

Morbidity and Poverty: Measuring Economic Burden of Illness Requiring In-patient Services

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ABSTRACT

Severe illnesses may have important consequences for the poor in terms of the costs of treatment they have to bear and income erosion effects of those illnesses. The resulting depletion of wealth may also transmit poverty to the next generation. This study compared the cost of illness between the Selected Ultra Poor (SUP) and the Not Selected Ultra Poor (NSUP) households and investigated whether health expenditures are catastrophic. It also investigated the crisis coping mechanism for meeting the cost burden of illness and its implications for the poverty status of households. The survey interviewed SUP and NSUP households during February-March 2006 in Rangpur, Nilphamari and Kurigram, drawn randomly from the 'Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor (CFPR/TUP) Repeat Survey 2005' based on those with severe illness. On average, findings revealed lower direct costs of illness for SUP households compared to NSUP ones but higher indirect costs for the former. A higher percentage of SUP households incurred catastrophic health care expenses compared to NSUP households. Asset depletion was found to be lower among SUP households who also reported higher asset value compared to NSUP households. Potential positive effect of the CFPR/TUP interventions was noted which may be important for guiding policy and practice by the programme.

INTRODUCTION

Morbidity or illnesses reflect the general health status of a population (CFPR/TUP Baseline Survey). Poor households tend to be both vulnerable to ill health due to under-nutrition and living in poor environmental conditions, which produce high risk of infections and vector borne diseases (Jayawardene 1993). They are also socially and economically vulnerable due to existing quality of health care along with difficulties in gaining access to and paying for treatment (Ahmed *et al.* 2003, Corbett 1989). Thus, poverty and morbidity seem to be intertwined with each other. Though it is a well-recognized fact that poverty leads to ill-health, yet not much is known about how morbidity itself can lead to poverty in developing countries. Two major channels may be identified. The first is through the demise or disability of an income earner in the household. This reduces future income generation and has the potential to jeopardize household consumption (Meessen, Zhengzhong, Damme, Devadasan, Criel, Bloom 2003). The resulting depletion of wealth may also lead to a lower capacity to invest in the education and well-being of the children in the household which again transmits poverty to the next generation.

The other channel may be through the associated cost of treatment. The illness of a household member leads to several different costs, such as treatment expenditures, opportunity costs of care giving, transportation costs with which households have to cope by following diverse strategies. When costs are limited, households are able to absorb them by making short-term adjustments such as consuming precautionary savings, calling on assistance from informal support networks or temporarily reducing consumption of other goods (Meessen, Zhengzhong, Damme, Deavadasan, Criel, Bloom 2003). Households facing much higher accumulating costs due to severe acute or chronic illness may have to adopt, as crisis coping mechanisms, riskier strategies of selling or mortgaging productive assets or land or borrowing from moneylenders at high interest rates, working for others which ultimately spiral down to poverty, or in case of those already poor, further impoverishment. The magnitude of these negative consequences, known as the medical poverty trap, may have important implications for the future economic status of households resulting in their inability to come out of the vicious circle of poverty.

ECONOMIC BURDEN ON HOUSEHOLDS DUE TO ILLNESS

Vulnerability of the extreme poor to severe ill health can strongly affect the welfare of both the individuals concerned and the households to which they belong. In order to understand the unidirectional causality between severe morbidity and poverty¹, it is important to consider the economic costs – both direct and indirect, associated with the presence of acute or chronic disease in a household. Diseases, both acute and chronic, can come at a high cost for the poor, especially if it necessitates hospitalization, in terms of transportation, time, direct medical costs (Zaman, Rahman, Edgeworth 2004), and income erosion through loss of workdays.

Health policy makers have long been concerned with protecting people from the possibility that ill health will lead to catastrophic financial payments and subsequent impoverishment. Russell (2004) reviews studies that have measured the economic costs and consequences of illness for households, focusing on malaria, tuberculosis (TB), and HIV/AIDS

¹ There also exists a well-documented causality between poverty and morbidity, thus the relationship between the two may be endogenous.

which are major sources of morbidity and mortality in developing countries. The studies show that in resource-poor settings illness impose high and regressive cost burdens on patients and their families. Though both direct and indirect costs of illness for malaria are less than 10% of household income, but are still significant when combined with the costs of other illnesses. The costs of TB and HIV/AIDS were catastrophic for households (more than 10% of the income). This study, however, does not explicitly consider the secondary cost of these diseases in terms of the means households use to cope with this crisis.

Khan (2005) investigates the amount and types of out-of-pocket expenditures by patients for nominally free services in a large public hospital in Bangladesh along with the factors influencing these expenses and the impact of these expenses on household income. Eighty-one maternity patients were interviewed during their hospitalization in the Dhaka Medical College Hospital. All interviewees incurred substantial out-of-pocket expenditures for travel, hospital, admission fees, medicine, tests, food and tips, where only two of these expenditures, travel expenses and admission fees, were not supposed to be provided free of charge by the hospital. The median total expenditure per-patient was \$65 (range \$2-\$350), equivalent to 7% (range 0.04%-225%) of annual household income. Factors increasing the expenditures were duration of hospitalization, rural residence, and necessary (e.g. c-section, hysterectomy) and unnecessary (e.g. episiotomy) medical procedures. These imply that free maternity services in Bangladesh impose large out-of-pocket expenditures on patients.

Xu *et al.* (2003) investigate the extent of catastrophic health expenditures in 59 countries by performing a cross-country regression analysis, where the proportion of households with catastrophic expenditures was regressed on the share of out-of-pocket payments in total health expenditure and the proportion of households below the poverty line. This study defines expenditures as being catastrophic if the household's financial contributions to the health system exceed 40% of income remaining after subsistence needs have been met, even though this threshold has varied from 5% to 20% of total household income in past studies where most of the studies use 10% as the threshold level. Health expenditures requiring out-of-pocket payments include health-related expenses, such as consultation fees, purchase of medications, hospital bills, etc. incurred at the time the household received the service. Findings show that the proportion of households facing catastrophic payments from out-of-pocket health expenses varies widely between countries, from less than 0.01% in Czech Republic and Slovakia to 3.5% in Vietnam. The study also finds a highly significant (at 1% level of significance) positive impact of the share of out-of-pocket payments in total health expenditure and proportion of households below poverty line on the proportion of households with catastrophic health expenditures. This study would be more complete if the indirect effects of illness would be considered.

Chima *et al.* (2000) compare the financial and economic costs of malaria attack to that of a combination of other illness episodes on households in five malaria holo-endemic rural communities in Nigeria. Information was collected on the amount of money households spent to treat both malaria and other illnesses respectively (including both the payment for treatment and the transportation costs of receiving treatment), together with the time lost due to both the groups of illnesses within 1 month prior to the interview. The results show that the average malaria expenditure is \$1.84 per household per month, while it was \$2.60 per month for the combination of other illness episodes. The combined financial costs of treating all illnesses deplete 7.03% of the monthly average household income, while treatment of malaria alone depletes 2.91%. Thus, it can be concluded that malaria is an important contributor to the economic burden of disease, in malaria holo-endemic communities.

Rapoport *et al.* (2005) present an analysis of the economic burden of a number of chronic diseases in Canada using data from the 1999 National Population Health Survey. Besides estimating the chronic disease burden considering person-level data from this nationwide

population survey, this study also examines the relation between chronic disease and utilization of physician and hospital services. Findings show that the number of chronic diseases is a highly significant predictor of utilization, where in the younger age group an additional chronic disease is associated with 1.74 more physician visits per year, and in the older age group the increase in physician visits predicted is 1.29. Regression results for hospital utilization show that an additional chronic disease raises the probability of hospitalization by 44% in the younger age group and by 27% among people over age 60 where the number of chronic diseases has a statistically significant coefficient in both age groups.

CALCULATING COSTS OF ILLNESS

Direct costs

Out-of-pocket expenditures on health care services to treat severe illness increase the poverty of the poor which is also known as the 'medical poverty trap' and impose a direct financial burden on households. These include fees for admission into medical facilities, consultation and treatment from public and private practitioners, purchase of medications, hospital bills, costs of ancillary services such as x-rays, ultrasounds and tests, etc. Along with medical expenditures, direct costs of severe illness may include expenditures associated with transport, food and accommodation. Accessing these services can lead to individuals having to pay catastrophic proportions of their available income and further impoverish the already poor. (Xu, Evans, Kawabata, Zeramdini, Klavus, Murray 2003).

Indirect costs

The indirect costs of severe illness in a household may include lost earnings associated with lost labour hours or workdays. This is particularly relevant for the poor because the number of workdays lost is directly relevant to their income and livelihood, commonly known as the income erosion effect. The indirect burden may also come in the form of opportunity costs of time and energy spent by other household/family members² caring for the ill, whereas they could have been involved in income-earning, education or other productive activities. Other crisis coping mechanisms such as loans, financial and non-financial debts, sales of assets such as land or cattle and mortgages acquired to finance catastrophic payments may also lead to further impoverishment of the poor. Since the erosion of assets has a long-term impact on the purchasing power of households, the estimation of the cost burden of illness will actually be incomplete if the coping mechanisms are not considered, especially for those who are poor.

Catastrophic health expenditures

Although the poor generally spend less on treatment compared to other economic groups due to lack of access and inability to pay, this spending makes up a higher proportion of their monthly or annual income (Zaman, Rahman, Edgeworth 2004). Even minor illness costs can exceed household budgets of the poor who often survive on a wage that barely covers minimum food requirements (Russell 2003). These health expenditures enforce the impoverishing effect of severe morbidity, driving many households into poverty and increasing the poverty of the poor. Most developed countries have advanced social institutions such as social insurance or tax-funded health systems that protect households from catastrophic spending. In contrast, developing countries like Bangladesh lack such appropriate supportive network and thus are more vulnerable towards the financial risks posed by such incidences.

² Referred to as caregivers/minders in existing literature.

THE CFPR/TUP INTERVENTION OF BRAC

More than a quarter of the people of Bangladesh live under the conditions of extreme poverty, hardly being able to meet the bare necessities of life. They are consequently in frequent poor health causing further drain on their inadequate resources due to loss of income and health expenses (CFPR/TUP Working Paper 7). Microcredit/microfinance programmes of the non-government organizations (NGO), which work alongside the government, are documented as an effective and powerful poverty alleviating instrument in Bangladesh (Ahmed, Rana 2005). Health interventions supplement its core activities and the success of BRAC micro-credit programme as a health intervention tool is also recognized (Husain 1998, Chowdhury and Bhuiya 2004). In order to reach the poorest of the poor, the ultra poor, BRAC has designed a customized development programme named 'Challenging the frontiers of poverty reduction/targeting the ultra poor' (CFPR/TUP). The vulnerability of the ultra poor in face of the threatening consequences of ill health necessitates a straightforward transfer of resources to them along with targeted social and financial assistance. The CFPR/TUP programme is based on a targeted intervention strategy for the 'Specially Targeted Ultra Poor' (STUP) including social development and health components with health education and greater access to health care service delivery. Although preventive health care is given higher priority, curative measures are also incorporated to provide assistance to the ultra poor in treatment-seeking activities and access to government and NGO services.

BRAC's long-term vision for the health sector is to ensure the poor's access to health care services by strengthening government health care services and by providing complementary health care. The health care support provided through BRAC intervention is as follows (Ahmed 2006):

Table A. Health support under the CFPR/TUP programme with rationale

Component	Rationale
○ EHC package, installation of sanitary latrines and tube-wells free of cost or with mobilized fund.	○ Developing health awareness, change 'unfelt need' to 'felt need' and control disease transmission
○ Consumer information package on locally available health services, such as place, provider, cost of required service/medicine, transport attendance, first aid emergencies and preventive health information.	○ To overcome information barrier
○ Identity card for facilitated access to health services.	○ To overcome barrier due to social exclusion and promote use of formal health services
○ Financial assistance for costly morbidity (e.g. including illnesses requiring in-patient treatment or costly lab tests) such as free medicine, support for pathological tests, etc from fund mobilized by programme and community	○ To overcome financial barrier
○ Intensive supervision and assistance from CHVs, and though provision of services (e.g. <i>Shushastho</i> , health POs) by staff, developing referral network for severe illness with other health providers, provision of treatment, transport, and an attendant at cost or for free contact/coordination with GOB/other health service provider suiting the need of the ultra-poor.	○ To optimize opportunity cost of assessing and attending health care services.

In the above context, it may be useful to conduct a study on the targeted group in the CFPR/TUP region that measures the costs of illnesses occurring from an economic point of view and the actual burden that these costs cause to the suffering of the households, evaluating

whether BRAC intervention has been able to reduce disastrous health expenditures for the ultra poor. It would also be interesting to examine the secondary/snowball effect or threat that these health hazards pose to the affected ultra poor households who have a very limited capacity to pay and thus resort to devastating crisis coping mechanisms that further affect their economic status. Illness costs exceeding the household's daily or monthly budget may trigger coping strategies such as borrowing or asset sales including claims on resources outside the households such as social networks or local organizations that offer credit. Illness costs and coping strategies then may have implications for household asset portfolios and process of impoverishment (Russell 2003). As a consequence of severe illness costs and coping strategies, the economic or social viability of the households often comes under threat. Thus, this study looks at the coping strategies undertaken by the sampled households. The consideration of these secondary impacts would lead to a more complete analysis of the actual burden of illness for these households.

RATIONALE

Few of economic burden studies include a comprehensive monetary measurement of the costs of severe illness, which is important if the estimates are to be used for projecting expenditures or for assessing the impact of interventions. While measuring direct costs of illness, most studies consider only medical costs ignoring important non-medical costs such as food and transport costs which account for a significant portion of the budget of a poor household. Also few of these studies actually consider the mechanisms used by poor households to cope with the cost burden of illnesses.

The rural part of Northern Bangladesh is characterized by a weak public health infrastructure without any formal insurance in the face of vulnerable poor households, the livelihood of which can hardly make ends meet, let alone bear the different costs associated with sickness which may become forbidding for the poor due to lack of supportive health insurance. The unforeseen costs incurred by households while dealing with illnesses, especially severe ones that require in-patient services, are expected to be burdensome for these households as the location, access and usage of medial facilities in this region are difficult. This is expected to have further implications for their poverty status. Thus, calculating the actual economic costs of serious illnesses and measuring the extent of its burden for ultra poor households in this region may be useful for future policy implications.

GENERAL OBJECTIVE

The general objective of this study is to explore methodology for calculating economic costs of severe illness and to study the impact of the CFPR/TUP intervention programme on expenditures due to health.

SPECIFIC OBJECTIVES

1. To develop a comprehensive methodology for calculating cost of illness requiring in-patient services i.e. hospitalization.
2. To compare the cost of illness between the SUP and NSUP households and investigate whether health expenditures are catastrophic.
3. To study the crisis coping mechanism for meeting the cost burden of illness and its implications for the poverty status of households.

MATERIALS AND METHODS

STUDY AREA

In 2002, BRAC launched the CFPR/TUP programme in the districts of Rangpur, Kurigram and Nilphamari of northern Bangladesh, choosing these districts on the basis of various spatial poverty maps and BRAC programmatic experiences and knowledge (CFPR/TUP Working Paper series no. 12). This study was conducted in these three districts that come under the CFPR/TUP region.

STUDY POPULATION AND SAMPLING

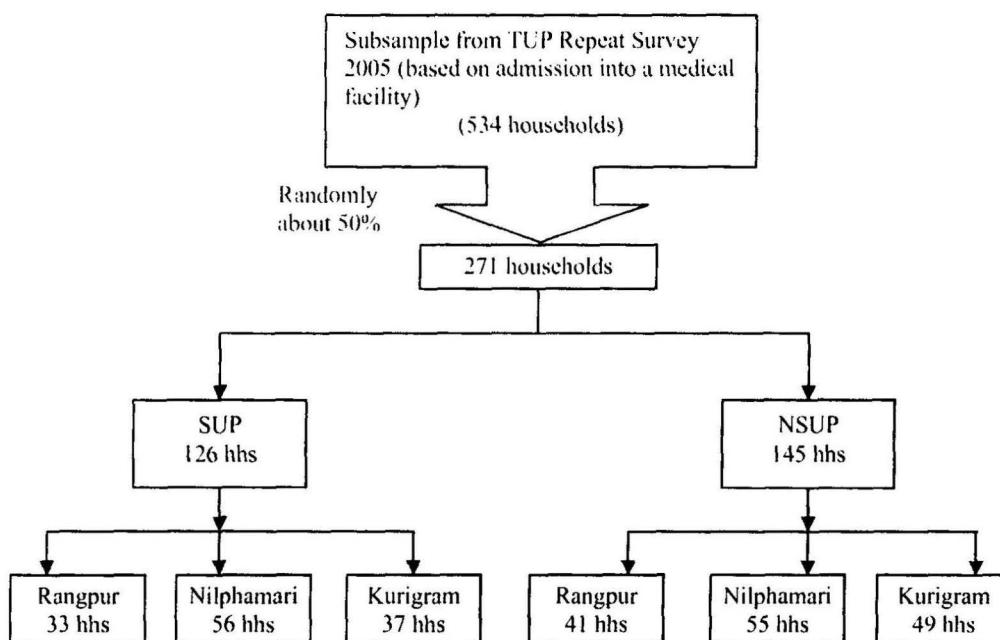
Among the ultra poor, households ranked in the two poorest wealth categories as identified by participatory wealth ranking, those which were selected to receive programme assistance are called SUP (selected ultra poor) and the others are called NSUP (not selected ultra poor) (CFPR/TUP Working Paper series no. 12). This study was conducted on SUP and NSUP households drawn from the TUP Repeat Survey 2005 based on the inclusion of members with severe illness. In this study, severe illness has been defined as any illness requiring in-patient treatment at a medical facility, public or private. Since the interest of this study is severe morbidity requiring hospitalization, a sub-sample of about 50% of these households was chosen randomly due to the exploratory nature of the study.

Experienced interviewers conducted face-to-face interview with the household head. A second attempt was made in case of failure to conduct the interview with the household head. If the household head was unavailable for the interview, then an important household member who was aware of the costs incurred due to the severe illness was interviewed (may have been the female household head, the principal male member or adult member accompanying the patient who was aware of the costs incurred).

Using a recall period of approximately one year³ information regarding the expenditures incurred by the patient and caregiver due to severe illness during the time of hospitalization and after was collected. The study collected household-based socio-economic and morbidity data from 271 households (about 50% of the subsample) on 322 individuals, consisting of both SUP and NSUP households from all three districts.

³ Recall errors are expected to be lower because of the severe nature of the incident.

Figure 1. Sampling procedure

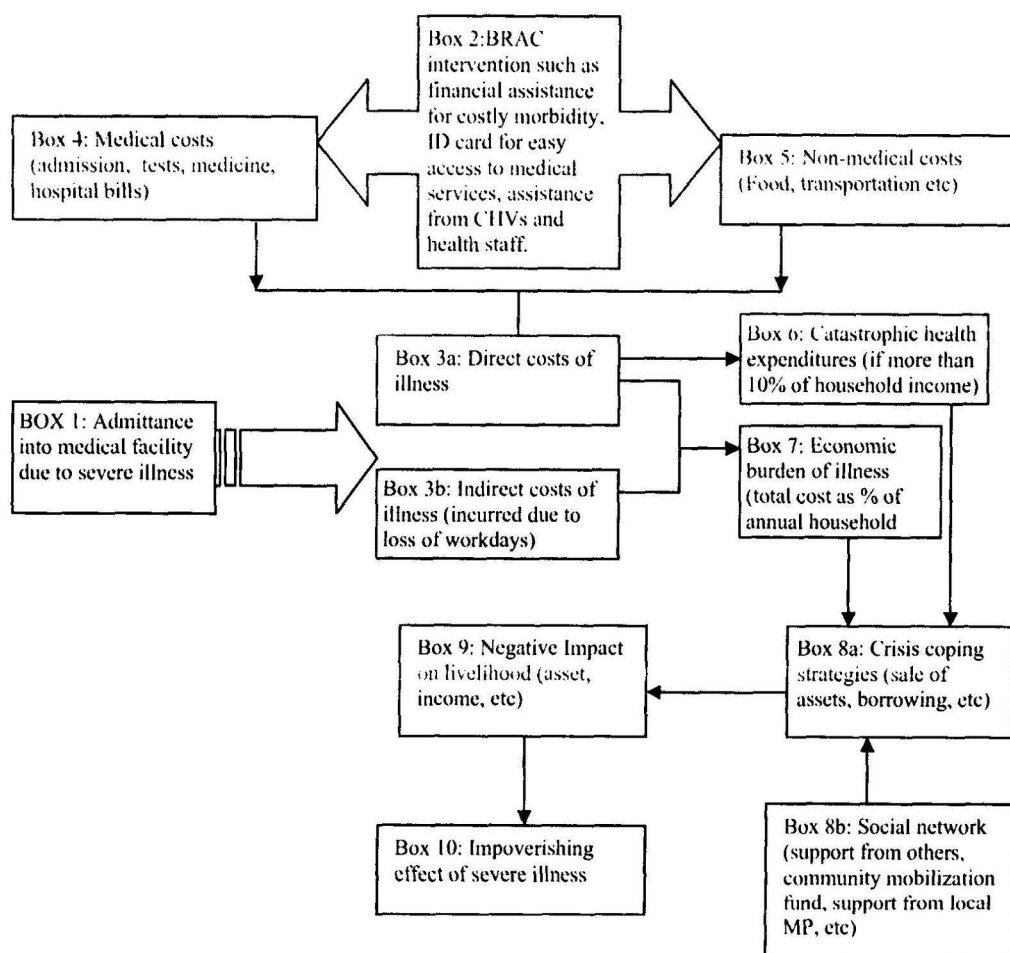


The schematic view of the sampling procedure is presented in Figure 1. Pre-tested questionnaires were used in face-to-face interview for data collection, following informed consent of the respondent.

CONCEPTUAL FRAMEWORK

In this study, the household was the unit of analysis for calculating illness costs because expenditures relating to health care and coping mechanisms usually affect the overall household budget, not just the sick individuals. The analysis of costs was disaggregated into two components – direct and indirect costs. Direct costs refer to household expenditures related to seeking treatment (medical expenses) along with non-medical expenses such as special food and transport costs. Travel expenses consist of costs associated with travel to and from the hospital by the patient and any accompanying relatives during hospitalization for purchasing medicine and food for the patient, if any (Khan 2005). Besides, in Bangladesh, a significant portion of out-of-pocket expenditures may include contingency costs (such as tips, etc). Indirect costs refer to the loss of household productive labour time (monetized loss of working hours) for patients and accompanying household members. Both types of costs will be influenced by the type and severity of disease. The term ‘economic burden of illness’ refers to the total costs (combining direct and indirect costs) expressed as a percentage of total household income. This study follows the assumption made by analysts that a household incurs catastrophic health expenditures if expenditures exceed 10% of the total household income which is likely because of the poverty level of households. Costs of severe illness extending beyond the household’s livelihood budget may trigger crisis coping strategies. This means that that these expenditures are likely to force family members to cut their consumption of other basic needs, trigger productive asset sales or incur debt leading to further impoverishment (Russell 2004).

Figure 2. Conceptual framework for analyzing the economic burden of severe illness for ultra poor households



THE MODEL

The direct costs (in Tk.) of illness are measured in this study based on the following framework that includes all expenditures linked to treatment seeking:

$$DC = CC + OC + MC + AC + CG + HB + TE + SF + LC$$

(medical expenses) (non-medical expenses)

where, DC = Direct costs

CC = Consultation costs

(Include hospital registration/admission/entrance fees)

OC = Surgery/operation costs

MC = Medication costs

AC = Costs associated with ancillary services
(blood tests, x-ray, ultrasonography, etc.)

CG = Contingency costs (tips, etc.)

HB = Hospital bills (for in-patient services: pre-and post-operative, such as trolley, beds, medical equipment, etc.)

TE = Travel expenses (for patient and accompanying family members)
 SF = Costs associated with special diet/food for the patient
 LC = Accommodation and food costs for accompanying family members

Indirect costs IC (in Tk.) of illness are defined as the loss of productive labour time due to illness⁴, for both patients and caregivers. It is measured in terms of income erosion effect of illness faced by the household⁵.

$$IC = (\text{lost labour hours/days of the patient during morbidity time seeking treatment} \times \text{minimum wage rate}) + (\text{lost labour hours/days of the caregiver} \times \text{minimum wage rate}) + (\text{lost labour hours/days of other family members} \times \text{minimum wage rate})$$

The scope of indirect costs should also consider the crisis coping mechanisms of the households that further impoverish the ultra poor. Other impacts include reduction in resources available for other household members, withdrawal of children from school, reduced consumption of other basic needs, etc.

The study calculates the economic burden (or cost burden) for the ultra poor by expressing total costs as a percentage of total household income.

$$\text{Economic burden of severe illness} = \frac{(\text{direct costs} + \text{indirect costs}) \times 100}{\text{total household income}}$$

This study considers whether the health expenditures incurred are catastrophic for the households. Expenditures are defined as catastrophic if a household's financial expenditures on health care in the face of severe illness exceed 10% of its annual income⁶. Health expenditures comprising 10% of the total household income become catastrophic for ultra poor households as in a poor country like Bangladesh, a major proportion of income is spent on meeting basic consumption needs.

In order to look at the factors that influence the cost burden of illness for ultra poor households, a multivariate ordinary least square regression analysis was conducted correcting for heteroskedasticity that may arise in cross section data, which leads to robust findings. The dependent variables are direct, indirect and total costs respectively. The independent variables include several determinants that may play a role in cost outcomes, such as, demographic and economic status, external support, disease categories, type of medical facilities, gender, etc. The TUP support variable is divided into two groups: those who reported receiving no help but are members and those who receive some kind of support such as *Shasthyokarmi* or *Shasthyoshebika* service, monetary support or support in kind such as medicine, etc. The regression analysis also considered the number of patients in households and the income earning ability of the sick household member as determinants of the costs of illness. The type of medical facility into which a sick member admitted was also considered, which was divided into two groups mainly -- District Hospitals and other types such as *Upazilla Health Complexes*, *Upazilla Health Centers*, etc. Disease dummies were created by categorizing the diseases reported in the survey into several broadly defined groups such as, respiratory, cardiac, gastroenterological, liver, kidney, neurological, and gynecological diseases.

⁴ Also a measure of opportunity costs of severe illness.

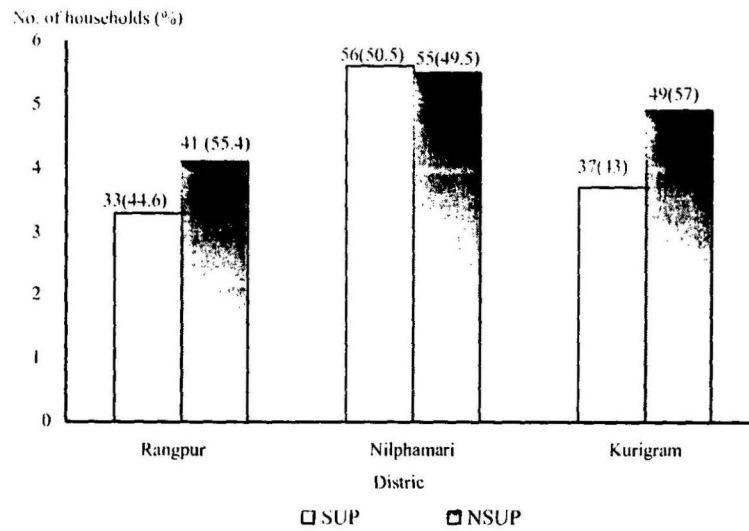
⁵ Minimum wage rates may be used as proxy if the actual wage-earning power of the person is unknown.

⁶ However, there is no consensus on the threshold proportion of household expenditure, varies from 5%-40% of total household income.

ANALYSIS OF DATA

The survey data were analyzed using SPSS for the detailed calculation of costs of illness and comparison between SUP and NSUP. The regression analysis was done using STATA. Figure 3 displays the frequency and percentage of SUP and NSUP households in each district.

Figure 3. District-wise distribution of SUP and NSUP



Among the sampled households in Rangpur, Nilphamari and Kurigram, 44.6%, 50.5% and 43% are SUP and 55.4%, 49.5% and 57% are NSUP respectively.

FINDINGS

Table 1a presents a demographic profile of the ill household members showing male and female ill individuals belonging to different age groups among the SUP and NSUP households. Among the SUP, almost 72% of ill male members and 69% of female members were less than 40 years of age. In contrast, among the NSUP, 65% male members were aged less than 40 years, whereas almost 70% women belong to the same age group.

Table 1a: Gender and age profile of ill household members

Age groups	SUP			NSUP		
	Male	Female	Total	Male	Female	Total
less than 15	22 (47.80)	20 (23.00)	42 (31.58)	29 (36.70)	23 (26.70)	52 (31.52)
15-40	11 (23.90)	40 (46.00)	51 (38.35)	22 (27.80)	36 (41.90)	58 (35.15)
40-65	10 (21.70)	24 (27.60)	34 (25.56)	25 (31.60)	24 (27.90)	49 (29.70)
above 65	3 (6.50)	3 (3.40)	6 (4.51)	3 (3.80)	3 (3.50)	6 (3.64)
Total	46	87	133	79	86	165

Note: Figures in parenthesis are column percentages

About 22% ill male members and 28% ill female members among the SUP were aged between 40-65 years, whereas the percentages among the NSUP belonging to this age group is a little bit higher. In both groups, only a few were found to be above 65 years.

Morbidity profile

The analysis begins with a presentation of specific diseases by age group across the ultra-poor (Table 1b). In the lowest age group (below 15 years), the most common disease in the selected sample due to which both SUP and NSUP households were hospitalized was diarrhoea, found in almost half of the people in this age group. Among the SUP, the second most prevalent diseases were pneumonia and fever/cough/cold and then typhoid and tumor were diseases that occurred among 5% people belonging to this age group leading to hospitalization. Around 8% of those aged above 15 were admitted into a medical facility due to abdominal pain, delivery complications and chest pain whereas hypertension and anemia occur in 5% of the cases. Abdominal pain is the most common illness for which 19% of the patients aged more than 60 years were hospitalized and other prevalent diseases that affected around 13% of this oldest age group are gastric/ulcer and leg ulcer.

On the other hand, among the NSUP, pneumonia was quite common causing almost 20% of the youngest age group to be hospitalized, whereas 4% of the people in this age group suffered from asthma. Abdominal pain affected almost 11% of those aged 15-59, where other common diseases affecting this age group are appendicitis, delivery complications and gastric/ulcer. The most common diseases from which those aged above 60 suffered and were hospitalized were cataract/eye problems and asthma and in some cases edematous.

Table 1b: Disease profile: Prevalence of specific diseases among SUP and NSUP

Name of disease	SUP						NSUP					
	Age ≤ 14		Age 15-50		Age ≥ 60		Age ≤ 14		Age 15-59		Age ≥ 60	
	No. with condition	%	No. with condition	%	No. with condition	%	No. with condition	%	No. with condition	%	No. with condition	%
Diarrhoea	19	51.4	21	21.9	4	25	22	47.8	28	24.6	3	23.1
Abdominal pain	0	0	8	8.3	3	18.8	0	0	12	10.5	0	0
Pneumonia	3	8.1	0	0	0	0	9	19.6	1	0.9	0	0
Fever/coughing/cold	3	8.1	4	4.2	0	0	1	2.2	3	2.6	0	0
Cataract/eye problem	0	0	1	1.0	1	6.3	0	0	3	2.6	3	23.1
Delivery complication	0	0	7	7.3	0	0	1	2.2	6	5.3	0	0
Gastric/Ulcer	0	0	5	5.2	2	12.5	0	0	6	5.3	1	7.7
Typhoid	2	5.4	4	4.2	1	6.3	1	2.2	5	4.4	0	0
Asthma	1	2.7	2	2.1	1	6.3	2	4.3	2	1.8	3	23.1
Leg ulcer	1	2.7	2	2.1	2	12.5	0	0	4	3.5	0	0
Chest pain	0	0	7	7.3	0	0	0	0	2	1.8	0	0
Tumor	2	5.4	2	2.1	1	6.3	0	0	2	1.8	0	0
Edematous	1	2.7	2	2.1	0	0	0	0	1	0.9	1	7.7
Head injury	0	0	1	1.0	0	0	1	2.2	3	2.6	1	7.7
Hypertension	0	0	5	5.2	0	0	1	2.2	3	2.6	0	0
Convulsion	1	2.7	1	1.0	1	6.3	1	2.2	1	0.9	0	0
Appendicitis	0	0	4	4.2	0	0	0	0	7	6.1	0	0
Tuberculosis/ TB	0	0	2	2.1	1	6.3	0	0	1	0.9	0	0
Anemia	0	0	5	5.2	0	0	0	0.0	0	0.0	0	0.0
Gynaecological problems	0	0	1	1.0	0	0	1	2.2	3	2.6	0	0
Weakness	1	2.7	2	2.1	0	0	0	0	2	1.8	0	0
Others	4	10.8	20	20.8	2	12.5	8	17.4	23	22.2	1	7.7

The 'others' category includes diseases such as heart disease, jaundice, tetanus, paralysis, malaria, dysentery, cholera, gall stone, etc.

Other diseases (which have a very low frequency in the sample) such as heart disease, jaundice, tetanus, paralysis, malaria, dysentery, cholera and gall stone account for around 11%, 21% and 13% for the three age groups respectively among the SUP and 17%, 22% and 8% respectively among the NSUP.

Overview of illness costs

Table 2 presents a summary of the mean direct, indirect and total costs of severe illness in the three districts incurred by SUP and NSUP households. Costs are reported in Bangladeshi taka. For all the three districts, mean direct costs were estimated to be between 5% and 11%, indirect costs 3% and 8% and total costs 8% and 17% of annual household income, which also signified the economic burden of illness for the ultra poor. Overall, direct costs and total costs of illness were higher for the NSUP compared to those for the SUP, but when it comes to indirect costs, it was the other way round. On the whole, even though SUP households faced slightly lower total costs than NSUP households, the burden seemed to be higher on the former as the costs comprised of a greater percentage of annual household income. Further investigation revealed that higher indirect costs were due to not only a larger loss of workdays for the patient and the caregivers of the SUP households, but also a higher daily net earning for them as compared to the NSUP ones (Table 3).

In Rangpur, NSUP households faced much higher medical and non-medical expenses as well as higher total costs compared to the SUP households, even though these differences were weak (not statistically significant even at 10% level of significance). These indicated a higher economic burden of severe illness.

On the contrary, the indirect costs of illness were lower for the NSUP households. A breakdown of the indirect costs showed a much higher daily net income accompanied by a higher absence from work faced by patients and caregivers in SUP households (Table 3).

Similar results were found in Nilphamari. On average, the direct and total costs of illness were higher for NSUP households compared to SUP, but the indirect costs were higher for the latter group. However, none of these differences were strong (not significant even at 10% level of significance). But in this case, the loss of workdays was a little lower for the SUP households, even though they faced a slightly higher average daily income. In contrast, Kurigram showed a completely different picture in terms of direct and total costs of illness. Both of these costs were higher for the SUP households, but the differences were weak (not statistically significant at 10% level of significance). This is the only district where the difference in indirect costs between SUP and NSUP households was significant at 10% level of significance, the indirect costs for the SUP and NSUP households being Tk. 1,681.43 and Tk. 950.10 respectively. The SUP households seemed to be away from work from a longer time period compared to the NSUP households even though the former had a lower daily income.

Table 2. Overview of direct, indirect and total costs of severe illness: A comparison between SUP and NSUP

District Name	SUP				NSUP			
	Sample Size (HHs)	Mean direct costs (tk.) over treatment period (% of annual household income)	Mean indirect costs (tk.) over treatment period and after (% of annual household income)	Mean total costs (tk.) over treatment period (economic burden measured as % of annual household income)	Sample Size (HHs)	Mean direct costs (tk.) over treatment period (% of annual household income)	Mean indirect costs (tk.) over treatment period and after (% of annual household income)	Mean total costs (tk.) over treatment period (economic burden measured as % of annual household income)
Rangpur	33	1821.76 (9.2%)	1717.12 (8.2%)	3538.88 (17.4%)	41	3362.97 (10.5%)	1424.02 (5.8%)	4787.00 (16.3%)
Nilphamari	56	1276.98 (6.5%)	1455.93 (6.9%)	2732.91 (13.4%)	55	1531.16 (5.7%)	1382.18 (6.3%)	2913.35 (12.0%)
Kurigram	37	1859.03 (6.9%)*	1681.43 (8.2%)*	3540.46 (15.1%)*	49	1456.61 (4.9%)*	950.10 (3.2%)*	2406.71 (8.1%)*
Overall	126	1590.58 (7.4%)	1590.56 (7.6%)	3181.13 (15.0%)	145	2023.93 (6.7%)	1248.00 (5.1%)	3271.93 (11.8%)

*, **, *** denote significance at 10%, 5% and 1% level of significance respectively.

Table 3. Breakdown of indirect costs for SUP and NSUP households

District	Mean (in tk.)			
	SUP		NSUP	
	Loss of workdays	Daily net income	Loss of workdays	Daily net income
Rangpur	40	118.50	27	90.00
Nilphamari	46	82.77	52	81.59
Kurigram	33	79.79	21	82.20
Overall	41	88.56	34	83.41

Components of direct costs

It is quite evident that there hardly existed any significant difference in direct, indirect and total costs of severe illness between SUP and NSUP households (Table 2). However, significant differences in direct costs could be noticed for a few diseases. Table 4 presents a breakdown of the mean direct costs of different types of diseases prevalent among SUP and NSUP households. Illness that required operation during admission in a medical facility were considered relatively more severe for this study even though both cases required hospitalization or admission into a medical facility. Accordingly, appendicitis, leg ulcer, eye cataract, tumor and tuberculosis were relatively more severe diseases compared to the rest because illness due to these diseases incurred operation costs. The direct costs of relatively more severe diseases were considerably higher than those for non-severe diseases except for tuberculosis. Among those suffering from relatively more severe illness, 42% were in Rangpur, 26% in Nilphamari and 32% in Kurigram and among those suffering from diseases which did not require operation, 26%, 42% and 32% respectively were from the three regions.

Considering relatively less severe illness, SUP households faced significantly lower medical, non-medical and overall direct costs compared to NSUP households for diarrhoea, delivery complications and gastric/ulcer. For diarrhoea, the most common disease among both SUP and NSUP households, medical, non-medical and overall direct costs differed only by Tk.146.58, Tk.44.1 and Tk.190.69 respectively. But both medical and non-medical and thus overall direct costs were much higher for NSUP households suffering from gastric/ulcer. Considering comparatively more severe illness, appendicitis, leg ulcer and tumor lead to large direct cost burdens for both SUP and NSUP households, where medical, non medical and overall direct costs were much higher for NSUP households.

Table 4. Mean direct costs: disease-wise comparison between SUP and NSUP

Name of disease	Medical Costs (tk.)			Non-Medical Costs (tk.)			Direct Costs (tk.)		
	SUP	NSUP	diff	SUP	NSUP	diff	SUP	NSUP	diff
Diarrhoea	206.91	353.49	146.58**	123.25	167.35	44.10*	330.15	520.84	190.69**
Abdominal pain	1107.75	1788.89	681.14	225.25	370.00	144.75	1333.00	2158.89	825.89
Delivery complication	476.29	1078.57	602.29*	97.43	394.29	296.86**	573.71	1472.86	899.14*
Gastric/Ulcer	484.00	1383.20	899.20*	230.00	520.00	290.00*	714.00	1903.20	1189.20*
Pneumonia	644.67	988.60	343.93	193.33	182.00	-11.33	838.00	1170.60	332.60
Typhoid	433.83	615.00	181.67	251.17	314.17	63.00	685.00	929.17	244.17
Asthma	386.00	694.29	308.29	158.33	221.43	63.10	544.33	915.71	371.38
Fever/coughing/ cold	334.20	605.33	271.13	154.00	196.67	42.67	488.20	802.00	313.80
Hypertension	1564.00	885.00	-679.00	795.00	656.00	-139.00	2359.00	1541.67	-817.33
Chest pain	1895.00	1885.00	-10.00	277.50	585.00	307.50	2172.50	2470.00	297.50
Head injury	855.00	811.20	-43.80	370.00	322.00	-48.00	1225.00	1133.20	-91.80
Anemia	688.75	---	---	177.50	---	---	866.25	---	---
Convulsion	---	1232.50	---	---	455.00	---	---	1687.50	---
Weakness	507.00	537.50	30.50	265.00	90.00	-175.00	772.00	627.50	-144.50
Edematous	489.00	2702.00	2213.00	425.00	460.00	35.00	914.00	3162.00	2248.00
Gynaecological problems	810.00	454.75	-355.25	100.00	403.50	303.50	910.00	858.25	-51.75
Appendicitis (s)	1528.75	4310.00	2781.25*	331.50	720.00	388.50	1860.25	5030.00	3169.75*
Leg ulcer (s)	985.00	4847.50	3862.50*	256.00	820.00	564.00*	1241.00	5667.50	4426.50*
Cataract/eye problem (s)	1275.00	1243.33	-31.67	340.00	696.67	356.67	1615.00	2040.00	425.00
Tumour (s)	3635.60	6672.50	3036.90*	1268.00	4575.00	3307.00*	4903.60	11247.50	6343.9*
Tuberculosis/TB (s)	534.33	600.00	65.67	386.67	100.00	-286.67	921.00	700.00	-221.00
Others	2212.60	1741.68	-470.92	525.50	525.93	0.43	2738.10	2267.61	-470.493

* ** *** denote significance at 10%, 5% and 1% level of significance respectively.
 Relatively severe diseases are marked with an s in parenthesis.
 --- implies no reporting of the disease for the relevant group

Among all reported diseases, tumor was the most devastating in terms of the largest direct cost burden for both SUP and NSUP households. Both medical and non-medical costs for tumor were significantly higher for the NSUP households. Similar results were found for leg ulcer. In fact, except for hypertension, chest pain and gynecological problems, SUP households faced lower medical costs for all other diseases but these differences were not statistically significant even at 10% level of significance. Diseases such as hypertension, pneumonia, tuberculosis, physical weakness lead to higher food and transportation costs for SUP households but again these differences were not statistically significant.

A comparison of the average direct cost burden of illness between SUP and NSUP households for public and private health facilities are shown in Table 5. Public health facilities visited by the households are union health centers, upazilla health centers, district hospitals, Dhaka eye hospital and medical college hospitals, whereas private or non-government health facilities visited are BRAC *Shusathyo*, private clinics, eye camps, mission hospitals, NGO hospitals, and Mariam eye hospital. Figures show different types of medical costs incurred by ultra poor households during their visits to public and private medical facilities, such as fees for admission, ancillary tests, doctor's visit or consultation, operation, medication costs, contingency costs, hospital bills and also non-medical costs related to illness such as expenditures on food and transportation. In Rangpur, all of the above types of costs faced by the ultra poor were found to be significantly higher in private medical facilities compared to those in public medical facilities.

Interestingly, operation costs were found to be actually lower in private facilities but the difference is weak (not statistically significant at even 10% level of significance). In contrast, patients admitted in private hospitals in Nilphamari paid higher admission fees, consultation charges and medicine costs but lower ancillary test fees compared to public medical facilities, but these differences were weak. Incidentally, patients did not incur any hospital bills, peration charges or contingency costs in private medical facilities.

Table 5: Districtwise average direct cost (med and nonmed costs) burden of illness: A comparison between public and private medical facilities

District Name	Medical facility type	Direct cost components (Average tk.)									
		Admission fee	Test fee	Doctor's visit/consultation fee	Medication	Operation fee	Contingency costs	Hospital bills	Total food expenditure	Total transportation expenditure	
Rangpur	Public	4.19	62.30	46.22	972.97	189.86	2.16	44.19	325.88	288.92	
	Private	70.63	1125.00	525.00	2750.00	750.00	12.50	712.50	470.00	360.00	
	Difference	66.44***	1062.70***	478.78***	1777.03***	560.14	10.34**	668.31***	144.12	71.08	
Nilphamari	Public	15.98	71.67	12.78	735.79	63.49	1.27	4.06	137.23	119.55	
	Private	29.38	2.50	25.00	950.00	0.00	0.00	0.00	78.75	81.25	
	Difference	13.39	-69.17	12.22	214.21	-63.49	-1.27	-4.06	-58.48	-38.30	
Kurigram	Public	5.54	79.40	8.33	768.45	178.57	4.76	4.76	213.76	89.11	
	Private	36.16	81.58	39.47	377.37	473.68	0.00	139.47	158.95	89.74	
	Difference	30.62***	2.17	31.14**	-391.08	295.11	-4.76	134.71***	-54.81	0.63	

*Private medical facilities include NGO facilities like BRAC Shusastho
 , * denote significance at 10%, 5% and 1% level of significance respectively.

Table 6: Components of direct cost: A comparison between SUP and NSUP

District Name	HH Status	Direct cost components (Average tk.)									
		Medical costs					Non-medical costs				
		Admission fee	Test fee	Doctor's visit/consultation fee	Medication	Operation fee	Contingency costs	Hospital bills	Total food expenditure	Total transportation expenditure	
Rangpur	SUP	2.38	45.00*	34.25*	842.95*	80.00	3.00**	23.75*	249.13	222.50	
	NSUP	17.33	262.44	138.89	1349.60	374.44	3.11	178.22	398.00	342.00	
Nilphamari	SUP	16.42	70.00	13.48	744.77	7.58*	0.00*	0.18	118.12	112.94	
	NSUP	17.13	65.15	13.53	752.28	110.29	2.35	7.35	148.90	121.46	
Kurigram	SUP	13.28	74.88	18.60	812.33	313.95	1.16*	32.56	217.35	115.51	
	NSUP	9.68	83.33	10.83	613.17	175.00	5.83	27.50	193.83	70.38	
Overall	SUP	11.74	64.70*	20.54*	790.62	115.44	1.14*	15.85*	181.93	143.09	
	NSUP	14.60	122.77	45.20	859.40	201.45	3.76	58.79	229.28	161.11	

, * denote significant differences at 10%, 5% and 1% level of significance respectively

In Kurigram, admission into private medical facilities incurred significantly higher admission fees, consultation fees and hospital bills compared to public medical facilities. However, expenses on medicine and contingency payments were higher for public medical facilities in this district. Patients admitted in public facilities faced higher food and transport expenditures compared to private ones, but the differences are statistically insignificant.

Table 6 presents a detailed district-wise breakdown of different components of direct costs incurred by SUP and NSUP households, where the average amount spent on each of the components is reported. Figures show average medical expenditures incurred by SUP and NSUP households during hospital visits, such as fees for admission, ancillary tests, doctor's visit or consultation, operation, medication, contingency costs, hospital bills and also non-medical costs related to illness such as expenditures on food and transportation. Overall, all direct cost components were higher for NSUP households compared to SUP households. But these differences were weak in case of admission fees, medication and operation costs. Most of the differences between SUP and NSUP households regarding components of medical expenditures were weak in all the three districts. However, in Rangpur, for SUP households, ancillary test fees, consultation fees, hospital bills and medical costs were lower. In Nilphamari, SUP households faced significantly lower operation expenses compared to NSUP households and no contingency costs, where the latter was also very low for the NSUP on average. In Kurigram, NSUP households faced higher contingency costs on average.

Catastrophic health expenditures

Table 7 presents the prevalence of catastrophic health expenditures among SUP and NSUP households for the threshold level of 10%.

Table 7. Prevalence of catastrophic health expenditures by SUP and NSUP

Health expenditure range%	Frequency (%)	
	SUP	NSUP
0 - 10%	98 (77.6)	117 (81.3)
10%-20%	15 (12.0)	16 (11.1)
20%-40%	10 (8.0)	9 (6.2)
40%-60%	2 (1.6)	1 (0.7)
above 60%	1 (0.8)	1 (0.7)

The results show that about 22% of SUP households incurred health care expenses (including treatment, food and transport costs) due to severe illness covering more than 10% of annual household income, so for these households the expenditures were catastrophic. On the other hand, 19% of the NSUP households faced catastrophic health expenditures covering more than 10% of their annual household income. Among the sampled SUP households, only 1.6% incurred health expenditures exceeding 40% of their annual household income and for 0.8% households, the expenditures were more than even 60% of household income, whereas among the NSUP households both percentages were lower at only 0.7%. A larger percentage of NSUP households (81%) face health expenditures which are less than 10% of household income compared to SUP households (78%). However, the percentage of SUP households incurring catastrophic health expenditures becomes higher compared to the NSUP households for higher burden ranges.

Crisis coping mechanism

Table 8 presents different types of crisis coping mechanisms that may be triggered by catastrophic health expenditures incurred by SUP and NSUP households and average money

received from these sources. In some cases, support was in kind, no amount of money was reported, so the amount of money may not represent the total amount of support.

About 55% of SUP households who resorted to crisis coping mechanisms to deal with illness burden managed from their own family income, whereas 61% of NSUP households could manage from their own family income. More NSUP households (51%) resorted to borrowing as a coping mechanism compared to SUP households (37%). The largest amount of fund inflow of Tk. 2,161.18 for the SUP households came from the sale of assets, which also collected Tk. 2,765.22 on average for the NSUP households. The percentage of NSUP households selling assets was also 3% higher than the SUP households. A significant amount of money for NSUP households came from their own savings, which was not a very significant source of support for SUP households. Another important source of support for both types of households was help from family and neighbors, on which quite a large number of households depended. More NSUP households resorted to drastic means i.e. begging compared to SUP households, yet both numbers were very low. Neither SUP nor NSUP households reported withdrawing children from school to cope with the costs and inconveniences of severe illness. Sixty-five SUP households reported of receiving support of Tk. 844.35 from BRAC.

Table 8. Comparison of the impact of diseases on SUP and NSUP household livelihoods.

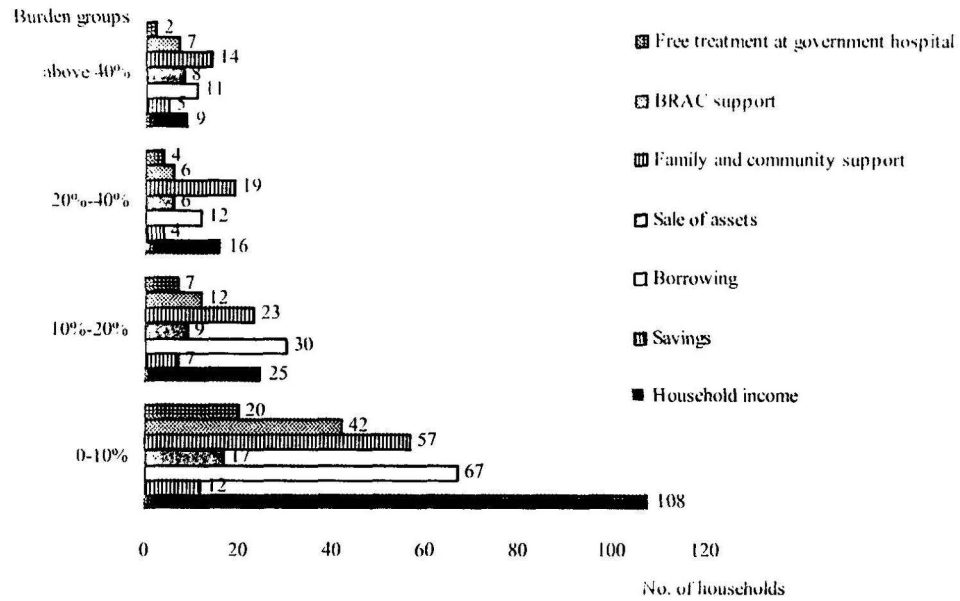
Household coping strategy	Frequency (%)		Mean amount (in tk.)* (N)	
	SUP	NSUP	SUP	NSUP
1. From own family income	69 (54.8)	89 (61.4)	318.29 (20)	448.4 (31)
2. From savings	11 (8.7)	17 (11.7)	727.78 (9)	4264.29 (14)
3. From Loan/collateral	46 (36.5)	74 (51.0)	1441.52 (46)	1306.92 (73)
4. Property/asset sale	17 (13.5)	23 (15.9)	2161.18 (17)	2765.22 (23)
5. Becoming a servant in someone else's household	1 (0.8)	1 (0.7)	0 (0)	500 (1)
6. Begging	2 (1.6)	3 (2.1)	275 (2)	666.67 (3)
7. Withdrawing family members from school	0 (0.0)	0 (0.0)	0 (0)	0 (0)
8. Support from relatives/neighbors/others	52 (41.3)	64 (44.1)	1041.47 (51)	1656.67 (63)
9. From Community mobilization fund	0 (0.0)	1 (0.7)	0 (0)	2000 (1)
10. BRAC-TUP	65 (51.6)	0 (0.0)	844.35 (23)	0 (0)
11. Free treatment at government hospital	15 (11.9)	18 (12.4)	0 (0)	0 (0)
12. Support from local MP	1 (0.8)	3 (2.1)	0 (0)	500 (1)

*This table includes those who have reported money amounts.

Figure 4 presents the common coping strategies pursued by households facing different cost burdens. An extremely large number of households belonging to the lowest burden group were able to bear the costs of illness from their own income (108), though quite a large number (67) also resorted to borrowing. Evidently, the high burden of illness made it difficult for the households to support health costs from their own income. The extent of borrowing declined drastically from the first to the second burden group, but the number of households that resorted to borrowing were about the same for the last two groups. Besides, the highest number of households selling assets to cope with illness was from the lowest burden group. The dependency on support from relatives to cope with the burden of illness seemed to be the same for households across the different burden groups. Households belonging to the 10-20% burden range mostly depended on borrowing and support from relatives for bearing the costs of illness,

where common strategies for the two groups facing highest burden were support from relatives and borrowing. The number of households receiving support from BRAC seems to have declined as the burden increased.

Figure 4. Coping strategies for different economic burden groups



Asset depletion

Table 9 presents the incidence of asset depletion faced by SUP and NSUP households resulting from sale of assets for bearing the heavy cost burdens of severe illness. To compare the extent of asset depletion among SUP and NSUP households, 4 levels of depletion were considered and the frequency along with percentage of households belonging to each group are presented. Around 47% SUP and 53% NSUP households did not experience any depletion of assets. Maximum number of households among both types reported experiencing no asset depletion at all.

Table 9. Asset depletion

Level of asset depletion	Frequency (%)		
	SUP	NSUP	Total
None (0.00%)	109 (47.19)	122 (52.81)	231 (100.00)
Low (0.01-20.00%)	13 (86.67)	2 (13.33)	15 (100.00)
Medium (20.01-40.00%)	1 (11.11)	8 (88.89)	9 (100.00)
High (above 40.00%)	3 (18.75)	13 (81.25)	16 (100.00)

Only 15 households faced a low level of asset depletion of which 13 were SUP households and 2 NSUP. But an opposite picture was seen for higher levels of asset sales, where the number of NSUP households facing asset depletion was actually larger than SUP households. Among the 25 households facing medium to high levels of asset depletion, only 4

were SUP and 21 NSUP implying that fewer SUP households had to resort to selling a significant portion of their assets compared to NSUP households.

The impact of illness cost burden on the stock of assets between the SUP and NSUP households is shown in Table 10. The mean value of asset stock before and after sale along with average percentages of asset sold, are shown.

Table 10. Change in stock of assets for SUP and NSUP households

	Average asset value before sale of assets	Average net asset value (after sale of assets)	Average % of asset depletion
SUP	11176.94	10885.36	25.05
NSUP	3113.97	2675.35	47.90
Diff	8062.97***	8210.01***	22.86**

*, **, *** denote significance at 10%, 5% and 1% level of significance respectively.

The SUP households owned a significantly higher initial stock of asset than NSUP households⁷. The average percentage of overall asset depletion for NSUP households (48%) was also significantly higher than that faced by SUP households (25%). The incidence of asset sale also left the NSUP households with a much lower value of asset stock compared to the SUP households.

Asset portfolio across burden groups

Table 11 presents the asset portfolio consisting of a few important assets among different economic burden groups. The average value of assets sold was higher for households belonging to higher economic burden groups ranging from Tk.107.56 for the lowest burden group to Tk.1,765 for the highest burden group. A similar trend was clearly also found for the average percentage of assets sold which moved gradually upward as higher burden groups are considered. As of 2005, the average value of current asset stock declined and was Tk.5,433.75 on households belonging to the highest burden range.

Table 11. Asset portfolio among different economic burden groups

Asset Portfolio	Economic burden groups			
	0-10%	10%-20%	20%-40%	above 40%
Average value of asset sold	107.56	392.59	873.33	1765.00
Average % of asset sold	3.20	5.06	10.38	20.91
Average value of current asset stock (in 2005)	6938.32	5666.31	6750.50	5433.75
Cow/bull	4881.10	3959.26	5633.33	3375.00
Goat/sheep	234.51	130.56	210.00	435.00
Duck/hen	170.00	150.56	80.33	77.75
Ornaments	83.08	56.85	71.67	26.00
Grain stock	0.91	40.83	0.00	0.00
Fishing net	96.46	32.33	0.83	30.00
Average asset value in 2005 (typewise)				
Productive	131.00	42.00	18.00	15.00
Non-productive	33.00	12.00	12.00	5.00

⁷ The initial asset value figures are in 2005 and the sale of assets occur during the study period. The total asset value was calculated by adding the values of all assets in 2005 and then the presale asset value was calculated by adding the flow of fund from sale of assets to the after sale value.

An unexpected hike in the average value of asset stock for the households facing a cost burden comprising of 20 to 40% of income was noticed. Households facing a relatively lower economic burden seem to have had a more diversified asset portfolio on the whole. Irrespective of the burden, the asset stock highest in value was cow/bull, which declined from Tk.4,881.10 to Tk.3,375 as the burden increased, but the unexpected hike for the 20-40% burden group still prevailed. The value of the stock of goat/sheep, though the second most important in value, was also much lower, yet the trend was similar. The value of other assets, such as ducks/hens and ornaments, declined steadily over the burden groups whereas the lower burden groups were actually left with no grainstock at all, which evidently shows depletion of these assets. Beginning with a higher average value of productive assets compared to non-productive assets in 2005, on average, the overall value of both productive and non-productive asset stocks declined gradually for households facing higher costs of illness.

Regression analysis of costs

The results for a regression analysis for direct, indirect and total costs of severe illness are presented in Table 12. The 'TUP support' is a dummy variable that is 1 for TUP members, who reported having received support.

Table 12: Determinants of costs of severe illness

Determinants of costs of severe illness (independent variables)	Dependent variables		
	Costs of illness		
	Direct (1)	Indirect (2)	Total (3)
TUP support (1=with support)	-165.18	750.39**	585.21*
No. of family members	-70.17	-12.02	-82.18
Daily household income	23.05***	3.83	26.88***
No. of patients in the household	74.49	296.09*	370.59
Earning status of ill member (1=earner, 0=non-earner)	962.42*	620.45*	1582.87**
Gender of ill member (1=female, 0=male)	-152.25	-931.48***	-1083.73**
Admitted into district hospital	1458.39***	619.07**	2077.47***
Respiratory disease	-401.38	-515.75	-917.12
Cardiac disease	1.00	1490.75**	1491.71
Gastroenterologist disease	5.21	-493.64 *	-488.42
Liver problems	3866.79***	-734.64	3132.16**
Kidney problems	-600.46	-733.82	-1334.28
Neurological problems	-497.93	520.89	22.97
Gynecological diseases	-206.38	-732.01	-938.39
Constant	22.56 *	808.75*	817.97*

*, **, *** denote significance at 10%, 5% and 1% level of significance respectively

Those who received support were less likely to incur higher direct costs on average as expected though the effect was weak, but a positive effect of support on indirect costs was found. Besides, households with a higher daily income incurred significantly higher direct costs, both medical and non-medical, whereas the effect on indirect costs was also positive as expected but weak. Larger family size did not lead to a significantly higher cost burden, but an increase in the number of patients in a household had positive effects on both direct and indirect costs incurred by households, the former being weak.

The 'earning status of ill member' is 1 if a sick person is involved in economic activities and is 0 if otherwise. Those who were involved in economic activities were more likely to have higher direct and indirect costs compared to those who were not (e.g. involved in housework, unemployed, disabled/old age, blind, etc.) (Table 12). Interestingly, female ill members were

less likely to lead to higher direct costs even though the effect was weak and the indirect costs were also likely to be lower for them compared to male members. The probability of lower direct costs for female members implies lower out-of-pocket expenditures made by the households on their treatment and food. Those admitted into district hospitals tend to have incurred significantly higher direct and indirect costs than other medical services such as Upazilla Health Center, BRAC Health Center (*Shushasthyo*), etc. Among the diseases, gastroenterological problems were significantly less likely to have incurred higher indirect costs in terms of combined income and workday loss, but liver problems were more likely to have caused larger direct costs for those with the disease than those without (with other diseases). For cardiac diseases, both direct and indirect costs were more likely to be larger compared to those not having the disease even the former was not significant.

DISCUSSION

Severe illness may lead to considerable economic costs for poor households that may arise from two sources: direct out-of-pocket expenditures made for medical and non-medical purposes and indirect costs resulting from lost working days for both the patient and other members of a household that affect their income earning ability and consequently the household budget. This study attempted to measure the economic burden caused by severe illness requiring hospitalization for the ultra poor, the variation in costs of illness between SUP and NSUP households, and whether the health care expenditures incurred by the SUP and NSUP households were catastrophic. Findings reveal that, on average, direct costs of illness were lower for SUP households compared to NSUP ones, while the average indirect costs were higher for SUP households because they were absent from work for a longer time and the daily income forgone was higher as well. For a larger number of SUP households compared to NSUP households, health expenditures were catastrophic. A large number of both SUP and NSUP households managed this crisis from their own income, whereas quite a few number of households depended on borrowing, support from others, and selling assets. Interestingly, the average percentage of asset depletion was much higher for NSUP households for whom average asset value, both before and after sale, was also lower. There was also a steady decline in both productive and non-productive assets as the burden of illness became higher.

On average, SUP households made relatively lower out-of-pocket payments for medical (treatment related costs) and non-medical (food and transportation) purposes, compared to NSUP households, even though differences were weak. A plausible reason may be that NSUP members also received similar health support from other NGOs though a very small percentage reported membership with other NGOs. On the other hand, that SUP households were facing higher indirect costs compared to NSUP households may be due to the fact that besides larger number of workdays lost, they also sacrificed higher daily income (Table 2, 3). Together, these lead to economic loss for the households. This is due to a larger involvement of SUP members in income earning activities, which implies a weak income effect among the SUP households. Assistance (covering costs of admission, surgery, medicine, ancillary tests, transportation, etc.) received from BRAC for morbidity incurring high expenses may have led to the difference in direct costs between the SUP and NSUP households.

The direct costs of relatively more severe diseases were considerably higher than those for non-severe diseases except for tuberculosis. This seems plausible as costs, both medical (e.g. ancillary, medication, operation fees and hospital bills) and non-medical (food and transportation), incurred during hospitalization due to these diseases were likely to be larger. Due to the relatively more severe or complicated nature of these diseases, people are more likely to visit secondary or tertiary level medical facilities, which are more dispersedly located involving higher transportation costs. Besides, people are also likely to lose more working days during and after hospitalization owing to these diseases because of the severe nature of the illnesses. Diarrhoea was found to be the most common disease among both SUP and NSUP households. Among the relatively less severe diseases, SUP households faced significantly lower medical, non-medical and overall direct costs compared to NSUP households for diarrhoea, delivery complications and gastric/ulcer. Apart from difference in prevalence, this may be due to the health services provided by BRAC (such as hygiene related health advice, easier access to oral saline, BRAC support for transportation and medicine, etc.), admission into local vs. tertiary health facility, etc. In contrast, for tuberculosis there is no significant

difference between SUP and NSUP households in terms of costs. This may be due to existence of TB programmes supported by other NGOs such as RDRS⁸ and Lamp⁹, in addition to BRAC. Diseases such as hypertension, pneumonia, tuberculosis, physical weakness lead to higher food and transportation costs for SUP households, but again these differences are statistically not significant. However, higher food costs may reflect better nutrition for the SUP households, whereas higher transportation costs probably caused by further distance from medical facility, more frequent visits made by caregivers, etc.

The economic burden of severe illness was found to be higher for SUP households than NSUP households. Besides, a higher percentage of SUP households faced catastrophic health expenditures than that among NSUP households. Furthermore, the percentage of SUP households incurring catastrophic health expenditures became slightly higher compared to the NSUP households for higher burden ranges.

As coping strategies, for SUP households the largest amount of money came from selling assets, whereas for NSUP households, it came from their own savings. However, more than half of the surveyed SUP households reported their own income and BRAC support as sources of support for coping with costs. Informal support was another important source of support for both SUP and NSUP households. BRAC support may be another reason why the cost burden for these households is low as the largest number of households receiving BRAC support belonged to this group. The lack of withdrawal of children from school may have positive long-run consequences for the economic and social status of the households and therefore is a positive sign. An extremely large number of households belonging to the lowest burden group were able to bear the costs of illness from their own income though quite a large number also resorted to borrowing.

SUP households were found to be better-off than NSUP households in terms of asset holding, as both the previous and after-sale asset stock was higher for the former group. The fact that a larger percentage among NSUP households faced high asset depletion compared to those among SUP households may portray a more secured future for the latter (due to less impoverishment). On the whole, the value of productive assets was found to be gradually lower for households facing higher economic burdens. Findings from the comparison of direct cost components between public and private medical facilities show higher food and transportation costs for private medical facilities as compared to public ones, which are expected because those with a relatively better economic status may opt for treatment at private medical facilities.

Regression findings show that those receiving support incurred lower direct but higher indirect costs on average. The latter may be due to the fact that those with support were away from work for a longer time. The number of patients in a household had positive effects on direct and indirect costs, yet the effects on direct costs were insignificant. This may be because the more sick people in a household, the higher health related expenses and loss of productive workdays for patients and caregivers would be (if involved in income generating activities). Alternatively, overall direct costs may be high if the cost per patient is high even though the total number of patients may actually be low. Higher direct and indirect costs may have occurred for earners probably due to a higher spending ability and a higher amount of income lost respectively. These may also include lost earnings for accompanying caregivers who may or may not have been earners. Higher indirect costs probably reflect a larger number of workdays lost or a positive income or both for earners.

⁸ RDRS works in Kurigram but BRAC has no TB program in this district.

⁹ Lamp works in Nilphamari and Dinajpur.

Interestingly, findings show that female ill members were less likely to receive medical and non-medical care as opposed to male members. Direct expenditures due to illness were lower for females compared to males but these differences were weak. The indirect costs were also more likely to be lower for female members as they may be less involved in economic activities or they may return to work earlier compared to the male members of the household. Those admitted into district hospitals tend to incur significantly higher direct and indirect costs than other medical services, which may be because people with more complicated problems tend to visit district hospitals and thus incur higher medical and other related costs and tend to be away from work for a longer time period losing more income.

METHODOLOGICAL CONSIDERATIONS

An important limitation of this study is that it does not include the less quantifiable costs associated with the suffering, grief or social exclusion arising from illness. Since this study is based on reported monetary cost or expenditure figures, there may be recall errors. However, due to the disastrous nature of disease (requiring hospitalization), the household members are more likely to remember the amounts. Due to measurement problems, economic burden is measured as total cost of illness expressed as percentage of total household income (not deducting subsistence expenditures such as food and clothing), because for some households these expenditures actually exceeded income. This problem may arise due to reporting errors or the seasonality of income. Owing to the questionability of the accuracy of reporting income figures, a convention is to use consumption expenditures as a proxy for income, but this exploratory study intends to follow the literature for calculating the burden of illness. Thus, it uses a single shot measure of household income verified through probing questions while surveying the household members.

This study does not consider land among the assets as the selection procedure ensures that the NSUP are likely to have a higher amount of land compared to the SUP. In any case, ultra poor households hardly own any agricultural land. In the survey, no household reported selling land. Also no land value was reported in the TUP survey from which information on asset holdings was taken, only the amount of land holding was reported. Due to difficulties in obtaining information and methodology for calculation, the productivity loss of housewives was not calculated. During the field test for the questionnaire, the productivity lost when an individual is ill but still remains working (number of hours lost due to illness during work) was also enquired after, but the respondents seemed unconfident in remembering/reporting the hours of work loss. Rather, they seemed more confident in remembering/reporting the number of days or months for which family members were not able to go to work due to illness in the family.

This study also does not consider the asymmetry of information in the context of use of health care. As far as diagnosis and treatments of illness are concerned, patients are at the mercy of the rural health provider (Meessen, Zhengzhong, Damme, Deavadasan, Criel, Bloom 2003) who may have limited medical knowledge. The above source of market failure may lead to supplier-induced demand (or provider-induced consumption of unnecessary medical procedures) in the provision of health care. This may be recognized as a new form of 'iatrogenic' suffering through poverty induced by doctors. This may be quite prevalent due to the nature of morbidity treatment fueling a vicious circle: Distress caused by disease through poor medical practice and lack of financial protection, the quest for treatment – often through a succession of ineffective therapies owing to lack of proper medical training and inexperience, consumption of savings, indebtedness, sale of productive assets and eventually poverty (Meessen, Zhengzhong, Damme, Devadasan, Criel, Bloom 2003).

POLICY SUGGESTIONS

- The percentage of SUP households facing catastrophic health expenditures is higher than the NSUP household members incurring the same. So, further protection of the interests of SUP should be addressed in policy formulation to ensure better access to health services and a higher degree of financial protection against the economic impact of illness, which would act as safety nets (community-based public health insurance or some form of enhanced insurance type protection).
- Households for whom the cost burden of illness is highest should be identified and more support should be provided to those households.
- More investment should be made in catastrophic disease prevention and more accessible curative health services for the ultra poor. Awareness building mechanisms should be undertaken for prevention against diseases. Investment in closer-to-client health services to reduce transportation costs is suggested.
- To reduce direct cost burden, BRAC should use *Gram Shahayak* Committees to mobilize the SUP and ensure relatively easier and lower cost access to lower cost medical facilities.
- Ill female members of the household should be ensured more protection since they seem to have less access to medical care or lower amount is spent for their treatment compared to men. This may be an area for further research as what may be the reason for lower costs faced by ill female members of the household.
- BRAC should continue providing support so that the poor don't get further impoverished due to illness costs.

REFERENCES

- Ahmed SM (2006). Facilitated access to health facilities for treatment of illnesses: experiences of the ultra-poor households in the CFPR/TUP programme. (Unpublished RED report).
- Ahmed SM and Rana AKMM. Customized development interventions for the ultra poor: preliminary change assessments of health and health-seeking behaviour. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada, 2005. (CFPR Working Paper Series No. 7)
- Challenging the frontiers of poverty reduction – targeting the ultra poor/targeting social constraints: Vol. 1. Project proposal (Unpublished).
- Challenging the frontiers of poverty reduction – targeting the ultra poor/targeting social constraints: a transition from darkness to light. Vol 2. 2007-11. (Unpublished BRAC document).
- Khan SH. Free does not mean affordable: maternity patient expenditures in a public hospital in Bangladesh. *Cost Effectiveness and Resource Allocation* 2005;3(1)doi:10.1186/1478-7547-3-1, 3:1.
- Meessen B, Zhenzhoong Z, Damme WV, Devadasan N, Criel B, Bloom G. Iatrogenic poverty. *Trop Med Int Health* 2003; 8:581-4.
- Onwujekwe O, Chima R, and Okonkwo P. Economic burden of malaria illness on households versus that of all other illness episodes: a study in five malaria holo-endemic Nigerian communities. *Health Policy* 2000;54(2):143-59.
- Rabbani M, Prakash VA, Sulaiman M. Impact assessment of CFPR/TUP: a descriptive analysis based on 2002-2005 panel data. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada, 2006. (CFPR Working Paper Series No. 12)
- Rapoport J, Jacobs P, Bell NR, Klarenbach S. Refining the measurement of the economic burden of chronic diseases in Canada. *CDIC* 2004;25(1).
- Review of the BRAC/CFPR specially targeted ultra poor programme. *Mission Report* 2004.
- Russell S. The economic burden of illness for households: a review of cost of illness and coping strategy studies focusing on malaria, tuberculosis and HIV/AIDS. 2003; (DCPP Working Paper 15).
- Russell S. The economic burden of illness for households in developing countries: a review of studies focusing on malaria, tuberculosis and HIV/AIDS. *Am J Trop Med*, 2004;71:147-55.
- Su TT, Kouyaté B, Flessa S. Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso. *Bulletin of the World Health Org.* 2006;84(1):1-80.
- BRAC. Towards a profile of the Ultra Poor in Bangladesh: Findings from CFPR/TUP Baseline Survey. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada, 2004.
- Whitehead M, Dahlgren G, Evans T. Equity and health sector reforms: can low-income countries escape the medical poverty trap. *Lancet* 2001; 358:9284, 833-6.
- Xu K, Evans DB, Kawabata K, Zeremini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. *Lancet* 2003; 362:111-7.
- Zaman S, Rahman H, Edgeworth R. Health domain of the ultra poor: an exploration. Dhaka and Ottawa: BRAC and Aga Khan Foundation Canada, 2004. (CFPR Working Paper Series No. 5)