

Title: Measuring the Benefits of Community-Based Interventions through Contingent Valuation

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## **Introduction**

This paper is concerned with the evaluation of community-based interventions as a means of promoting healthy behaviours through knowledge sharing, empowerment, and group initiatives / action. As behaviour change takes time, such groups may not have immediate impact on health outcome. In the meantime the motivation for attending the groups can be driven by a variety of factors such as the opportunity for social interaction, learning and gaining reassurance. These can be defined as process outcomes which in contrast to health outcomes are the 'utility bearing characteristics that occur up until the final outcomes are obtained' (Salkeld, 1998). The potential benefits at a broader community level could also be significant (Mooney, 1998). For example, the groups may be of value to women who are not currently members but may wish to join the group in the future ('option' value). Altruism, or the value derived from those who will never attend the groups from the consumption of the intervention by others may also be relevant. Such factors can be critical in determining the success of community user groups in terms of participation levels and broader community support as well as contributing to their effectiveness in terms of improving health and their value to users (Hawe et al. 2004).

The valuation of non-health or process benefits of health care interventions has been the focus of a number of studies in the health economics literature. These studies used willingness-to-pay as a method of valuing the process of care in regards to IVF treatment or screening (e.g. Ryan, 1996; Berwick et al. 1985) or the value of different methods of service provision (e.g. Donaldson et al. 1997a, Donaldson et al. 1997b, Gibbs et al. 1998). The methods employed varied from asking individuals to trade between and value different (health versus non-health) attributes using WTP (e.g. Ryan, 1996, Berwick et al. 1985) to obtaining values for equally effective health interventions that differ in terms of process from the same respondents (e.g. Donaldson et al 1997b., Gibbs et al. 1998) or separate samples (Donaldson et al. 1997a). The valuation of option value and altruism have received significant attention in the environmental economic and to a more limited extent the health economic literature (e.g. Onwujekwe & Uzochukwu, 2004; Arana & Leon, 2002).

The overall aim of this study was to find out to what extent process and broader community values are important to individuals valuing a social intervention which is aimed at improving health outcomes using willingness-to-pay. As these groups can result in broader community involvement or impact, the perceived benefits to other community members were also examined. The specific objectives were to:

- 1) Quantify how much a women's group intervention was worth to both users and non-users by eliciting their maximum willingness-to-pay and to test the hypothesis that these groups have value for potential future users as well as to those who do not intend on participating;
- 2) Find out which of either health, pre-defined non-health attributes, or a combination of the two, were reflected in people's WTP estimates (what were their expectations when considering a women's group programme in the community) and to test the hypothesis that improved health is not the only attribute entering their utility function in relation to this type of intervention;
- 3) To consider the determinants of WTP, explore construct validity and to assess whether the type of attributes reflected by respondents in their WTP estimates, impacts on the absolute amount they are WTP.

We begin by describing the intervention and the study context and subsequently outline the study methods. The results and an overview of a few points for discussion follow.

## **Study Methods**

### **Intervention**

This study was carried out as part of an economic evaluation alongside a trial of a community-based participatory intervention with women's groups to improve birth outcomes in rural Nepal (Manandhar et al. 2004). This model of participatory action groups in health care and has been applied in a number of different settings, e.g. Bolivia (Howard-Grabman, 1993), Australia (Lumley et al. 2003). The intervention in Nepal was

evaluated through a cluster randomised trial which ran over 33 months with neonatal and perinatal mortality as primary outcomes. Nepal is a low income country in the Himalayan region of South Asia where over 70% of women are illiterate and more than 90% of births take place at home without a trained attendant (HMGN, 2002). Given the prevailing geographic and financial realities, achieving a substantial increase in institutional deliveries is unlikely to be feasible in the short term (Borghini & Ensor, in press). Interventions promoting changes in practices at home and in the community were therefore felt to be more realistic, locally relevant and potentially cost-effective.

The intervention relied upon a facilitator who encourages women to share experiences and problems of pregnancy and childbirth during monthly meetings lasting about an hour. Although any woman could attend the meetings, married women of reproductive age and especially pregnant women were the target population. After a series of ten meetings, groups then fed back their findings to the broader community and selected strategies to address priority problems such as: initiation of an emergency loan fund for mother and child health; use of stretchers; locally produced clean home delivery kits, and the screening of awareness raising videos (Morrison et al. 2005).

### **Sample and Questionnaire**

A total of 111 women's groups were running during the trial period, one group per administrative area of around 800 population. Generally 8% of all married women of reproductive age and 35% of all pregnant women attending attended meetings (Manandhar et al. 2004). There were an average of 10 members per group. Eleven groups were selected for the contingent valuation study and all their members were interviewed. Group selection was guided by security considerations, the strategy in place and level of group activity. The selected sample comprised plain and middle hill areas. To ascertain the value of the groups to other members of the community, a similar number of females not attending meetings<sup>1</sup> were selected at random from the administrative areas encompassing four of the eleven groups. Selection was stratified in

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<sup>1</sup> Criteria for selection was that they be married women of reproductive age.

terms of distance from the group (near/far<sup>2</sup>). Interviews were conducted in the respondent's home. As many husbands of both users and non-users as available at the time of interview were also interviewed.

For the women's group members, a focus group discussion introducing the contingent valuation (CV) scenario was first presented during their monthly group meeting, followed by individual interviews with each of the women. For non-users (both females and males) probe questions were used to gauge baseline knowledge levels and familiarity with the intervention during individual interviews. The intervention was then described in terms of the process (monthly meeting for women to discuss and learn about problems of pregnancy and childbirth) and intended outcomes (to improve the health of newborn babies<sup>3</sup>). Rather than describe the intervention to users, they were prompted to discuss the processes they had been through as a group. Female non-users were asked why they did not attend the groups in order to determine whether they would be potential future users or permanent non-users.

Respondents were asked whether they would be WTP to ensure the groups were sustained for a three year period<sup>4</sup> when the trial came to an end. Those who were WTP were asked how frequently they would be able to contribute (e.g. monthly, 6-monthly or yearly) and how much they could contribute each time. The interviewer then sought to bid them up from this amount until they reached their maximum. Total WTP was calculated as the product of their maximum and selected frequency of payment over a 3 year period.

Finally, respondents were asked why they were or were not WTP and were talked through the following options:

- learning new knowledge, social gathering, increasing the confidence of women (*'non-health' outcomes*)

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<sup>2</sup> Near: less than 30 minutes walking; Far: more than 30 minutes walking. We felt that those living further away from the groups could have different reasons for not attending than those living within easy access.

<sup>3</sup> Information on the effectiveness of the women's groups in reducing neonatal mortality could not be disclosed at that time, as the trial results had not yet been disseminated.

<sup>4</sup> To match the original trial duration and the period needed to complete the full action research cycle.

- to improve mother and baby health and reduce the number of mothers and/or babies dying (*health outcome*)
- both the above
- other \_\_\_\_\_ (respondent asked to specify)

For simplicity, attributes were grouped together as either health or non-health related. The choice of likely non-health attributes was informed by preliminary focus group discussions with women's group members prior to the WTP survey. Interviewers were also instructed to list any additional attributes mentioned by respondents. These were later classified as either related or not to health. Background information was also collected on variables with a hypothesised relationship with WTP (Table 1). This approach was chosen in preference to a discrete choice approach as we felt it would be logistically challenging to assign levels to such abstract outcomes as learning and empowerment as well as cognitively challenging for respondents to trade between these and health outcomes.

The interview was administered by one of two trained female interviewers. The identity of the interviewer was noted for analysis of potential interviewer effects.

**Table 1 Variables with hypothesised relationship with WTP**

Variable	Specification	A priori expectations with regards to association with WTP
Literate	1=literate 0=illiterate	By facilitating understanding of health messages, literacy will increase the capacity to benefit from women's groups, and therefore is positively associated with WTP.
Wealth	An asset score <sup>5</sup> which ranks more highly those households with more assets Wealth1=lowest wealth group (base case) Wealth2= medium wealth group Wealth3=higher wealth group	Higher wealth groups will be WTP more than lower wealth groups.
Age	Continuous years of age	Negative association with WTP – the elderly will benefit less from the intervention as they are less likely to have children. They perceive themselves as lower risk
Ethnicity	Prof=professional (lowest) caste Newari=Newari ethnic group Indo = Indo-Aryan ethnic groups Tibeto=Tibeto-Burman ethnic groups (reference case)	Negative association between WTP and professional caste. Unclear relationship for other ethnic groups.
Complic	Whether or not had previous negative birth outcomes, either stillbirth or miscarriage or neonatal death	Those with previous negative birth outcomes will be willing to pay more due to greater perceived risk.
Kit	Whether or not used kit during last delivery (1=yes; 0=no) <sup>6</sup>	Those who used a kit will be willing to pay more as have greater awareness about potential risks during childbirth.
Contrace	=1 if had permanent contraception =0 if either temporary or no	Negative association with WTP for those with permanent contraception

<sup>5</sup> Asset indices have a number of advantages compared to income or total expenditure as measures of wealth status, especially being less prone to measurement error or misreporting and less time consuming and have gained increasing popularity in recent years in less developed countries where income data is not readily available (Filmer, 1998; World Bank, 2000). The index comprised variables on asset ownership, source of water and sanitation and number of rooms in dwelling. It was derived using principal component analysis (ibid).

<sup>6</sup> Due to the small numbers using safe home delivery kits in the non-user group, this variable was not included in the regression analysis of WTP for non-users.

	contraception	
Intervie	1=interviewer 1 2=interviewer 2 (reference case)	No relationship with WTP. This variable was included to check for interviewer bias
Reason why willing to pay	Health=1; willing to pay for health outcomes only Processhealth=1; willing to pay for health and non-health outcomes Process=1; willing to pay for non-health outcomes only (reference case)	Those valuing both process and health outcomes will be WTP more as they have a greater appreciation of the group.
Meet	Continuous measure of the number of meetings attended (for users only)	Those attending more meetings value the intervention more and will be willing to pay more.

### Statistical Analysis

The response rates and proportions from each group (user and non-user) and reasons for being WTP are described. Those falling into each group (users; non-users, non-health versus health outcomes) were compared to identify significant differences in terms of the variables in Table 1. Statistical significance was measured by the Pearson chi square test (for binary variables), the Mann-Whitney U test and t test, for non-normal and normally distributed continuous variables, respectively.

Mean WTP (with 95% confidence intervals) and median WTP (with 25<sup>th</sup> and 75<sup>th</sup> percentiles) were calculated for the full sample, for users and female and male non-users and for each preference group (health/non-health). The reasons given by non-users for not attending meetings were analysed in order to split this group into potential future users and permanent non-users, valuing the benefits of the intervention to others.

Using ordinary least squares (OLS) the dependent variable, total willingness-to-pay, was regressed against the variables listed in Table 1 to assess construct validity and ascertain which variables are most relevant in explaining WTP estimates. To adjust for non-normality in the dependent variable it was log-transformed. Due to the small number of zero values, it was not felt necessary to adopt a model which allows for censored dependent variables. A general to specific regression method was used. All variables with a hypothesised relationship with WTP were first entered into the general model. We



used the F-test to test the hypothesis that the coefficients on the variables with smallest t-statistic were equal to zero. The variables were dropped from the model if the probability associated with the F-test was greater or equal to 0.10. If not, they were re-entered into the model. This procedure continued with each variable until none of the remaining variables satisfied entry or exit criteria.

As determinants of WTP were thought to vary between women's group members compared to non-members, the regression model was run separately for women attending meetings and women not attending<sup>7</sup>. Due to the small quantity of data on husbands, and the lack of individual income data (we used a household asset score), it was not included in the regression models, but the characteristics of husbands and mean WTP are presented.

We believe that the responses given by women attending meetings within each group were not independent in the same way as responses between groups, or female non-users drawn at random. Women attending meetings are likely to share certain characteristics which made them join the group in the first place, which may or may not be observed within the model. Furthermore, their valuation is likely to be influenced by how well their own group is functioning as well as the particular attributes of their geographic area (e.g. socio-economic status, ethnicity and topography etc.). Lastly, during the focus group discussion prior to individual interviews, women's group members had the opportunity to discuss their valuation of the group with other group members which may have influenced their individual responses. To adjust for this potential lack of independence of within group responses, we used the robust standard error, cluster option, with the administrative area which encompasses each group (a ward) as a cluster variable, and considered the impact on results (Arellano, 1987).

The Ramsey RESET test was used to check for functional mis-specification in both the general and reduced models (Ramsey, 1969). Analysis of plots of residuals against fitted

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<sup>7</sup> The Chow test also revealed a significant improvement in fit by running separate instead of a pooled regression.

values was used to check for heteroscedasticity, or non-constant variance in the error term. In addition, the Cook Weisberg test for heteroscedasticity was also used. Corrections for heteroscedasticity can be carried out if present using the correction proposed by White (1980), through the use of robust standard errors. Vif scores were assessed to check for multicollinearity (a vif score above 10 indicating presence of multicollinearity). The skewness and kurtosis test was used to assess normality of the residuals.

## **Results**

### **Response rate**

During the period of March to October 2004, 196 interviews were conducted, of which 93 were with members of women's groups, 70 were with female non-users and 33 were with husbands (15 of women's group members and 18 of non-members). Overall, 157 (80%) respondents stated a positive willingness-to-pay for the women's group intervention. Response rates were highest amongst the women's group members (87%) compared to 76% of female non-users and 70% of husbands. 10 respondents were not willing to pay anything (true zeros) due to lack of money or indifference to groups and 29 could not give a value, rejecting the CV scenario. Of these, 41% said they would either contribute later to see how well the scheme was working, 21% said they needed to consult with the budget holder and 17% rejected the payment scenario, saying that it wouldn't be possible to run the women's groups in this way, or that the government should pay.

### **Reasons for being WTP**

Of those willing to pay a positive amount, 152 (97%) were able to give reasons for their willingness to pay. 66 (46%) respondents valued non-health outcomes only, 22 (15%) valued health outcomes only and 56 (39%) valued both non-health and health outcomes. So non-health outcomes were valued as an integral part of the intervention by respondents in 85% of cases. In addition to those outcomes determined prior to the

survey, other non-health outcome responses included broader community development, supporting the group, or future generations (n=9).

### **Characteristics of respondents**

Literacy rates were low across all stakeholder groups but were higher amongst women attending meetings than those not attending (30% compared to 16%) and highest of all amongst men (70%) (Table 2). The wealth index suggests there were a larger proportion of women non-users than users from the lowest wealth tercile (40% versus 27%), although not significantly so. Women attending meetings were mainly from the Tibeto-Burman ethnic group (51%) whereas a majority of non-attending women were from Indo-Aryan ethnic groups (41%). More women attending meetings used safe delivery kits than those not attending (16% versus 7%) (p=0.10). The other variables did not differ significantly across groups.

There was no significant difference in income (measured by the wealth index), age, ethnicity, contraceptive status or education for those valuing non-health versus health outcomes. Surprisingly, those having complications in previous pregnancies were no more likely to value health outcomes than those with no previous complications. However, women's group members were significantly more likely to choose both health and non-health outcomes than female non-members (p=0.000). The latter were more likely than members to opt for non-health outcomes only (58%) (p=0.02) and health outcomes only (p=0.01).

**Table 2 Characteristics of Respondents**

Variables	Measurement	Users	Female non-users	Husbands	All
Literate***	1=yes N(%)	28 (30%)	11 (16%)	23 (70%)	62 (32%)
Age***	Mean	30.90	31.20	36.94	32.09
	Median	30.02	29.81	34.00	31.00
Indo ***	1=yes	11 (12%)	29 (41%)	13 (39%)	53 (27%)
Tibeto***	1=yes	47 (51%)	19 (27%)	6 (18%)	72 (37%)
Newari*	1=yes	24 (26%)	10 (14%)	8 (24%)	42 (21%)
Prof	1=yes	11 (12%)	12 (17%)	6 (18%)	29 (15%)
Wealth1	1=yes	19 (27%)	23 (40%)	9 (35%)	51 (33%)
Wealth2	1=yes	27 (38%)	18 (31%)	6 (23%)	51 (33%)
Wealth3	1=yes	25 (35%)	17 (29%)	11 (42%)	53 (34%)
Complic	1=yes	19 (25%)	14 (23%)	8 (24%)	41 (24%)
Kit*	1=yes	12 (16%)	4 (7%)	5 (16%)	21 (12%)
Contrace	1=yes	11 (14%)	15 (23%)	7 (22%)	33 (19%)
Health**	1=yes	7 (9%)	13 (27%)	2 (9%)	22 (16%)
Processhealth***	1=yes	40 (54%)	7 (15%)	9 (41%)	56 (42%)
Process**	1=yes	27 (36%)	28 (58%)	11 (50%)	66 (49%)
Intervie	1=interviewer 1	60 (65%)	45 (64%)	18 (55%)	123 (63%)

Note: \*\*\*<0.01, \*\*<0.05, \* < 0.10

### Willingness-to-pay

The mean willingness-to-pay for the group as a whole (with 95% CI) was Rs 622 (95% CI: 454 - 791) or £4.68<sup>8</sup> and median (with 25<sup>th</sup> and 75<sup>th</sup> percentiles) Rs 360 (Rs 180 - 720), or £2.71. There was no significant difference between WTP for users (mean Rs 622; median Rs360) versus female nonusers (mean Rs553; median Rs360). Although the sample size was small, WTP for husbands of users was greater than husbands of non-users (Rs 1,236; median Rs 1,080 versus mean Rs 465; median Rs360) and borderline significant (p=0.06).

<sup>8</sup> At an exchange rate of 1GBP=133 Rs

Of the female non-users, 51% reported not attending meetings because they did not know about the meetings. They were considered to be potential future users, their WTP reflecting an option value of being able to benefit from the intervention in the future. The remaining 49% did not attend meetings because of distance, lack of time or age/contraceptive status. These women were considered to be permanent non-users, and their WTP value reflective of altruism. Of the potential future users, 78% gave a positive WTP value, mean Rs 464, median Rs 360. Of the permanent non-users, 74% gave a positive WTP value, mean Rs 646, median Rs 330. The difference in values given between these two groups was not significant.

Of those valuing only non-health outcomes mean WTP was Rs 517 (£3.89) and median Rs 300 (£2.26) (Table 3). Of those valuing only health outcomes mean WTP was Rs 1,328 (£9.98), median Rs 495 (£3.72)<sup>9</sup>. The WTP of those only valuing health outcomes was significantly higher than those valuing only non-health outcomes (p=0.01) or combined (p=0.07) (with and without the outlier).

**Table 3 WTP for health versus non-health outcomes**

Reason WTP	Measurement	Total
For health outcomes only	N	22
	Mean in Rs (95% CI)	1,328 (295-2360)
	Median in Rs (25 <sup>th</sup> – 75th)	495 (300-1200)
For non-health outcomes only	N	66
	Mean in Rs (95% CI)	517 (320-714)
	Median in Rs (25 <sup>th</sup> – 75th)	300 (180-720)
For both health & non-health outcomes	N	56
	Mean in Rs (95% CI)	591 (397-785)
	Median in Rs (25 <sup>th</sup> – 75th)	360 (180-600)

<sup>9</sup> The mean is inflated due to the presence of an outlier in the user group, which when dropped falls Rs 876 (422-1330) or £6.59 and median Rs 450 (300-1080) or £3.38. The outlier is retained for the subsequent regression analyses.

## Regression Analysis

Only 120 observations were included in the regression analysis due to missing data. Table 4 below shows the results from the general and reduced OLS regression equations for women's group members. In terms of the overall significance of the coefficients of the regressors in the general model, the F test indicates that they are not significantly different from zero. The Ramsey RESET test does not indicate that the model is misspecified, however, the normality test indicates that at 10% significance the residuals are non-normal, and therefore we are cautious in the interpretation of the coefficients and standard errors in the generalised model. The models' overall significance and normality of residuals improved in the reduced (& cluster) model. The use of a safe delivery kit during previous delivery was found to have a significant association with WTP, as previously hypothesised, in both the general and reduced models. Those valuing health outcomes were also found to be willing to pay more than those valuing non-health outcomes. Although not significant in the reduced form, the sign on the wealth status and education variables are counter to expectations (Table 1), suggesting that the association with WTP is negative. The only other variable with a coefficient which does not meet with prior expectations is contraceptive status, although this is also not significant. The clustering reduced the standard error around the variable 'Health' making it significant at 0.05 level, and increased the standard error on Wealth2 and Wealth3 and Processhealth, so these remain insignificant. The significance of the Health variable indicates that, controlling for other variables, those who attend women's groups and valued health outcomes only were willing to pay more than those who only valued non-health outcomes.

Given the log linear nature of the dependent variable, the coefficients can be interpreted as a percentage change in WTP resulting from a unit change in the explanatory variables. The regression results can be taken to indicate that use of a kit during last delivery increases willingness-to-pay by 72%, and valuing health outcomes over non-health outcomes increases willingness-to-pay by 70%.

**Table 4 OLS coefficients, standard errors and p-values for general and reduced regression equations of women's group members WTP**

	Estimated coefficient	Standard error (cluster=ward)	P-value (cluster=ward)	Estimated coefficient	Standard error (cluster=ward)	P-value (cluster=ward)
Kit	0.89	0.34 (0.19)	0.01*** (0.00)	0.72	0.28 (0.24)	0.01*** (0.02**)
Wealth2	-0.72	0.34 (0.38)	0.04** (0.09*)	-0.48	0.30 (0.32)	0.11 (0.16)
Wealth3	-0.56	0.41 (0.44)	0.18 (0.23)	-0.19	0.30 (0.37)	0.52 (0.62)
Meet	0.84	0.73 (0.77)	0.26 (0.31)			
Literate	-0.43	0.28 (0.28)	0.13 (0.16)	-0.38	0.25 (0.25)	0.14 (0.17)
Health	0.58	0.49 (0.35)	0.25 (0.13)	0.70	0.40 (0.25)	0.08* (0.02**)
Processhealth	0.45	0.31 (0.33)	0.16 (0.21)	0.40	0.25 (0.29)	0.12 (0.21)
Complic	0.31	0.34 (0.33)	0.37 (0.37)			
Intervie	-0.23	0.26 (0.18)	0.39 (0.23)			
Newari	0.41	0.37 (0.27)	0.28 (0.17)			
Indo	0.69	0.55 (0.40)	0.21 (0.12)			
Prof	-0.26	0.45 (0.47)	0.56 (0.59)			
Contrace	0.08	0.41 (0.42)	0.85 (0.86)			
Age	-0.02	0.02 (0.01)	0.38 (0.25)			
Constant	6.15	0.82 (0.63)	0.00*** (0.00)	5.77	0.27 (0.29)	0.00*** (0.00)
Adj-Rsq	0.09			0.15		
F stat	1.39			2.56**		
N	54			54		
RESET F stat	0.85			2.13		
Cook-Weisberg chisq stat	0.19			0.33		
Mean vif score	1.82			1.39		
Skewness-kurtosis chisq stat	5.48*			4.67*		

\*<0.1; \*\*<0.05; \*\*\*<0.01

In the female non-user group, the F test indicates that the coefficients of the regressors in the general model are only significantly different from zero at the 0.1 level. The model passes all the other tests. Wealth status is a significant predictor of WTP and shows the anticipated positive relationship. In the reduced model the interviewer who administered the survey also influences WTP. Unlike women's group members, the reasons for WTP did not have a significant effect on WTP in this population group. Although insignificant, signs on the coefficients of the other variables match with prior expectations apart from age and literacy.

The regression results indicate that those in wealth groups 2 and 3 are, everything being equal, willing to pay more than 100% more than those in income group 1. Those interviewed by interviewer 1 are willing to pay 71% more than those with interviewer 2.

**Table 5 OLS coefficients, standard errors and p-values for general and reduced regression equations of female non members WTP**

Explanatory Variables	Coeff	SE	p-value	Coeff	SE	p-value
Wealth2	1.43	0.54	0.01***	1.14	0.41	0.01***
Wealth3	1.60	0.58	0.01***	1.05	0.47	0.03**
Complic	0.77	0.57	0.19	0.65	0.40	0.11
Wtph	0.03	0.44	0.95	-0.09	0.39	0.83
Wtpproh	0.76	0.58	0.20	0.46	0.48	0.35
Interview	-0.60	0.35	0.10	-0.71	0.33	0.04**
Newari	0.31	0.93	0.72			
Indo	-0.72	0.58	0.22			
Prof	-0.08	0.68	0.91			
Contrace	-0.57	0.47	0.23	-0.40	0.38	0.30
Age	0.02	0.03	0.58			
Literate	-0.03	0.71	0.97			
Constant	5.61	1.30	0.00***	6.24	0.60	0.00***
Adj-Rsq	0.23			0.25		
F stat	1.94*			2.80**		
N	38			38		
RESET F stat	0.80			1.44		



Cook-Weisberg chisq stat	0.46			2.20		
Mean vif score	2.22			1.33		
Skewness-kurtosis chisq stat	1.22			0.20		

## Discussion

The study indicated that non-health outcomes were important to community members (both users and non-users) influencing WTP values elicited in over 80% of cases. Women's group members who valued health outcomes exclusively were willing to pay significantly more than those who valued non-health outcomes exclusively. Although this relationship did not hold for female non-users. We used a simple method to gauge what was underlying individuals WTP values. It had the advantage of being fairly easy for interviewers to administer and response rates were high at over 80%. Efforts were made to ensure neutrality during the description of the intervention, and to give respondents the option of providing other attributes of value than those pre-defined. The limitation of the approach is it did not enable us to place a value on health compared to non-health outcomes as respondents were not asked to explicitly trade between them.

By interviewing non-users as well as users, we examined whether the intervention had value in terms of potential future use or altruism. We found that the value derived from potential future use as well as altruism was not significantly different from that derived from direct use, which suggests that inclusion of these values in a CBA of a community-based intervention could have a significant effect on the results. Before concluding as to the importance of including these values, further validation work needs to be conducted. However, the findings so far show that careful thought needs to be given when deciding whose values to include in a WTP study.

We attempted to validate (construct validity) results by assessing whether WTP had the expected association with key variables (Table 1). The overall significance of the model was low for users and lower than for non-users. Although insignificant, for women's

group members, wealth status and literacy were negatively associated with WTP, counter to theoretical expectations. If this association is real, it could be explained by a variety of factors: that less educated, poorer women value the intervention relatively more, as they feel they have greater capacity to benefit (from learning, reduced health risks); that more educated, wealthier women are influencing other women in terms of WTP during the original focus groups, although confidence interval suggests a fair amount of variation in responses given; that there is a certain stigma attached to the intervention by wealthier groups and that it is seen to be for 'poorer' women; or that results are invalid. A flaw in the measurement of the wealth index is also a possibility, although this was validated and performed well against annual household medical expenditure.

It could also be that group effects predominate over individual effects, and for this type of group commodity, group WTP may be a more appropriate method of valuation. Once we have analysed the qualitative data from the focus groups we will try to gauge if this is the case. We attempted to control for some of these group specific variables by using the cluster command. This generally reduced standard errors and increased the significance of one variable. Further analysis on convergent validity (time spent attending meetings) and reliability (contrasting focus group data with individual interviews) will be carried out subsequently.

In the non-user group, wealth was a significant predictor of WTP, which validates the theoretical validity of this model, although literacy again was not and had a negative sign on the coefficient. Could it be that education has less effect on WTP in areas with very low literacy rates, or again that the more educated potential future users perceive the intervention to be of less value, that they have less to learn, and that the permanent non-users feel less connected to users than the less educated?

The inclusion of an interviewer dummy variable allowed us to check for interviewer bias. We found that the interviewer was a significant predictor of WTP in the non-user group. Further analysis revealed that interviewer1 was more effective in bidding respondents up from their original value: there was no significant difference between original bids by

interviewer, but the difference was significant when the difference in final bids was considered. This shows the importance of considering interviewing effects when analysing results, and ensuring sufficient time is given to piloting to minimise the chance of interviewer bias.

Generally, the study suffered from small sample sizes, which may explain the lack of significance in the regression models. The problem was intensified by the large amount of missing data on some variables. These respondents did not differ significantly from those included in the model in terms of remaining variables. We attempted to address the problem of missing values by replacing them with means of the respective variables. This worsened the fit of the model. We also created dummy variables with a missing value. This also worsened the fit of the model and led to results which were difficult to interpret.

However, despite the limitations the study raises a number of questions. Specifically, it shows as pointed out by Salkeld (1998) that the community may value a variety of non-health outcomes at the individual level, and future capacity to benefit as well as altruism which are not immediately obvious to policy makers or trial designers. Ignoring these other factors which contribute to welfare as well as whose values to consider, could lead to an inefficient allocation of resources.

In general, WTP enabled us to get a quantitative hold on some of these issues, although it may prove unfeasible to use as a tool for differentiate less tangible non-health outcomes. Specifically, it did not inform us as to the range of qualitative processes at work within the community as a result of the intervention (e.g. why users attend and non-users do not, or the broader institutional changes which may have taken place at the community level as a result of the intervention). A qualitative process evaluation alongside such interventions would be a good means of so-doing and serve as a useful complement to and also help validate the quantitative estimates derived through WTP.

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