, MFX - *marginal effect* and SE - *standard error*

Table 5

Determinants of Willingness to Cross-subsidise the Poor

Independent variables	Logit Model		OLS Log liner model WTP to cross subsidise	
	Coefficient (SE)	Marginal Effects (SE)	Full Model Coefficient (SE)	Reduced Model Coefficient (SE)
Gender	0.450 (0.20)**	0.108 (0.05)**	0.171 (0.16)	0.212 (0.16)
Married	0.032 (0.18)	0.008 (0.04)	0.049 (0.15)	
Religion	-0.012 (0.18)	-0.003 (0.04)	-0.133 (0.12)	
Occupation	0.340 (0.47)	0.084 (0.12)	0.554 (0.22)**	0.580 (0.22)**
Health Poor	-0.529 (0.32)*	-0.125 (0.07)*	-0.155 (0.28)	
Health Average	-0.361 (0.18)**	-0.087 (0.04)**	-0.074 (0.12)	
Education	0.206 (0.28)	0.050 (0.06)	0.261 (0.22)	
Dar es Salaam	-0.493 (0.41)	-0.116 (0.09)	0.628 (0.31)**	0.691 (0.29)**
Morogoro	0.012 (0.30)	0.003 (0.07)	-0.307 (0.24)	
Exemption Eligibility	-0.362 (0.42)	-0.087 (0.09)	0.189 (0.29)	

NHIF member	-0.551 (0.45)	-0.136 (0.11)	0.081 (0.23)	0.055 (0.22)
Outpatient visit to formal provider in previous month	0.295 (0.19)*	0.073 (0.05)*	-0.301 (0.14)**	-0.297 (0.14)**
Age	-0.015 (0.01)*	-0.004 (0.00)*	0.012 (0.01)*	0.009 (0.01)*
Income	0.039 (0.04)	0.009 (0.01)	0.033 (0.03)*	0.046 (0.02)
Household Size	0.037 (0.03)	0.009 (0.01)	0.003 (0.02)	
Above 59 years	-0.009 (0.17)	-0.002 (0.04)	-0.166 (0.14)	
Number of Observation	984	443	443	
Wald chi^2/F statistics	51.4***	5.43***	11.98***	
Pseudo/Adjusted R^2	0.043	0.155	0.141	

Note *, **, *** shows significance at 10%, 5 % and 1 %, MFX - marginal effect and SE - standard error

Insurance: Results from the logit model showed that gender, residing in Dar es Salaam or Morogoro, having a formal education, religion, and income significantly affect household WTJ the CHF/TIKA, when controlling for other variables, consistent with prior expectations (Table 4). Residing in Dar-es-Salaam and Morogoro increased the probability of being willing to join voluntary health insurance by sixteen and fifteen percent respectively. Being from a male headed household and having formal education increased the probability of willing to join insurance by fourteen and seven percentage points respectively. The coefficients on some of the variables (occupation, poor self assessed health status, and household size) had signs that were inconsistent with prior expectations, however they were not statistically significant.

The log linear model showed that being from a male headed household, age, income of households, and residing in Dar es Salaam were the only variables influencing the actual amounts households were willing to pay for health insurance when controlling for other variables (Table 4). The coefficients on some of the variables (occupation, age, and having a recent outpatient visit) had signs that were inconsistent with prior expectations, however, they were not statistically significant.

Willingness to Cross-subsidize the Poor: Overall there was a greater willingness to cross-subsidize the poor among rural compared to urban households (46.0% and 41.2% respectively (p < 0.05)), but the actual average amounts stated were lower in rural compared to urban areas (mean Tsh 6,620 (median Tsh 5,000) and Tsh 13,940 (median Tsh 10,000) respectively) [data not shown]. Moreover, the proportion of NHIF members who were willing to cross-subsidize the poor was significantly lower compared to CHF members (39% compared to 53%) (p < 0.01), but NHIF members were willing to cross-subsidise significantly higher average amounts than CHF members (mean Tsh 13,690 (median Tsh 5,000) and Tsh 4,790 (median Tsh 5,000), p<0.01).

Determinants of Willingness to Cross-Subsidise the Poor: Table 5 shows the determinants of household willingness to cross-subsidise the poor. Being from a male headed household increased the probability of being willing to cross-subsidise by 11 percentage points. Having a recent outpatient visit to a formal provider increased the probability of being willing to cross-subsidise the poor by seven percentage points (p<0.1). Conversely, the elderly, and those with poor or average self assessed health were less willing to cross-subsidize the poor. The signs of the coefficients on all the variables met with prior expectations except for household size, although the coefficient on this variable was not significant. The log linear model indicated that richer households, and those working in the formal sector were willing to pay more in cross-subsidises for the poor, consistent with expectations (p<0.01). Counter to expectations, the elderly were more willing to pay for the poor, possibly due to a sense of solidarity with the poor, and those who had recently sought care were less willing to pay for the poor, possibly due to the costs incurred when care seeking. The signs on the coefficients of exemption eligibility and household size were also counter to expectations but these were not statistically significant.

DISCUSSION

This study has shown that informal sector urban populations will be willing to join the TIKA scheme in urban areas if premiums remain low. However, only a

third would be willing to pay more than Tsh 5,000 per household per year. The findings also indicate that it may be possible to substantially expand enrollment in the CHF among households in rural areas, if awareness of the scheme is increased, and the benefit package expands to include hospital care. However, there were few people who would be willing to pay more for such increased benefits. This study found that female headed households and the poor will be less willing and able to pay for insurance, and those in urban areas will be willing to pay more. Other studies have also found that females were less WTP for health insurance than males (8). Only one other study compared the willingness to pay for insurance in urban and rural areas (11) and found that those in rural areas were willing to pay significantly more than those in urban areas, in contrast to our findings.

This study also highlighted that people are generally willing to cross-subsidise the poor in the community. Although the proportions who were willing to cross-subsidise the poor were slightly lower (45%) than those reporting a willingness to purchase a mosquito net for the poor reported elsewhere (57%) (17). Those living in rural areas were more willing to cross-subsidise, however, the amounts people were willing to cross-subidise were lower compared to urban areas. Rural dwellers may have been more constrained in their ability to pay due to their reliance on subsistence farming activities. While income had no effect on people's willingness to cross-subsidise the poor, it was a significant determinant of how much they would cross-subidise consistent with Jacobsson *et al* 2005 (18), as was occupation. It was interesting to note that both CHF and NHIF members were willing to cross-subsidise the poor, with the amounts being higher for NHIF members (43% higher) than CHF members although this was not significant in the models. The higher willingness to pay among NHIF members is likely due to the fact they have a stable source of income, whereas CHF members largely depend on agricultural output.

A number of policy recommendations for expanded insurance coverage in Tanzania result from this study. People are willing to join and pay for health insurance if they are made aware of the principles of insurance and properly understand the concept of risk pooling. Certain groups were found to be less willing and able to pay for insurance including female headed households, the elderly, the poor and those living in rural areas. Consequently, these groups might be considered for exemption from premium payment, or be offered subsidised premiums. Currently, districts are supposed to exempt the poor from paying for CHF cards (19). However, in practice such exemptions generally do not occur due to the difficulty of identifying the poor (13), a

problem faced in many settings (3). Indeed, it can be difficult to ascertain income levels among the informal sector. Different approaches to identifying the poor have been evaluated (20). It was found that proxy means testing (ranking based on education, household characteristics and asset ownership) and participatory wealth ranking have considerable errors of exclusion and inclusion compared to means testing (ranking based on income or expenditure) in Ghana (20). Although participatory wealth ranking was found to work well in Burkina Faso (21). However, the administrative costs of identifying income through these approaches can be significant (20). This study suggests that exemptions might be applied to a wider range of groups that can be more easily identified, such as female headed households, or households that have an elderly household head. It would also be advisable to charge higher premiums in urban compared to rural areas, and in districts with higher socio-economic status, as these groups will have a greater willingness to pay for insurance. Currently in Tanzania districts have the autonomy to decide on the premium level for the district as a whole, which facilitates this process. The greater willingness to pay for insurance in urban compared to rural areas suggests that cross subsidisation should be promoted between urban and rural councils/districts for the CHF/TIKA. At present, funds are pooled at the district level, but there is no pooling of funds across districts. Such pooling would also allow for cross-subsidisation between richer and poorer districts/councils and increase the financial sustainability of the scheme. CHF members indicated a relatively high willingness to cross-subsidise poorer groups, suggesting that in principle such an approach would be acceptable. However, a greater potential for cross-subsidisation lies between the NHIF and the CHF. Indeed, the NHIF has been given the mandate to manage CHF and increase enrollment. This study indicates that NHIF members are willing to cross-subsidise the poor, and would potentially be willing to cross-subsidise CHF members. Using data derived from this study, NHIF members could potentially generate Tsh 3, 765, 874,000 per annum in cross-subsidies (=mean willingness to cross-subsidise x 316,460 [NHIF principal members in 2008]). This amount of money would be sufficient to enroll an additional 753,175 CHF members per annum at a premium of Tsh 5,000 (=3,765,874,000/5,000). This is equivalent to 11% (753,175/6,996,036) of households in Tanzania using 2000 census data, and hence, could have a dramatic effect on national insurance coverage, and could serve to support almost half of the country's poor. However, it remains to be seen how acceptable such a measure would be to a broader range of NHIF members across the country. It is likely that

they would not be willing to support higher income CHF members, but rather for their contributions to be earmarked to support poorer groups.

This study is the first to look at the sensitivity of WTP for insurance to changes in the benefit package. This findings revealed very little effect of an expanded benefit package on WTP, this could be a result of our study design which provided only a very limited description of benefits, and overall insurance design. Future studies might explore household responsiveness to more specific design issues, such as the scope of services covered in the benefit package (and inclusion or not of drugs, which are often out of stock in public facilities, for example), the degree of service quality (in terms of staff availability and type of staff, for example), and the premium payment method (in cash or in kind, and the timing and frequency of payment). For example, in Ethiopia a study evaluated the willingness of households to pay for insurance in terms of labour (the amount of labour an individual is willing to contributes in terms of person – days times the wage rate reported by the individual) (22). Discrete choice experiments would be a way of simultaneously addressing preferences across such a range of dimensions, and may offer more conclusive evidence of how to tailor the design of insurance schemes to specific communities to maximize and expand enrollment in efforts towards universal coverage.

ACKNOWLEDGEMENTS

REFERENCE

1. Ekman, B., Community-based health insurance in low-income countries: a systematic review of the evidence. *Health Policy Plan*, 2004. **19**: 249-270.

2. McIntyre, D., Garshong, B., Mtei, G., *et al*, Beyond fragmentation and towards universal coverage: insights from Ghana, South Africa and the United Republic of Tanzania. *Bull World Health Organ*. 2008. **86**: 871-876.

3. Kamuzora, P., and Gilson, L. Factors influencing implementation of the Community Health Fund in Tanzania. *Health Policy Plan*, 2007. **22**: 95-102.

4. Carrin, G., Waelkens, M., and Criel, B. Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. *Trop. Med. Int. Health*, 2005; **10**: 799-811.

5. Jehu-Appiah, C., Aryeetey, G., Spaan, E., *et al*. Equity aspects of the National Health Insurance Scheme in Ghana: Who is enrolling, who is not and why? *Soc. Sci Med*, 2011. **72**: 157-165.

6. Macha, J., Harris, B., Garshong, B., *et al* (in press) Factors Influencing the Burden of Health Care Financing and the Distribution of Health Care Benefits in Ghana, Tanzania and South Africa. 2011.

7. Goudge, J., Akazili, J., Ataguba, J., *et al*. (in press). Social solidarity and willingness to tolerate risk and income-related cross-subsidies within health insurance: experience from Ghana, Tanzania and South Africa, University of the Witwatersrand: South Africa.

8. Dong, H., Kouyate, B., Snow, R., *et al*. Gender's effect on willingness-to-pay for community-based insurance in Burkina Faso. *Health Policy*, 2003. **64**: 153-162.

9. Mushi, D. P. Financing Public Health Care: Insurance, User Fees, or Taxes? *Welfare Comparison in Tanzania*. 2007, Research on Poverty Alleviation Dar es Salaam 1 - 20.

10. Onwujekwe, O., Okereke, E., Onoka, C., *et al*. Willingness to pay for community-based health insurance in Nigeria: do economic status and place of residence matter? *Health Policy Plan*, 2010. **25**: p. 155-161.

11. Dong, H., Kouyate, B., Cairns, J., and Sauerborn, R. Differential willingness of household heads to pay community-based health insurance premia for themselves and other household members. *Health Policy Plan*, 2004. **19**: 120-126.

12. Humba, E., The Current Status of NHIF and CHF and Prospects for the coming 5 years in Technical Review Meeting. September, 2010: Blue Pearl Hotel, Dar es Salaam.

13. Mulligan, J., and Mtei, G. Community Health Funds in Tanzania: *A Literature Review* 2007; 1 - 18.

14. Ryan, M., Scott, D., Reeves, C., *et al*. Eliciting public preferences for healthcare: a systematic review of techniques. *Health Technol Assess*, 2001. **5**: 1-186.

15. Ramsey, J. B. Test for Specification Errors in Classical Linear Least-squares Regression Analysis. *J. Royal Stat. Soc.* 1969. **31**: 350 - 371.

16. Long, S., and Freese, J. *Regression Models for Categorical Dependent Variables Using Stata, 2nd Edition* 2006, Stata Press.

17. Onwujekwe, O., and Uzochukwu, B. Stated and actual altruistic willingness to pay for insecticide-treated nets in Nigeria: validity of open-ended and binary with follow-up questions. *Health Econ*, 2004. **13**: 477-492.

18. Jacobsson, F., Carstensen, J., and Borgquist, L. Caring externalities in health economic evaluation: how are they related to severity of illness? *Health Policy*, 2005. **73**: 172 - 182.

19. URT, *The Community Health Fund Act* 2001, Government Printer; 1999.: Dar es Salaam

20. Aryeetey, G., Jehu-Appiah, C., Spaan, E., *et al*. Identification of poor households for premium exemptions in Ghana's National Health Insurance Scheme: empirical analysis of three strategies. *Trop.*

Med. Int. Health, 2010. **15**: 1544-1552.

21.   V Ride, M. Y., Kafando, O., Sanfo, N., *et al.* community - based targeting approach to exempt the worst - off from user fees in Burkina Faso. *J. Epidemil. Community Health* 2010. **64**.

22.   Asfaw, A., and Braun, J. Can community health insurance schemes shield the poor against the downside health effects of economic reforms? The case of rural ethiopia. *Health Policy,* 2004. **70**: 97-108.