

# Self-perceived Health of Ultra Poor Women: The Effect of an Inclusive Development Intervention

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## FOREWORD

Over a quarter of Bangladesh's people live in extreme poverty, not being able to meet even the barest of the basic needs. They spend most of their meagre, unreliable earnings on food and yet fail to fulfil the minimum calorie intake needed to stave off malnutrition. They are consequently in frequent poor health causing further drain on their meagre resources due to loss of income and health expenses. More often than not, the extreme poor are invisible even in their own communities, living on other peoples' land, having no one to speak up for them or assist them in ensuring their rights. Extreme poverty also has a clear gendered face – they are mostly women who are dispossessed widows, and abandoned.

The extreme poor are thus caught in a vicious trap and the story of denial and injustices tend to continue over generations for a large majority of them. Thus, a vast majority of the extreme poor in Bangladesh are chronically so. The constraints they face in escaping extreme poverty are interlocked in ways that are different from those who are moderately poor. This challenges us to rethink our existing development strategies and interventions for the extreme poor, and come up with better ones that work for them. This is the challenge that drove BRAC to initiate an experimental programme since 2002 called, 'Challenging the Frontiers of Poverty Reduction: Targeting the Ultra Poor' programme. The idea to address the constraints that they face in asset building, in improving their health, in educating their children, in getting their voices heard, in a comprehensive manner so that they too can aspire, plan, and inch their way out of poverty.

The extreme poor have not only been bypassed by most development programmes, but also by mainstream development research. We need to know much more about their lives, struggles, and lived experiences. We need to understand better why such extreme poverty persists for so many of them for so long, often over generations. Without such knowledge, we cannot stand by their side and help in their struggles to overcome their state.

I am pleased that BRAC's Research and Evaluation Division has taken up the challenge of beginning to address some of these development knowledge gaps through serious research and reflection. In order to share the findings from research on extreme poverty, the 'CFPR/TUP Research Working Paper Series' has been initiated. This is being funded by CIDA through the 'BRAC-Aga Khan Foundation Canada Learning Partnership for CFPR/TUP' project. I thank CIDA and AKFC for supporting the dissemination of our research on extreme poverty.

I hope this working paper series will benefit development academics, researchers, and practitioners in not only gaining more knowledge but also in inspiring actions against extreme poverty in Bangladesh and elsewhere.

**Fazle Hasan Abed**  
Chairperson, BRAC



# **Self-perceived Health of Ultra Poor Women: The Effect of an Inclusive Development Intervention**

## **ABSTRACT**

In 2002, BRAC launched a targeted and comprehensive development programme called Challenging the Frontiers of Poverty Reduction: Targeting the Ultra Poor (CFPR/TUP) aimed at the poorest of the poor, who have often been excluded from other development initiatives. This study examines changes in the self-reported health status of these ultra poor women in northern Bangladesh over a period of one and half years since the launch of this programme. The data for this study come from a baseline survey performed in 2002 and a follow-up survey from 2004. The ultra poor women selected for the CFPR/TUP programme fared far better than those not included in the programme with better self-reported health status. Programme effects remain positive and significant after controlling for marital status, education, age, previous health, disability, occupation, sanitary knowledge and behaviour, family planning, and location. We conclude that the CFPR/TUP programme has a significant effect on women's health, highlighting the importance of development as a holistic process with various components.

## INTRODUCTION

Bangladesh is the one of the poorest and most densely populated countries in the world where 40% of people consume less than 1805 kcal per capita per day (BIDS 1992). Various development initiatives have been undertaken to help the poor, of which micro-credit has been shown to enhance the steady movement of borrowers from poverty to non-poverty and to improve housing, sanitation, nutrition, education, reduce child mortality and increase women's empowerment among borrowers (Yunus 2004). At the same time, it has also been shown that micro-credit services need to be tailored to complement other anti-poverty interventions as no single instrument can reasonably be expected to solve the complex causes of poverty (Zaman 1998). Even though micro-credit generally targets all the poor in theory, it often fails to reach those living in extreme poverty in practice (Rahman *et al.* 2000, Hashemi 1997, Halder *et al.* 1998, Matin 2001).

Including the poorest in development programmes is an important part of BRAC's strategy (Halder 2003). This is reflected in one of their newest programmes, entitled 'Challenging the Frontiers of Poverty Reduction: Targeting the Ultra Poor' (CFPR/TUP), which aims to incorporate previously excluded groups into mainstream development programmes. Aimed at those that could not join conventional micro-credit and other development programmes, beneficiaries are provided income-generating assets, free health care services for all the household members in case of illness, and a subsistence allowance (given weekly for 18 months). The allowance aims to reduce their dependence of daily labour to survive and allow them to focus on generating income from the BRAC-provided asset. The goal is to eventually incorporate the participants into mainstream, micro-credit centred development programmes.

The CFPR/TUP programme's health component is an important element of the programme, and consists of two strategies: the provision of basic healthcare services along with information to raise awareness of health-related issues, and the provision of financial assistance for clinical care if so required. These strategies are implemented through local Programme Organizers (PO) who visit participants once a month, documenting participant and family health, providing feedback on disease prevalence and raising awareness on a variety of topics. In the case of sickness, the PO prescribes appropriate solutions if possible and refer participants to local health facilities if necessary. In a referral, the PO accompanies the patients during their visits and explain the symptoms and case history to the medical practitioners. In the case of hospitalization, the PO visits the patients daily.

Another role of the PO is to increase awareness among participants about topics related to health, such as safe water and sanitation, pregnancy-related care, family planning, immunization and tuberculosis. This is done through presentations to small groups of participants during monthly visits; previous topics are briefly reviewed before starting the next one. The meeting also serves to check up on the health of participants and their families; this information is documented in a health log kept by the participants.

The CFPR/TUP programme was launched in three districts in northern Bangladesh in 2002. A comprehensive household survey was done before intervention to get baseline information and an understanding of ultra-poor households. These households included the first cohort of CFPR/TUP programme members as well as a comparison group. The full survey was administered in a third of the villages where the TUP programme was



launched; all CFPR/TUP members (referred to as SUP hereafter – Selected Ultra Poor) in those villages were surveyed, as well as an equal number of non-participants (NSUP hereafter) from each village. A more focussed follow-up survey was carried out on the same households in early 2004. The surveys interviewed the main woman of the household, which may have been the household head.

The follow-up survey identified major changes in programme households, particularly in relation to food consumption. For more information on the objective and subjective changes in these households see the CFPR/TUP Working Paper No. 7. This paper builds on a report from the survey which identified the changes in households studied and expands upon it by controlling for various socioeconomic and demographic characteristics to establish the programme's health effect.

A self-reported health score is used to compare differences in health; this has been recognized as a reliable and cost effective means of health assessment, with strong evidence of its predictive power (Kaplan *et al.* 2002). It is particularly relevant when more detailed information on health is not available. Women's self-reported health status is compared across several variables of interest, such as marital status, education, age, previous health, disability, occupation, sanitary knowledge and behaviour, previous food deficits, family planning, and location. Occupation, sanitation and family planning are directly linked to the programme intervention, and the continued relevance of CFPR/TUP membership while controlling for these variables illustrates the programme's strong impact on women's health.

## THE DATA

This paper uses data obtained during two household surveys on the first cohort of CFPR/TUP programme members and a comparison group. The baseline survey covered 5,626 households and the follow-up was able to identify and survey 5,403 households. Filtering the 2004 cohort by 2002 information to ensure comparability, we were able to identify 3,490 SUP and NSUP households which match both the eligibility criteria (Table 1). These households form the basis of the analysis.

The 2004 survey was field-tested in the Netrokona district, where the CFPR/TUP programme was launched in 2003. Experienced interviewers were appointed for data collection who got theoretical and practical training over a week. Ten teams of two people each were deployed to collect the data. Four supervisors performed spot-checks and checked the questionnaires for complete and consistent answers, failing which the interview would be repeated. Researchers from the head office provided additional support to the interviewers during frequent visits.

**Table 1. Sample size of the data in 2002 and 2004**

Types of household	Baseline		Follow-up		Comparable households	
SUP	2,189	38.91%	2,090	39.36%	1,812	51.92%
NSUP	3,437	61.09%	3,220	60.64%	1,678	48.08%
Number of observations	5,626		5,310		3490	

## METHODOLOGY

### Dependent variable – self-reported health status

The answers to “How do you rate your health” are organised on a five-point scale, as per the internationally used SF-36 health assessment tool and range from ‘excellent’ to ‘not good/bad’. This question was asked only to the main respondent the questionnaire – the main woman of the household. For analysis, the variable was simplified into two categories – good health and poor health – the three good health outcomes were collapsed into one indicator, while the last two categories were merged to give the poor health indicator.

Since self-reported health is entirely subjective, it is important to compare peoples’ responses to more objective measures to ensure its validity. We observed strong links between reported health status and women’s ability to carry out different tasks. Examples are provided below: in one question, respondents were asked whether they found it difficult to perform tasks involving strenuous physical activity, such as ploughing, carrying loads, digging earth, etc. Another question asked how hard it was for them to walk for a distance of one mile (Table 2).

### Independent variables

Several socioeconomic variables that may play a role in health outcomes were incorporated in the analysis. These variables fall into several categories: demographic, economic, previous health indicators, and participants’ behaviour. They include membership in the CFPR/TUP programme, previous health, age, education, marital status, disability, occupation, knowledge of a sanitation campaign, total number of children borne, previous food deficits, family planning, and location. Women’s occupations were grouped into three categories: occupations that earned them an income (not including day labour), day labour, and occupations that did not give these women any financial earnings (such as domestic work). Location was introduced at the district and *upazila* (sub-district) level. A full explanation of these variables is provided in Table 3.

### Variables examined but not included

Other variables were examined but not included in the analysis since no connection could be drawn between health outcomes and these variables. These variables include the source of drinking

**Table 2. Functioning and health status in 2004**

	Good health		Poor health	
How difficult is it for you to do hard physical labour?				
Very difficult	360	22.15%	1,076	57.69%
A little difficult	558	34.34%	544	29.17%
Not difficult at all	707	43.51%	245	13.14%
How difficult is it for you to walk one mile?				
Very difficult	265	16.31%	782	41.93%
A little difficult	458	28.18%	616	33.03%
Not difficult at all	902	55.51%	467	25.04%

water (98% of respondents get their drinking water from tubewells), source of cooking water (96.5% get this from tubewells), presence of soap in the household (linked to health in 2002 but not in 2004) and the value of their houses (health seems completely independent of this with near zero correlation) (Table 4). Whether a child was borne in the last two years (from 2002) also did not seem to have any link to women's health in 2004. A variable indicating women's health-seeking behaviour for pregnancy problems was not included because very few observations were available.

### Analysis

The bivariate analysis below compares self-reported health against several categorical variables – CFPR/TUP programme membership,

marital status, literacy, and occupation. This gives a good overview of the demographic characteristics of the sample. The multivariate analysis that follows seeks to explain the health changes that the CFPR/TUP programme is specifically responsible for, holding other potential factors constant. This is done by regressing a binomial variable (whether a person reported poor health or not) in a probit model. In this representation, the variable taking on a value of zero represented good health and a value of one represented poor health. The categories of zero and one are subjective, and switching them would result in an identical analysis with the opposite signs. Different specifications are presented below, but all follow the same basic format, regressing poor health on CFPR/TUP membership and other relevant variables:

$$POORHEALTH2004_i = TUP_i\beta_1 + Z_i\delta + POORHEALTH2002_i\beta_2 + OCCUP_i\lambda + P_i\gamma + L_i\phi + \varepsilon_i$$

where  $[TUP]$  is a dummy variable indicating CFPR/TUP membership,

$Z$  is a matrix of other relevant variables (such as age and education),

$POORHEALTH2002$  is a dummy variable indicating poor health in 2002,

$OCCUP$  is a matrix of occupations,

$P$  is a matrix of variables relevant to the programme, and

$L$  is a vector of location variables.

**Table 3. List of explanatory variables in multivariate analysis**

Independent variable	Default (zero value):	Information from year
Poor health in 2002	Good health (answer in top 3 categories)	2002
CFPR/TUP programme membership	Not a TUP member (NSUP)	2004
Schooling, schooling squared, schooling cubed	Zero years of schooling	2004
Married (with husband present)	Separated, divorced, widowed or single	2004
Age, age squared, age cubed	Numeric value - youngest is 15 years old	2004
Disabled (physically or mentally)	Not disabled	2002
Number of children borne (in 2002)	No children borne	2002
Family planning used	No form of birth control used	2004
Occupation variables (2)	Non-earning occupations	2004
Not aware of sanitation campaign	Aware of whether sanitary campaign was active in village or not.	2004
Sanitary habits – Defecation variables (3)	Uses a sanitary latrine	2004
Location – District variables (2)	Resident of Rangpur district	Both
Location – Upazila variables (28 - not reported)	Resident of Jalkar, Rangpur district	2004

To gain a deeper understanding of the sample, we split up the women into two categories – those that were healthy in 2002 and those that were not (i.e. the values of the dummy variable for poor health in 2002). This allows us to see the possibly different marginal effects of each independent variable on two different groups. The women in poor health are arguably worse off, so we would expect to see a stronger impact of TUP membership on their health, and a smaller impact on the health of those women that were already healthy in 2002. Therefore, for the first specification, results are presented in three columns – the first representing the entire sample and the other two representing those women who had, respectively, good and poor health in 2002.

Six specifications were tested, of which the first does not include any family planning, occupation or location information. The next specification adds family planning to the model. This is the only specification that includes family planning because the question was asked only to married women, reducing the sample size substantially and possibly losing some information. The

third specification drops family planning and adds occupations. The fourth specification adds variables on knowledge of a sanitation campaign and sanitary behaviour, namely, where the women defecate. The last two specifications include location dummies at the district and *upazila* (sub-district) level. The two district and 28 *upazila* values are not reported – the variables serve as a controlling factor only, and limited information can be gained from the coefficients themselves.

Because the CFPR/TUP programme intervention occurs in several different ways, after establishing that the programme has an effect on women's health, we tried to identify which aspects of the programme have a greater impact on health. The programme's health impact could arise out of its nutritional role, provision of assets, increased awareness of health matters, and more sanitary behaviour. We hope to see which aspects of the programme had the greatest impact on women's health by adding the relevant variables in different specifications and by including interaction variables.

**Table 4. List of variables not included in analysis**

Variable	Reason not included	Variable from year
Source of drinking water	98% use tube wells, no health link can be established	2002
Source of cooking water	96% use tube wells, no health link can be established	2002
Present value of dwelling	Near zero correlation with health, no link apparent	2002
Household had soap	No apparent effect on health in 2004	2002
Child borne in last 2 years	No apparent effect on health in 2004	2002
Nutrition - Caloric consumption	Vastly reduced sample size (255 observations)	2004
Previously used family planning	Further limiting of sample size, no apparent health link	2004
Pregnancy-related care	Very few (22) observations	2004

## RESULTS

Table 5 gives us some basic demographic information about our sample: SUP women are slightly older, fewer SUP women are married, and fewer SUP women are able to read and write, although not many more NSUP women are literate. The majority of SUP members (61%) were involved in income generating activities compared to 8% of NSUP women while relatively few SUP women worked as day labourers, reflecting the programme's emphasis away from daily labour to asset-based occupations. The majority of NSUP women (66%) listed non-earning occupations such as housework as their primary occupation, followed by day labour (26%).

Rather than looking at just the difference between the SUP and NSUP groups, we incorporate the two groups' initial situations in our analysis by looking at the change in health for each group over time. Looking at women's self-reported health over the two time periods we see that similar proportions of SUP and NSUP women initially reported good health, but while the proportion of women reporting good health increased in 2004 for SUP women, this proportion fell slightly for NSUP women (Table 6).

We can also contrast women's current health status with their previous health status to get an

**Table 5. Socio-demographic characteristics of the SUP and NSUP women in 2004**

Characteristics	SUP		NSUP		All	
Mean age	38.4		37.3		37.9	
<b>Marital status</b>						
Married	1,159	63.96%	1,269	75.63%	2,428	69.57
Divorced/ separated/widowed/single	653	36.04%	409	24.37%	1,062	30.43
Significance $\chi^2$	P < 0.001					
<b>Educational status</b>						
Literate	80	4.42%	120	7.15%	200	5.73%
Illiterate	1,732	95.58%	1,558	92.85%	3,290	94.27%
Significance $\chi^2$	P = 0.001					
<b>Occupation</b>						
Income-Generating	1,107	61.09%	141	8.40%	1,248	35.76%
Labourer	180	9.93%	428	25.51%	608	17.42%
Non-earning	525	28.97%	1,109	66.09%	1,634	46.82%
Significance $\chi^2$	P < 0.001					
Total	1,812		1,678		3,490	

**Table 6. Self-reported health status at baseline and at follow-up survey**

Health status	SUP 2002		SUP 2004		NSUP 2002		NSUP 2004	
Good	783	43.21%	909	50.17%	749	44.64%	716	42.67%
Poor	1,029	56.79%	903	49.83%	929	55.36%	962	57.33%
Significance $\chi^2$	P < 0.001				P = 0.251			
Total	1,812				1,678			

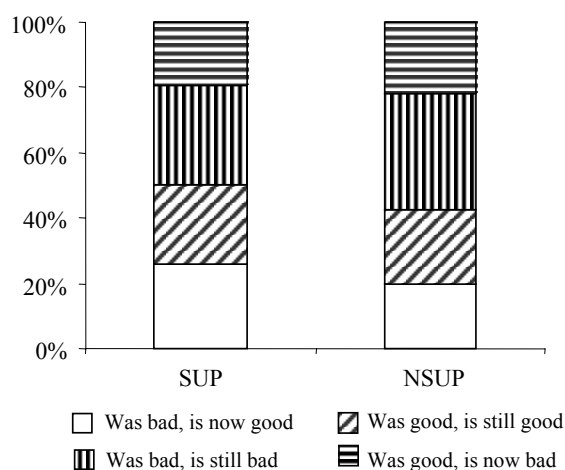
idea of the dynamics of reported health status. This gives us four categories: two in which reported health status changed and two in which it remained unchanged. Figure 1 shows that SUP women fared better than NSUP women along many criteria: they generally reported better

improvements, fewer reported poorer health; and a slightly greater proportion of SUP women reported good health status if it was previously good.

We can gain only limited information comparing women across literacy status since only a very small proportion of women in the sample can read and write, so although literate women reported better health more often (and greater improvement in health if SUP women), we cannot tell if this is just a quirk in the data (Table 7).

Looking at self-reported health by marital status shows that the CFPR/TUP programme has an extremely important effect for unmarried women. Although more CFPR/TUP members reported good health regardless of marital status, the strong improvement in unmarried women is contrasted with unmarried NSUP women, more of whom reported poor health. Considering the well-documented disadvantages faced by female-headed households, the improvements amongst SUP women are even more impressive (Table 8).

**Figure 1. Changes in health status**



**Table 7. Self-reported health status by literacy: baseline and follow-up survey**

Health status of women	SUP 2002		SUP 2004		NSUP 2002		NSUP 2004	
<b>Literate</b>								
Good	36	55.38%	46	57.50%	57	60.00%	66	55.00%
Poor	29	44.62%	34	42.50%	38	40.00%	54	45.00%
Number of observations	65		80		95		120	
Significance $\chi^2$	P = 0.798				P = 0.462			
<b>Illiterate</b>								
Good	746	42.73%	863	49.83%	692	43.71%	650	41.72%
Poor	1,000	57.27%	869	50.17%	891	56.29%	908	58.28%
Number of observations	1,746		1,732		1,583		1,558	
Significance $\chi^2$	P < 0.001				P = 0.252			
Total	1,811		1,812		1,678		1,678	

**Table 8. Self-reported health status of SUP and NSUP women by marital status: baseline and follow-up survey**

Health status of women	SUP 2002		SUP 2004		NSUP 2002		NSUP 2004	
<b>Married</b>								
Good	558	46.62%	629	54.27%	620	47.55%	598	47.12%
Poor	639	53.38%	530	45.73%	684	52.45%	671	52.88%
Number of observations	1,197		1,159		1,304		1,269	
Significance $\chi^2$	P < 0.001				P = 0.830			
<b>Unmarried</b>								
Good	224	36.48%	280	42.88%	129	34.49%	118	28.85%
Poor	390	63.52%	373	57.12%	245	65.51%	291	71.15%
Number of observations	614		653		374		409	
Significance $\chi^2$	P = 0.020				P = 0.085			
Total	1,811		1,812		1,678		1,678	

Finally, looking at health changes across women's current occupations, we see that SUP women generally show greater improvements, but those SUP women that remained in non-earning occupations are actually worse off than their NSUP counterparts. This surprisingly strong effect may be exaggerated by the small number of non-earning SUP women, but is a source for concern (Table 9).

We were interested in establishing what role the programme's nutritional aspect plays in women's self reported health status but due to limited data we could not incorporate it into the multivariate analysis. A random subset of the

sample in both surveys was asked detailed consumption information over a three-day recall period. From this household information, BRAC researchers constructed daily caloric intake on an individual basis using adult equivalence. The average caloric intakes over time are presented below, followed caloric intake organised into four categories chosen to represent the national poverty line (2122 kcal), and different levels of extreme poverty. While NSUP women displayed similar levels of caloric intake, SUP women showed general improvements, with a general shift upwards from the lowest level of consumption (<1600 kcal) to the national poverty line (Table 10).

**Table 9. Self-reported health status of SUP and NSUP women by occupation: baseline and at follow-up survey**

Health status of women	SUP 2002		SUP 2004		NSUP 2002		NSUP 2004	
<u>In income-generating activities (other than labour)</u>								
Good	35	43.21%	749	51.69%	26	36.11%	32	33.68%
Poor	46	56.79%	700	48.31%	46	63.89%	63	66.32%
Number of observations	81		1,449		72		95	
Significance $\chi^2$	P = 0.137				P = 0.744			
<u>Who work as day labour</u>								
Good	325	41.04%	102	49.04%	191	43.71%	260	44.44%
Poor	467	58.96%	106	50.96%	246	56.29%	325	55.56%
Number of observations	792		208		437		585	
Significance $\chi^2$	P = 0.038				P = 0.412			
<u>Without earning occupations</u>								
Good	420	44.87%	58	37.42%	531	45.50%	424	42.48%
Poor	516	55.13%	97	62.58%	636	54.50%	574	57.52%
Number of observations	936		155		1,167		998	
Significance $\chi^2$	P = 0.083				P = 0.814			
Total	1,809		1,812		1,676		1,678	

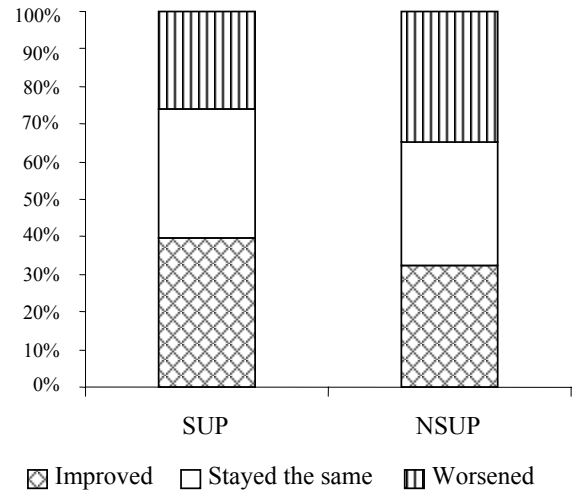
**Table 10. Caloric intakes of women: baseline and follow-up survey**

Caloric intakes of women	SUP 2002		SUP 2004		NSUP 2002		NSUP 2004		All 2002		All 2004	
Average caloric intake (kcal)	1759.56		2103.16		1761.69		1799.65		1760.62		1952.00	
<u>Caloric intake categories – frequency and percentage</u>												
Under 1600 kcal	54	42.19%	31	24.22%	58	45.67%	56	44.09%	112	43.92%	87	34.12%
Between 1600-1805 kcal	11	8.59%	19	14.84%	9	7.09%	14	11.02%	20	7.84%	33	12.94%
Between 1805-2122 kcal	23	17.97%	23	17.97%	21	16.54%	18	14.17%	44	17.25%	41	16.08%
Over 2122 kcal	40	31.25%	55	42.97%	39	30.71%	39	30.71%	79	30.98%	94	36.86%
Significance $\chi^2$	P = 0.013				P = 0.717				P = 0.052			
Total	128				127				255			



Figure 2 shows the changes in individual consumption category. Once again, a strong CFPR/TUP programme effect is easily discernible, and although we cannot use this information for the formal analysis, we suspect that nutrition plays a role significant in the health changes observed. Poor health and caloric consumption (in categories) are significantly correlated, but the strength of this correlation (lower than expected at 13.7%) may be affected by the small sample size.

**Figure 2. Changes in consumption**



## MULTIVARIATE ANALYSIS

In Table 11, the numbers represent marginal probabilities – the effect a marginal change in an independent variable will have on the probability of reporting poor health status, holding all other variables constant at their default values. Many of the variables used are dummy variables, so this ‘marginal’ change often reflects a discrete change from zero to one. For example, the variable “married” reflects the change in probability for an unmarried woman to report poor health status when compared with a married but otherwise identical woman.

The “poor health in 2002” variable is strongly positive and significant in all specifications at the 1% level. Reading column 1, the interpretation is simple – holding other factors constant, those with poor health in the past (2002) are approximately 9% more likely to report poor health in 2004. This result is consistent with our expectations of past health affecting present health, but the fact that the effect is only around 10% highlights the variability in women’s health.

Membership in the CFPR/TUP programme, on the other hand, is strongly negative and significant – TUP members are 9% less likely than non-members to report poor health, as per column 1. However, once we split up the sample to reflect previous health situations, the numbers change. CFPR/TUP membership is more important for those that had poor health in 2002 than for those that had good health in 2002, with the effect nearly doubling for those in poor health in 2002. These gains are sizeable, and reflect merely a year and a half of programme participation.

Years of schooling, similarly to literacy, do not seem important for ultra poor women, showing up insignificant in most specifications. The exception to this is the column where we look at only the sample in good health in 2002, where

another year of education makes a person more likely to report poor health. This may reflect greater awareness of ones’ body – private knowledge that adds to a person’s reported health status.

One very relevant variable is marriage – showing strong effects against poor health in all specifications and for all samples. This probably reflects the disadvantages faced by single women in society as well as the benefits of having an additional earner in the family. In a male-dominated society, women are necessarily more dependent on their husbands, and this dependency is compounded by the fact that men remain the primary earners.

The number of children a woman has borne has a minor but consistently significant impact towards poorer health. This is consistent with our expectations since rearing children may be costly and time-consuming. Bearing an additional child (by 2002) increases the probability of reporting poor health by approximately one percent. An updated variable would no doubt give stronger effects.

One specification tested the impact on health of using family planning. Our reasoning here is not that a form of birth control implies direct health benefits, but rather that women using family planning are more likely to be socially active and ‘empowered’, and this may be reflected in their reported health. Indeed, we see that using family planning does significantly decrease the probability of reporting poor health, while simultaneously reducing the impact of being a CFPR/TUP programme member. However, because this question was asked only to married women due to cultural constraints, it limits our sample and the new variable picks up effects of households with husbands as well any empowerment effects. In fact, we can see later

from interacting this term with programme membership that the hoped-for ‘empowerment effect’ either does not exist or cannot be established with this variable.

As was the case with education, being a year older or being disabled do not seem to have an

effect on reported health. With disability, the effect may be similar to that of literacy – we may not pick up any effects on health since only a small percentage of the sample is disabled. A sample with more disabled people is necessary to understand its effects, and that is beyond the scope of this data and study.

**Table 11. Determinants of poor health in 2004**

Determinants of Poor Health in 2004 Probit model, marginal value reported	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Basic Model			Family Planning	Occupation	Sanitary Variables	District- level; effects not reported	<i>Upazila</i> - level; effects not reported
	Entire Sample	Good Health in 2002	Poor Health in 2002	Married Sample	Entire Sample	Entire Sample	Entire Sample	Entire Sample
Poor Health in 2002	0.093 5.25***			0.087 4.02***	0.092 5.24***	0.086 4.87***	0.089 5.00***	0.107 5.66***
CFPR/TUP Member	-0.091 5.19***	-0.061 2.35**	-0.112 4.84***	-0.057 2.61***	-0.080 3.83***	-0.069 2.88***	-0.075 3.12***	-0.079 3.10***
Years of schooling	0.010 0.19	0.135 1.83*	-0.119 1.62	0.025 0.43	0.004 0.07	0.006 0.12	-0.004 0.07	0.012 0.21
Schooling squared	-0.012 0.61	-0.056 2.12**	0.036 1.31	-0.015 0.75	-0.010 0.54	-0.011 0.58	-0.007 0.37	-0.010 0.50
Schooling cubed	0.002 0.93	0.005 2.26**	-0.002 1.01	0.002 1.01	0.001 0.87	0.001 0.90	0.001 0.68	0.001 0.75
Married	-0.053 2.34**	-0.048 1.39	-0.056 1.90*		-0.064 2.79***	-0.067 2.93***	-0.064 2.80***	-0.066 2.80***
Number of children borne (in 2002)	0.010 2.23**	0.014 1.79*	0.008 1.42	0.017 2.47**	0.009 1.99**	0.009 1.89*	0.010 2.23**	0.008 1.74*
Age	0.017 0.82	0.019 0.53	0.006 0.23	0.006 0.10	0.024 1.13	0.025 1.19	0.031 1.50	0.028 1.27
Age squared	-0.000 0.82	-0.000 0.43	-0.000 0.27	-0.000 0.07	-0.001 1.05	-0.001 1.10	-0.001 1.39	-0.001 1.10
Age cubed	0.000 1.09	0.000 0.46	0.000 0.55	0.000 0.08	0.000 1.25	0.000 1.29	0.000 1.56	0.000 1.25
Disabled	0.031 0.15		0.023 0.11		0.011 0.06	0.002 0.01	0.030 0.14	0.101 0.54
Income-Generating Occupation					-0.057 2.50**	-0.052 2.27**	-0.043 1.87*	-0.014 0.58
Day Labour Occupation					-0.096 3.85***	-0.095 3.77***	-0.099 3.92***	-0.070 2.63***
Didn't know about sanitation campaign						0.067 3.08***	0.057 2.60***	0.064 2.73***
Defecates in various locations						-0.085 3.28***	-0.071 2.67***	-0.000 0.01
Defecates in a fixed location						0.057 2.32**	0.068 2.73***	0.038 1.40
Defecates in a pit						0.086 2.65***	0.063 1.91*	0.068 1.91*
Uses Family Planning				-0.081 3.47***				
Observations	3490	1532	1958	2199	3490	3490	3490	3488

Robust z statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Note: District dummies included in regression 6 but not reported. *Upazila* dummies included in regressions 7 and 8 but not reported.

Two dummy variables were used for the women's occupation – women involved in income-generating (except for day labour) and day labour, with the default option being women whose occupations do not earn them cash. Both occupations lead to better health when compared to non-cash work, with day labour reducing the probability of reporting poor health more strongly. This is in contrast to the tabulation provided in Table 9, which suggested better health outcomes for occupations involving income generating activities.

We can understand the weaker effect of IGA-category occupations by considering the effect of programme participation – including occupations in the regression reduces the programme effect to 8%, but it is still strongly significant. Looking at a similar regression to this one that excludes CFPR/TUP programme membership as a variable (not presented), we see the effect of both occupation categories increases to nearly 10%; this time income generating activities lead to a greater health reduction. Women are associated with IGA occupations through the CFPR/TUP programme, so the programme variable picks up these effects more strongly than occupational categories. This is examined further below.

Not knowing about sanitation campaigns has the predictable effect of increasing the probability of reporting poor health status. This is contrasted by the slightly surprising effect of sanitary behaviour on health. The default value here is defecation in a sanitary latrine, so all other behaviours are expected to be associated with worse health outcomes. Defecating in a pit, predictably, is associated with an increased probability of reporting poor health. Similarly, defecating in a fixed location which is not a pit or latrine is also associated with worse health outcomes. However, defecating in various locations is associated with better health outcomes. This may be because defe-

cating in various locations may be associated with occupations that give greater earnings, which lead to better health in spite of the women's behaviour.

The choice of where to defecate depends largely on availability and cleanliness of latrines, and fewer women involved in day labour may have access to latrines. A greater proportion of day labourers defecate in various locations compared to those in other categories, so although we control for occupations, we may be missing some information here (Table 12).

Location variables were included in the model to capture some large-scale community effects. These effects may not be captured through variables in the data, including relative wealth and inequality, other NGO campaigns, and prevalence of disease. Looking at how our main explanatory variables change when these factors are accounted for can give us an idea of these community effects that cannot be effectively captured in the data.

Including district dummies for location in the model increases the impact of CFPR/TUP membership, reduces the effect of marriage and reduces the effect of variables on sanitary knowledge and sanitary behaviour. This is easily understood in terms of those variables picking up effects that are caused by an underlying variable.

Including the 28 *upazila* dummies has even stronger effects, further increasing the effects of past health and CFPR/TUP membership on reported health. At the same time, the impact of doing an income-generating activity is reduced to zero, while day labour remains significant, although reduced. The coefficients and significance of sanitary behaviour are further decreased: defecating in various or fixed locations no longer have an impact on reported health, while defecating in a pit still increases the probability of reporting poor health.

**Table 12. Choice of sanitary behaviour and occupation categories**

	Income-Generating Activities		Day Labour		Non-earning work	
Defecate in various locations	164	13.14%	173	28.45%	395	24.17%
Other Behaviour	1,084	86.86%	435	71.55%	1,239	75.83%
Total	1,248		608		1,634	

### Looking at joint effects of CFPR/TUP membership and individual behaviour

The above analysis gives us a clear idea of the effect of CFPR/TUP membership on reported health status holding all other factors constant. To understand which aspect of the programme leads to these health effects, we now look at the effects

of CFPR/TUP membership when other variables take on different values. This is done through creating a new variable indicating when an individual meets both relevant categories, for example, when an individual is a CFPR/TUP programme member who reported poor health in 2002, as is shown in the first column of Table 13. As we can see below, previously reporting poor

**Table 13. Determinants of Poor Health in 2004 – Interacting Variables**

Variables interacted with CFPR/TUP:	(1) Poor Health	(2) Married	(3) Family Planning	(4) Occupation	(5) Sanitation
CFPR/TUP Member	-0.062 2.40**	-0.121 3.60***	-0.027 0.72+++	-0.089 3.28***	-0.062 1.71*+++
Poor Health in 2002	0.120 4.78***	0.093 5.27***	0.087 4.03***	0.093 5.24***	0.086 4.85***
CFPR/TUP & Poor Health 2002	-0.053 1.53+++				
Married	-0.053 2.35**	-0.078 2.37**		-0.063 2.76***	-0.067 2.94***
CFPR/TUP & Married		0.042 1.06+++			
Number of children borne (in 2002)	0.010 2.21**	0.010 2.22**	0.017 2.51**	0.009 2.00**	0.009 1.88*
Income-Generating Occupation				-0.012 0.25+++	-0.051 2.24*++++
CFPR/TUP & IGA Occupation				-0.045 0.83+++	
Day Labour Occupation				-0.122 4.11***	-0.095 3.78***
CFPR/TUP & Day Labour				0.084 1.64+++	
Didn't know about sanitation campaign					0.071 2.62***
CFPR/TUP & didn't know about sanitation campaign					-0.012 0.27+++
Defecates in various locations					-0.074 1.99*++++
CFPR/TUP & defecates in various locations					-0.033 0.58+++
Defecates in a fixed location					0.061 1.67*+++
CFPR/TUP & defecates in a fixed location					-0.004 0.09+++
Defecates in a pit					0.082 1.90*+++
CFPR/TUP & defecates in a pit					0.026 0.36+++
Uses Family Planning			-0.062 2.02**		
CFPR/TUP & uses Family Planning			-0.044 0.95+++		
Observations	3490	3490	2199	3490	3490

Robust z statistics in parentheses: \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

+ jointly significant at 10%; ++ jointly significant at 5%; +++ jointly significant at 1%

( Joint significance refers to CFPR/TUP membership, interacted variable and original variable)

Note: Variables Age, Age squared, Age cubed, Years of schooling, Years of schooling squared, Years of schooling cubed, Disabled included but not displayed.

health increases the chance of reporting poor health by 12%, while being a member of CFPR/TUP reduces this probability by 6.2%. These are individual effects which are not strictly comparable. To look at the programme's effect on someone who previously reported poor health, we need to also consider the interacted term, so we add the 6.2% from the CFPR/TUP variable and an additional 5.3% from the interacted term. Therefore, the programme's impact on someone who previously reported poor health is  $(-6.2 - 5.3 =) -11.5\%$ . As expected, this result is nearly identical to the programme's effect when looking at the sample that previously reported poor health (column 3 from Table 11). Note that since the ones in poor health are 12% more likely to report poor health, the overall effect is (the sum of all three variables) that the programme offsets the poor health 'disadvantage' that these individuals faced.

Similarly, we can look at the effects of programme membership and marriage – we know that married women are less likely to report poor health. What about married women who are programme members? Adding the programme effect (-.121), the marriage effect (-.078) and the interacted variable (+.042), we obtain an estimate that is higher than either variable on its own, but less than the sum of both (-.158). Looking now at the use of family planning, we see that its combined effects with the programme (-.133) are dominated by the marriage variable – there is no additional 'empowerment' from women using birth control, and perhaps a link to worse health.

Continuing this exercise to see which occupation has a greater effect on health, we see that the health impact of IGA dominate that of day labourers – 14.6% to 12.6% as expected. This result was not immediately apparent in the initial regression (column 5 of Table 11).

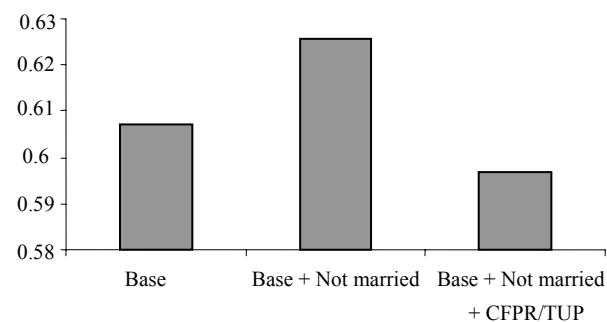
Similarly, we see that although not knowing about sanitation campaigns leads to worse health, the CFPR/TUP programme adds an even greater marginal benefit to these individuals. This result is

of particular interest, because although the effect is small, it shows that the programme's interaction with these individuals helps their health in spite of their gaps in general knowledge.

Looking next at sanitary behaviour, we see the surprising result that the programme actually further improves the health of women defecating in various locations (-.168 overall), while the programme's beneficial effects are undone by those defecating in a fixed location or a pit. This may be a result of the variable picking up another aspect of the programme – perhaps it reflects an income-generating process that leads to better health but is simultaneously associated with defecating in various places. Other ideas to explain this outcome included different interactions between occupations and defecation behaviour, the possibility of an individual maximising private gain by defecating in different places (with a negative externality), or different reporting by these individuals who are indifferent to their health. However, trying all of the above and controlling for occupations, all these attempts still fail to explain this difference.

Looking at the same information graphically (Fig. 3), it is apparent that once we take individuals' average situations into account, the CFPR/TUP programme more than offsets health-losses associated with female-headed households. Considering the programme's focus on the extreme poor and the disadvantaged, this is a heartening result.

**Figure 3. Probability of reporting poor health in 2004: a simulation exercise**



## CONCLUSION

Women's health is undermined by poverty, illiteracy and patriarchal norms in Bangladesh, with poor women more vulnerable than the better-off in all respects. In an attempt to eliminate these gender disparities, non-governmental organisations and the government provide several programmes aimed at women, including healthcare, nutrition and micro-credit programmes. Recognising that the poor are composed of several different categories able to take advantage of pre-existing programmes differently, BRAC launched an inclusive development programme in northern Bangladesh. After a year and a half of the programme's presence, we can see substantial improvements in the health status of women who were programme members.

These benefits extend across different socioeconomic and demographic groups. For instance, the programme narrows down the gap between married and widowed/divorced women significantly, highlighting the importance of the programme to one of the most disadvantaged groups in society. We also observed a widening gap between non-participants, with an increasing number of these women reporting poor health.

We suspect that the programmes' nutritional aspect has a strong effect on women's health, but were not able to incorporate this information in the analysis in a satisfactory manner. On the basis of our limited data, we see a very significant correlation between health and caloric intake, and we see strong improvements in programme members' consumption. The parallel movement with health is not enough to judge the strength of the link, but nutrition seems to play a role bolstering the estimated programme effect.

There is some evidence that this health improvement comes about from the members'

participation with the programme as much as their increased health knowledge, but the effect was established in an indirect manner and can no doubt be expanded upon by more focused research. At the same time, this paper hoped for an indicator of empowerment or social interaction from women's use of birth control, but found that this had no appreciable effect on health and effects of being in a male-headed household dominated any possible empowerment effects.

The study shows that women defecating in various locations were less likely to report poor health than those using latrines, and several attempts to explain this result were not satisfactory – controlling for occupations, possible interactions with other variables, and subjective biases. We are still unable to explain why these individuals are less likely to report poor health.

Women's occupations significantly affect their self-reported health. Since part of the CFPR/TUP programme consists of encouraging women into different occupations, the strong effect of occupation on health is expected and bolsters these results. As expected, the health benefits are weaker for those that already had good health. Those in poor health in 2002 show almost double the gains of those already in good health, with CFPR/TUP membership increasing the probability of a good health score in 2004 by nearly 11%. These results hold consistently, controlling for marital status, years of schooling, age, previous health, disability, occupation, sanitary practices, knowledge of sanitation and location. We conclude that the CFPR/TUP programme has a significant effect on women's health, highlighting the importance of development as a holistic process with various components.

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