Can Micro Health Insurance Reduce Poverty? Evidence from Bangladesh[1]

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Abstract: This paper examines the impact of micro health insurance on poverty reduction in rural areas of Bangladesh. The research is based on primary data collected from the operating areas of Grameen Bank during 2006. We used the following indicators to understand poverty status in details: household income, stability of household income, investment in productive assets and head count index of poverty measurement. The results show that micro health insurance has a positive association with all these indicators, but the evidence is not robust.

Key words: *Micro health insurance, Microcredit, Poverty reduction, and Grameen Bank*

1. Introduction

The importance of microinsurance emanates from the limitations of the micro credit programs in preventing all sorts of vulnerabilities of poor households. As reported in the literature microcredit generates various beneficial outcomes (Schuler and Hashemi, 1994; Hashemi *et al*., 1996; Hulme and Mosley, 1996; Schuler *et al*., 1996; Khandker, 1998; Pitt and Khandker, 1998; Pitt *et al*., 2003; Khandker, 2005; Gertler *et al.* 2009). However, the welfarists argue that adding auxiliary services is important for improving the effectiveness of microcredit programs (Dichter, 1996; Jani and Pedroni, 1997; Bhatt, 1998, cited by Bhatt, 2001; Woller *et al*., 1999; Woller and Woodworth, 2001). Households who suffer from severe health shocks are unable to reap much benefit from microcredit because health shocks discourage the households from investing in new technology or expanding existing business (Dror and Jacquier, 1999; McCord, 2001; Jutting, 2003). Evidence show that illness,

[1] We are very grateful to Nobel ***Laureate*** Professor Muhammad Yunus for giving us permission to conduct our survey on Grameen Bank. We are equally grateful to Shaikh Abdud Daiyan, the former Managing Director of Grameen Kalyan, for his whole hearted support for our survey. We offer our special thanks to the rural women who spent time answering the questions patiently and eagerly.

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especially chronic illness, of household members (particularly earning members) is the main reason for failing to cross the poverty line for the majority of the Grameen Bank (GB) borrowers who did fail to cross the line (Tod, 1996; Wright, 2000).

Thus, GB added a Micro Health Insurance (MHI) scheme in the late 1990s to protect its clients from health risks to prevent their economic downfall. Under the MHI scheme GB sells annually renewable prepaid insurance cards to the clients and offers health services directly from the health centres operated by it. The service package comprises both curative and preventive healthcare including health promotion services. There is no restriction for non-card holders to seek healthcare from these health centres. However, the card-holders are charged lower prices for the services compared to the non-card holders. Thus, the card holders receive insurance benefits in the form of concessional price (i.e., co-payment). Following GB, some other micro finance institutions (MFIs) in Bangladesh operates MHI schemes for similar purposes.

These types of MHI schemes may contribute to reduce poverty through improving health as well as reducing health risks of the insured. However, to date there has been very little research on the added effects of MHI on poverty reduction. Mosley (2003) examined the added effects of the MHI scheme of BRAC in Bangladesh on some outcomes, such as assets, household expenditure, current saving, educational expenditure, and education level. However, the study did not explicitly examine whether MHI contributes to reduce poverty. In addition, the evidence was not conclusive as the study was conducted at a very early stage of program development using a small sample. The other impact assessment studies on MHI have concentrated on some process outcomes, such as healthcare utilization, out of pocket expenditure, or cost recovery (Jutting, 2004; Dror *et al*., 2005; Dror *et al*., 2006; Msuya *et al*., 2007; Schneider and Hanson, 2007). Thus, there is no conclusive empirical evidence on whether the addition of a MHI scheme to microcredit reduces poverty.

In this paper, we have used several indicators (household income, stability of household income, investment in productive assets and head count poverty index) for poverty measurement. This research uses data collected through primary sources using quantitative technique from a cross section design. The survey was conducted on 465 households in three areas of GB (those with at least five years experience of MHI, those with 2 years or less experience of MHI, and those without MHI) using a multistage sampling techniques during June-July 2006. The primary research method is econometric analysis of the impact of placement of MHI. The study finds positive, but non-robust association of MHI with all the indicators used for poverty measurement. Hence, this research contributes to the knowledge gap giving more comprehensive evidence regarding the effects of MHI on poverty reduction.

This paper is organized as follows. Section 2 describes the conceptual framework explaining the added effects of MHI; Section 3 presents a brief description of health, microcredit and MHI programs in Bangladesh; Section 4 describes the methodology; Section 5 provides the findings; and Section 6 offers the conclusion.

2. Impact of Adding MHI to Microcredit: A Conceptual Framework

A MHI scheme offering both curative and preventive healthcare and health promotion services may increase the health status of the participating households via increased health awareness, improved health practices, and increased utilization of formal healthcare (see Figure1). Improved health status may lead to higher productivity, higher labour supply, low level of workdays lost, and a lower level of healthcare expenditure. The first two can be regarded as ‘augmenting’ effects and the latter two as ‘stabilization’ effects.

Figure1

Under augmenting effects it is assumed that improved health status leads to an increase in the efficiency of labour supply as well as actual labour supply which increases productivity in the microenterprise and thereby earnings[2]. The stabilization effects can be elaborated as follows. First, improved health status leads to less income loss through reducing the workdays lost due to illness. Second, it reduces both direct and indirect health expenditures because healthcare utilization may be reduced due to improved health status[3]. Thus, the household may maintain health care expenditure from regular income or savings. This may help the household to avoid borrowing or selling of productive assets to meet the medical needs of the household[4], which may prevent falling incomes earned from microenterprise.

In addition, the supplementation of MHI to microcredit may reduce the uncertainty of healthcare expenditure and thus raise investment in all forms of capital. This may happen because if the household is insured against health risk, it may invest in high return riskier assets because the insured household does not need to retain cash or to hold easily liquidable assets for precautionary purposes. It is worth mentioning that Kochar (2004) finds, from a study in rural Pakistan, that overall savings of households rise in the expectation of future illness of adult males, but investments in productive assets decline.

Thus, these two channels (improvement of health status and reduction in uncertainty regarding healthcare expenditure) may lead to household income above subsistence level. When income rises above subsistence level, the household may increase investment in nutritional improvement, human

[2] In addition, as microentrepreneurs in most cases are women, they also tend to take care of sick children and adults in the household. Increased health status of the household members reduces the time spent caring and thereby increases the supply of effective labour.

[3] It is worth mentioning that this may happen only if there is a substantial improvement in health status, which may not occur in the short run. Thus, healthcare expenditure may not fall in the short run; rather, it may increase because insurance provides incentives to use more health care.

[4] Poor households sell various household assets (livestock, land and grains) and take loans for covering the financial costs of illness (Sauerborn *et al*., 1996).

capital and physical capital. This along with reduced uncertainty of health expenditure may also reduce vulnerability that may lead to investment in high return assets. Moreover, surplus income may enhance social capital through increasing the strength of the solidarity of the group members, which may reduce the probability of drop out from microcredit program. These effects together may lead the household to attain high income state in the long run. Our focus is whether the addition of a MHI scheme to microcredit reduces poverty of participating households in rural Bangladesh.

3. Health, Microcredit and Microinsurance Programs in Bangladesh

Health programs

The constitutional commitment of the government of Bangladesh is to provide basic medical care to all its citizens. The government has been investing substantially since independence to develop the health infrastructure as well as strengthen health and family planning services with special attention to the rural population. Providing Primary Health Care (PHC) to attain 'Health for All' is the major thrust of the health program.

There is a three- tier mechanism for providing health and family planning services in rural areas: (i) domiciliary services by a Health Assistant and Family Welfare Assistant at the household level[5]; (ii) Health and Family Welfare Centres (HFWCs) at the union level, and (iii) Upazila Health Complexes/Thana Health Complexes (UHCs/THCs) at the upazila (Thana) level. In the present health care delivery mechanism, HFWCs[6] have been working as the first level facility, UHCs as the first referral hospital, and district hospitals as the second referral hospital. Teaching hospitals and specialized hospitals provide healthcare at the tertiary level.

[5] Under the Health and Population Sector Program a 'community clinic', was introduced in 1998 for every 7000 population in the village level instead of domiciliary services provided by health and family planning visitors. But the concept of the community clinic was abolished in 2001.

[6] Some HFWCs have been upgraded into union sub-centres (USCs) where an MBBS doctor has been posted. USCs are run by the health services department and HFWCs by the family planning department.

The household level domiciliary services comprise health education, maternal and child health (MCH) care, including family planning services, vaccination, and control for communicable diseases, oral dehydration, etc. on a very limited scale. The static centre at the union level offers PHC, which includes treatment for minor illnesses, control of communicable diseases, and MCH care, including family planning services. UHC provides both outpatient and inpatient services for health care including MCH and family planning services. Actually, UHC is the main centre for implementing the Essential Services Package (ESP), which was designed to attain "Health for All". The ESP includes reproductive healthcare, child healthcare, communicable disease control, limited curative care, and behavioural change communication. In addition to public provision of healthcare, there is a large private sector that includes a not-for-profit sector and a for-profit sector. The former is relatively small and run by NGOs, MFIs and charitable institutions.

In spite of having a well-established healthcare delivery network government has largely failed to meet the health care needs of the rural population due mainly to supply side constraints. These are: (i) a failure to keep the doctors in UHCs and USCs; (ii) lack of proper input mix and skill mix; (iii) lack of friendly behaviour of the providers; and (iv) charge of unofficial fees. Thus, although there is under utilization of many UHCs, the majority of patients seek healthcare from private providers, especially from informal providers (BBS, 2006).

Microcredit and Microinsurance

The microcredit program was initiated by Mohamed Yunus through the 'Jobra' experiment[7] in the late 1970s. Grameen Bank (GB), which has played the main role in developing the microcredit program,

[7] Jobra is a village adjacent to Chittagong University, Bangladesh.

was established by the leadership of Mohamed Yunus in 1983. There has been a massive expansion of Grameen type microcredit since the 1990s. According to the Palli Karma Sahayak Foundation (PKSF), in December 2005, there were about 700 micro finance institutions (MFIs) and 33.17 million microcredit members in Bangladesh. The main players in the microfinance sector are Grameen Bank, BRAC, ASA and Proshika. Some government departments, specialized organizations, and commercial banks also provide microcredit. PKSF, an apex organization for microcredit funding and capacity building, has been playing a significant role in the expansion of microcredit.

Microinsurance, a cluster of activities, emerged in developing countries to cover mainly life and health risks after the failure of insurance schemes initiated by the governments in many countries including Brazil, India, Philippines and the USA, due to the absence of traditional insurance for the rural people. The original schemes failed largely because they provided insurance against uninsurable risks, such as multiple risks of crop failures, and covariant risks; and because of failure to prevent moral hazard and adverse selection (Brown, 2001; Mosley, 2001). Microinsurance has been defined as follows: 'the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved' (Churchill 2006:12).

The evolution of microinsurance has come through three distinct historical roots (Mosley, 2007). First, drawing on lessons from the failure of multiple-risk schemes, some organizations (e.g., FINCA of Uganda) initiated some experimental schemes to insure against a single risk such as property, health or life. These schemes are connected with microfinance and their aim is to achieve financial sustainability in the medium term. Second, some profit motive schemes, offering mainly life insurance for low income people (e.g., *Grameen Bima* and *Gono Bima* of Bangladesh) were set up in the private sector; their aim was to make profits from low income people, especially microfinance clients. Third, in order to expand into areas of social protection not covered in the conventional loan-based microfinance,

some non-government organizations (NGOs), especially MFIs (e.g., the Self-employed Women's Association of India, Grameen Bank and BRAC of Bangladesh) set up some insurance schemes for the poor to insure against some risks, such as health, life, livestock and property. MHI fits into the third category of microinsurance that deals with the health risks of the poor.

The main player in the MHI sector in Bangladesh is GB (see Table-1 for the key features of the MHI scheme of GB). Some other organizations (BRAC, Society for Social Services, Sajida Foundation, Shakti, Dhaka Community Hospital, Nari Uddug Kendra, Dushtha Shasthya Kendra, and Integrated Development Foundation) also offer a prepaid health program in Bangladesh.

Table 1

4. Methodology

4.1. Data

We collected primary data from a household survey using structured questionnaires in 2006. We finalised the survey questionnaires after incorporating comments and suggests from a number of experts who were sent a preliminary draft of the questionnaires, as well as feedback from two rounds of piloting.

We study the MHI component of GB because this operates MHI on a large scale. In order to construct a meaningful study design that would enable us to test causal relationships, GB branches were stratified into three distinct types: (i) branches with at least five year experience of MHI (GB-1); (ii) branches with one or two years experience[8] (GB-2) and (iii) branches without MHI (GB-3).

[8] While the sample was designed in June 2006, the MHI scheme was being operated in its 32 branches of which 14 branches had the scheme for at least five years and 2 branches had the scheme for two years or less.

A multistage sampling technique was applied. One GB branch was randomly selected from each of GB-1 and GB-2; they are Madhabpur and Pakutia respectively. Note that MHI has been in operation in Madhabpur for about a decade and in Pakutai for two years. Madhabpur is located at Singair upazila (sub-district) of Manikgonj district and Pakutai is at Nagarpor upazila of Tangail district. One GB branch (Joy Mantap) was selected from GB-3. This branch was purposively selected from the same upazila (Singair) as Madhabpur, in order to make a meaningful comparison group. Note that there are 8 branches of GB in Singair upazila and a MHI scheme has been operating in its three unions (Madhabpur, Shaharil and Jamsaha) since 1996. Among the remaining five unions where GB has not yet placed its MHI scheme, Joy Mantap is adjacent to Madhabpur and they are connected with the same road. It is also worth mentioning that GB decided to introduce its MHI scheme into Joy Mantap in the near future[9], which may reduce program placement bias in this design.

A list of all the villages holding at least one female centre of GB was prepared for each selected area. In the second stage, 2 villages from each area were selected randomly. Thus, a total of 6 (3x2) villages were selected. In the third stage, two female microcredit centres were selected randomly from each village where more than two microcredit centres existed[10]. Some villages had only one credit centre, in that case it was selected. Note that each credit centre consists of 40-50 microcredit members and they usually live in a particular area of the village.

A list of current GB microcredit member households was made in each selected GB loan centre, using information obtained from respective branch offices of GB. We attempted to interview all the eligible member households in the selected microcredit centres of each sampled village, in order to control for sample selection bias. However, some households could not be interviewed due either to absence of the

[9] GB placed its MHI scheme later on, but was withdrawn due to establishment of a hospital by a local philanthropist.
[10] Since about 96 percent of existing GB members are female, we selected only the female microcredit centres.

key respondent or unwillingness to take part in the survey[11]. The overall response rate was 73 percent. A total of 329 households were surveyed of which 136 were from GB-1, 85 from GB-2 and 108 from GB-3. The participation in MHI among the households interviewed in the survey was 82 percent (96 percent at GB-1 and 59 percent at GB-2). The willingness to participate in MHI at GB-3 was 98 percent[12].

4.2. Method

One of the major challenges in estimating the impact of a program (like MHI) using non-experimental data is to deal with endogeneity – heterogeneity in unobservable individual characteristics of the participants and non-participants, which influences both the decision to participate in the scheme and the outcome. The coefficient of interest (the effect of participation in MHI) is overestimated when endogeneity is not controlled for (Ribar, 1994). Note that random assignment of individuals into a treatment group and a control group can balance the heterogeneity in unobservable individual characteristics and, thus, the bias disappears in an experimental study. However, random assignment is not possible here; hence it is necessary to choose an empirical model, which can control for endogeneity.

Following the empirical literature on health insurance and microcredit (Pitt and Khandker, 1998; Waters, 1999; Nanda, 1999; Yip and Berman, 2001; Jowett *et al*., 2003; Trujillo, 2003; Khandker and Faruqee, 2003; Jutting, 2004; Jowett *et al*., 2004) we can consider a structural equation to estimate the outcomes of the interest.

$$y_{ij} = X_{ij}\beta_y + A_{ij}\delta + \varepsilon_{ij} \qquad (1)$$

[11] One repeat visit was made to absent households. The survey was conducted during harvesting season hence it was not possible to capture all the absent households as they were away from home for long periods during the day. It is worth mentioning that respondents were not pressurized nor offered motivation to take part in the interview.
[12] Respondents in GB-3 were asked whether they would like to enrol in MHI if it was placed in their area.

y_{ij} is the outcome of interest (household income, stability of household income, investment in productive assets and head count poverty index of household *i* in village *j)*[13]. X_{ij} is a vector of observed individual, household and village characteristics (education, age, duration of membership in MHI and so on). A_{ij} is a binary variable where A_{ij} =1 if household i of program village j participates in MHI and A_{ij} = 0, otherwise; and ε_{ij} is the stochastic error term. The estimate of δ will give the unbiased effect of MHI on the outcome *y* only if A_{ij} is an exogenous variable. Thus, it is important to explore the exogeneity of A_{ij} .

We can also consider the following reduced form participation equation

$$A_{ij} = X_{ij}\beta_A + Z_{ij}\phi + \mu_{ij} \qquad (2)$$

X_{ij} is as defined in equation (1); Z_{ij} is a distinct set of household or village characteristics that affect only participation in the scheme (A_{ij}), but not the outcome (y_{ij}) conditional on A_{ij} ; and μ_{ij} is the stochastic error term.

Endogeneity arises when A and ε (or ε and μ) are correlated, resulting in biased estimates of δ . It is necessary to test whether endogeneity exists in the participation decision before taking any measure to control for it. This is because the coefficients are underestimated if endogeneity is controlled for when it does not exist, since this produces larger standard errors and avoidable loss of precision (Bollen *et al*., 1995).

[13] The exact specification of the model (linear, probit or ordered probit) depends on the nature of the outcome (whether it is continuous, binary or ordered response).

While conditioning on participation is the commonly used method for analyzing the causal effect of health insurance as evidenced in the literature, this method is not the focus of our research for the reasons explained below. First, MHI may produce a lot of spill over effects. This is because the MHI scheme offered by GB is different from a traditional three-party (the insurer, the insured and health service providers) health insurance system. GB MHI provides healthcare directly to their clients through establishing health centres instead of simply paying coverage, as is usually done by third-party health insurance. In addition, GB MHI offers health promotion services to all the microcredit members living under the catchment areas of the health centre regardless of their participation in MHI. Moreover, the uninsured can seek healthcare from the health centres by paying the standard fees. If these spill over effects are not taken into account, the impact of MHI will be severely underestimated.

Second, there was a very high enrolment rate in MHI at GB-1 (96%). Since there are very few observations on the non-participant group, the estimation of equation (1) may not give sensible findings.

Thus, in what follows we focus on outcomes conditioned on *placement* of the program, rather than *participation* in the program. Available empirical literature on this method falls mainly into two groups. One group has compared the program group with a comparison group where the program was in the pipeline (Chase, 2002; Galasso and Ravallion, 2004). The other group has compared the program group with a comparison group where the program has not been placed at the time of survey (Amin *et al*., 1996; Hadi, 2002). The model can be written as follows

$$y_{ij} = X_{ij}\beta + P_{ij}\lambda + \varepsilon_{ij} \qquad (3)$$

y and X are as defined previously; P represents program status where $P = 1$ if the household is drawn from a program area where MHI has been operating for at least five years (GB-1); and $P = 0$ if the household is drawn from the comparison area where MHI was not placed at the time of survey (GB-3). The estimate of λ measures the average treatment effect of MHI. Measuring *average treatment effect* rather than *average effect of treatment on the treated* is sensible because non-participants may also obtain benefits from MHI due to spill over effects.

The major concern in this method is to control for program placement bias (the particular features that attract an organization to place the program in an area) and geographical heterogeneity, which may affect the outcomes. Social programs like MHI are rarely placed randomly; rather placement depends on both demand and supply side factors. The best way to ameliorate the effects of program placement bias is to select a suitable comparison area.

We took the following measures to select a suitable comparison area. First, selecting the program area (GB-1) and control area (GB-3) from the same small geographical area to reduce geographical heterogeneity; second, choosing the control area where there is potential for placing the program in the near future to reduce the supply side bias of program placement; and third, conducting a survey to see whether eligible households in the control area would be willing to be insured if MHI is placed in their areas, to control for demand side bias. Note that the willingness to enrol in the MHI scheme was 98 percent in GB-3, which was very similar to actual enrolment in GB-1 (96%).

In addition, we used a similar method to select the households from the program area and control area. It is worth mentioning that we conducted the survey on female microcredit members, a relatively homogeneous group of people, in both the program area and the control area. Thus, estimation of

equation (3) through proper specification (including all the observable individual, household and village characteristics) may give sensible findings.

Although this study uses primary data collected expressly for assessing the impact of MHI, and applies appropriate methods for analysing the data, there are still some limitations. These largely arise from time and resource constraints[14]. First, although panel data or repeated cross section data is suitable for analysing dynamic outcomes, this study uses a single cross section data. The sample is also not representative of the insured population.

4.3. Poverty measurement indicators

In order to detailed understanding of the impact of MHI on poverty status we have concentrated on the following indicators: household income, stability of household income, investment in productive assets and head count index of poverty measurement.

We collected the data regarding household income for the last 12 months preceding the survey. We have measured gross income of the household instead of net income (income retained after deduction of production costs) because the respondents usually are not able to state the costs of production correctly. It is worth mentioning that we have used age and sex adjusted per capita income in this analysis. We used the following weights to construct age and sex adjusted household size: 1.0 for males aged over 18 years, 0.9 for females aged over 18; 0.94 for males aged 13-18, 0.83 for females aged over 13-18; 0.67 and 0.52 for a children aged 7-11 and 4-6 respectively; 0.32 for toddlers aged 1-3;

[14] There was no external research funding for this study.

and 0.05 for infants. Note that Townsend (1994) used these weights which were constructed based on a South Indian dietary survey.

We have used food sufficiency level and non-land asset level for measuring stability of income. Food sufficiency level is a good indicator of the stability of household income of the poor because it varies with the fluctuations of income. Level of non-land assets is also a good indicator because poor people usually depend on the non-land assets to cope with any income shock. The data for each of the indicators was collected during the survey using the structured questionnaires. For the former, we asked the respondents to classify her household in terms of food consumption from the following options: deficit in whole year, sometimes deficit, neither deficit nor surplus, and surplus. For the latter, we used the current value of all the non-land assets whether they contribute to household income or not. Like per capita income we have used age and sex adjusted household size to measure per capita non-land assets.

By productive assets we mean the physical capital and working capital of the microenterprises, which contribute to household income. We collected data on working capital currently used in the microenterprises. We also had data on the current value of the different types of physical assets (both land and non-land) of the households which contributes to household income. The value of land varies substantially from area to area. Thus, we have used the current values of the non-land assets (cattle, poultry, agricultural equipment, fishing net, sewing machine, and rickshaw/van) as a proxy for physical capital.

In the head count ratio (the proportion of the population that lies below the poverty line) of poverty measurement, we used Cost of Basic Need (CBN), the commonly used method in Bangladesh, to

measure poverty line[15]. Following Ravallion and Sen (1994) we set 2112 calories and 58 of grams protein as the minimum daily calorie requirement of an average adult for food poverty line and 35 percent of food poverty line income as non-food allowance.

5. Findings

Socio-demographic statistics

Microcredit was placed at GB-1 and GB-3 in 1983 and at GB-2 in 1986. A MHI scheme was placed at GB-1 and GB-2 in 1996 and 2004 respectively.

There were some differences in literacy rate and educational infrastructure among the selected GB villages. There was no difference as such in general infrastructure, economic indicators and occurrence of natural calamities (except cyclone) among the three categories of GB villages. There was also no substantial difference in health infrastructure. Very similar number and type of MFIs work in all the villages. Thus, in terms of observable features the selected GB villages are very similar.

There was some variation in the length of membership in microcredit and MHI. At GB-1 about 66 percent of the members had at least 5 years experience of microcredit, and at GB-2 and GB-3, 42 percent and 44 percent had at least 5 years experience respectively. At GB-1, about 64 percent of the insured had at least 5 years experience of MHI (the average experience is about 6 years) and at GB-2, 96 percent had one year experience.

Almost all the microentrepreneurs were aged between 17 and 64 years irrespective of the sample areas. Most of them were of reproductive age (15-49 years). More than 90 percent of the microentrepreneurs

[15] The sum of the costs of a normative bundle of goods needed to meet one's minimum nutritional requirement and the costs of non-food basic need items is termed as poverty line expenditure.

were married in all the sampled areas. The majority of the microentrepreneurs, irrespective of the sample areas, had no formal education. But the formal education rate was higher in GB-2 compared to other areas. The majority of the microentrepreneurs in GB-2 and GB-3 had household based self-employment[16]; and this was around 44 percent for the microentrepreneurs in GB-1. A good number (28%) of microentrepreneurs of this area had small businesses. Some microentrepreneurs (18%, 22%, and 17% for GB-1, GB-2, and GB-3 respectively) were not directly involved in any economic activity. Rather, they gave the money borrowed from MFIs to someone else in the household or outside the household. Microentrepreneurs were themselves the household head in some cases (15%, 14%, and 10% at the GB-1, GB-2, GB-3 respectively), but the vast majority of households were male headed. Like microentrepreneurs, the majority of the household heads had no formal education. Small business, farming and day labour were the major occupations of household heads in all the areas.

Descriptive statistics

There is substantially higher mean per capita income and per capita non-land assets in GB-1 compared to GB-3 or GB-2 (see Appendix Table-A1). Their differences between GB-1 and GB-2 and between GB-1 and GB-3 are significant at the 1 percent level (see Table-2). The average value of productive assets is also substantially higher for GB-1 compared to GB-2 or GB-3. The difference is significant between GB-1 and GB-3 at the 5 percent level and between GB-1 and GB-2 at the 1 percent level. The data shows that the majority of the households do not have food deficit irrespective of MHI placement status (see Appendix Table-A2). Although food surplus status is higher in GB-1 compared to GB-2 or GB-3, the differences are not significant at any conventional level (see Table-2).

Table 2

[16] Note that livestock fattening, poultry feeding, farming, tailoring, etc. fall in this category.

As per the CBN method the per capita annual poverty line expenditure was US $155.77 in GB-1 and US $156.05 in GB-3. Table-3 shows the percentage of GB member-households above the poverty line. A substantially higher proportion of households are above the poverty line in GB-1 compared to GB-3. The difference is significant at the 10 percent level.

Table 3

Econometric results

We have specified a log-linear model for per capita income, per capita non-land assets and productive asset level of the household conditioned on the placement of MHI as suggested in Section 4.2 [see equation (3)]. The histograms of the log-linear data of all these variables are approximately normal shaped. Thus, it seems acceptable to use OLS regression[17]. We have specified an ordered probit model for food sufficiency level. As there are very few observations in 'deficit in whole year' category, we have merged this group into the 'sometimes deficit' group and named this 'food deficit'. Thus, we have designed the ordered probit model as follows: food deficit = 0, neither deficit nor surplus =1 and surplus =2 for both organizations. We have specified a binary probit model for head count poverty ratio using the following design: household living below poverty line = 0 and household living above poverty line = 1.

The control variables included in all these specifications are: education of the household head, occupation status of the household head[18], education of the microentrepreneur, employment status of the microentrepreneur, the proportion of income earners in the household, number of individuals in the household living abroad, amount of owned cultivable land, amount of owned homestead land, duration

[17] Additionally we have applied robust regression and quintile regression techniques to compare the results with OLS results.

[18] We have classified the household head occupation into three groups: low-grade occupation (day labour, rickshaw/van pulling, fishing, self-employment, and begging), medium grade occupation (small farming, small business, boatman, and small service) and high grade occupation (business and service). Note that we have used low-grade occupation as a reference category.

of membership in microcredit program, membership status in other microcredit program, and number of chronic diseased persons in the household other than gastrointestinal diseases. It is worth mentioning that productive assets have not been measured in age and sex adjusted per capita term. Thus, we have added the age and sex related variables (age of the household head, sex of the household head, and age of microentrepreneur) in this case. In addition, we have controlled village literacy rate as a village level attribute.

Table-4 shows the OLS estimation of log-per capita income, log-per capita non-land assets and log-productive assets. Each of the models is jointly significant at the 1 percent level. There is no evidence of mis-specification in these models (the p-value of the RESET is above the conventional significance levels).

Table 4

The coefficients of most of the control variables in all the models have the expected signs. In the case of per capita income, education level of the household head, occupation status (both medium grade and high grade) of the household, number of individuals living abroad, and amount of owned cultivable land are positively significant at the 1 percent level. In addition, amount of owned homestead land is positively significant at 10 percent and chronic disease status is negatively significant at the 10 percent level. It is also worth mentioning that duration of membership status in microcredit program is close to significant at the 10 percent level; the p-value is 0.11.

The coefficients of some variables do not have the expected signs, but they are not statistically significant. For example, the coefficient of the employment status of the microentrepreneur is negative contrary to the expectation. This may happen because affluent microcredit members usually borrow money from the microcredit programs for the enterprise run by their husband or any other male member of the household; the female microcredit member is not usually involved in running the

microenterprise. The coefficient of MHI status is positive, but not significant. The robust regression and quintile regression also provide evidence for similar association of MHI status with household income. Some factors may be responsible for this insignificant association. First, it may need a longer duration of time to generate a significant impact on household income via improving health status through providing primary healthcare. Note that GB does not provide secondary or tertiary healthcare from its health centre. Although it maintains a referral mechanism for the higher levels of healthcare, this does not function effectively as we observed during the survey[19]. Second, improvement of income is also a dynamic outcome of MHI and thus, static (cross section) data cannot measure it properly.

In the case of non-land assets, high grade occupation of the household, number of persons living abroad, and amount of owned cultivable land are positively significant at the 1 percent level. Moreover, education level of the microentrepreneur, proportion of income earning members in the household, and amount of owned homestead land are positively significant at the 5 percent level. In addition, employment status of the microentrepreneur and duration of membership in microcredit program are positively significant at 10 percent. The coefficient of MHI status is positive, but not significant in either case. Robust regression and quintile regression also give similar evidence.

Table-5 shows the ordered probit estimation of food sufficiency level. The model is jointly significant at the 1 percent level. There is no evidence of mis-specification in the model.

Table 5

The coefficients of all the control variables have the expected signs apart from membership status in other microcredit program though this is not significant. In this model, education level of the household head, amount of owned cultivable land, amount of owned homestead land and duration of membership

[19] Officially there is a provision that an insured household will receive up to TK.2000 (about US $29) annually as referral (hospitalization) benefits. It was basically provided from an external funding provided by ILO. But it is not provided now-a-days because the fund has been exhausted.

in microcredit program are significant at 1 percent. Moreover, high grade occupation of the household head is significant at 5 percent and number of individuals living abroad is close to significant at 10 percent (p-value = 0.11). MHI status is positive and close to significant at the 10 percent level (p-value = 0.14).

Thus, the analysis does not provide any robust evidence on the impact of MHI on any of the indicators of the stability of household income. The reasons may be similar as explained earlier: ineffective functioning of referral services and analysing dynamic outcome using static data. Additionally, health care expenditure and workdays lost (the main determinants of stabilization of household income as assumed in Figure-1) did not differ significantly between the program area (GB-1) and comparison area (GB-3)[20]. Note that adverse effects of protection against moral hazard (co-payment) may be a reason for the former.

In the case of productive assets, sex of the household head, occupation status of the microentrepreneur and amount of owned cultivable land are positively significant at the 1 percent level; the number of persons living abroad is positively significant at the 5 percent level; and age of microentrepreneur and duration of membership in microcredit program are positively significant at the 10 percent level. The coefficient of MHI status is positive, but not significant in any case. Robust regression and quintile regression also provide similar association between MHI and investment in productive assets.

Similar factors may be responsible for these results. Additionally, MHI offers mainly primary healthcare and, thus, the insured still may need to hold idle money to meet the potential illnesses which require secondary and tertiary level of care. This may reduce potential investment in productive assets.

[20] We collected this information from the survey.

Table-5 also shows the results of a binary probit estimation of head count poverty ratio. The model is jointly significant at the 1 percent level and here is no evidence of mis-specification in the model. The coefficients of most of the control variables have the expected signs. Some (high grade occupation of the household head and number of persons living abroad) are positively significant at 1 percent and some (amount of owned cultivable land) at 5 percent. In addition, the coefficient of education level of the household head is positive and close to significant at 10 percent (p-value = 0.13). The coefficients of those variables which do not have the expected signs are not significant at any conventional level apart from membership in other microcredit programs. Most people who borrow from multiple organizations are in a loan trap and their economic condition is worsening as we observed during field survey. This is because they mainly repay the loan of one organization by borrowing from another organization. This may play an important role behind the significantly negative coefficient of membership in other microcredit programs. The coefficient of MHI status is positive, but not significant. This implies that the MHI may raise the income of microcredit members above the poverty line, but the evidence is not strong.

6. Conclusion

This study reveals the evidence of positive association of MHI with enhancing household income, stabilization of household income, increased investment in productive assets and reduction of poverty. However, the evidence is not robust for any of the outcomes. The potential reasons are: lack of proper referral services, adverse effects of protection against moral hazard, and use of static data to analyse dynamic outcomes. Maybe the program needs a longer duration of time to generate a robust impact on poverty reduction. However, a fundamental question arises when one thinks about the expansion and replication of MHI. Can MHI be an alternative for existing government programs?

Although government health centres are not functioning effectively in many rural areas, the government is ultimately responsible for ensuring health services for the rural poor. It is worth mentioning that MHI has been mainly operated in the areas where government healthcare facilities are not functioning well. In addition, there are many concerns about the sustainability of microfinance institutions (MFIs). It is worth mentioning that, in Bangladesh, MHI is mainly MFI driven. Many MFIs also may not have capacity (both managerial and financial) to expand or replicate MHI.

Thus, one suggestion is that the government may contract out its poorly functioning health centres to the existing micro insurers or to the most effective MFI in the respective areas. If the micro insurers have the opportunity to use existing government health facilities the following benefits may be generated. First, it may save the rental costs or construction costs of building a new health centre, and thus, the insurers could offer lower charges for their products. Second, it may enhance the confidence of both clients and health personnel regarding the sustainability of the program. Third, contracting out may avoid the duplication of providing health services and reduce the financing gap in the health sector.

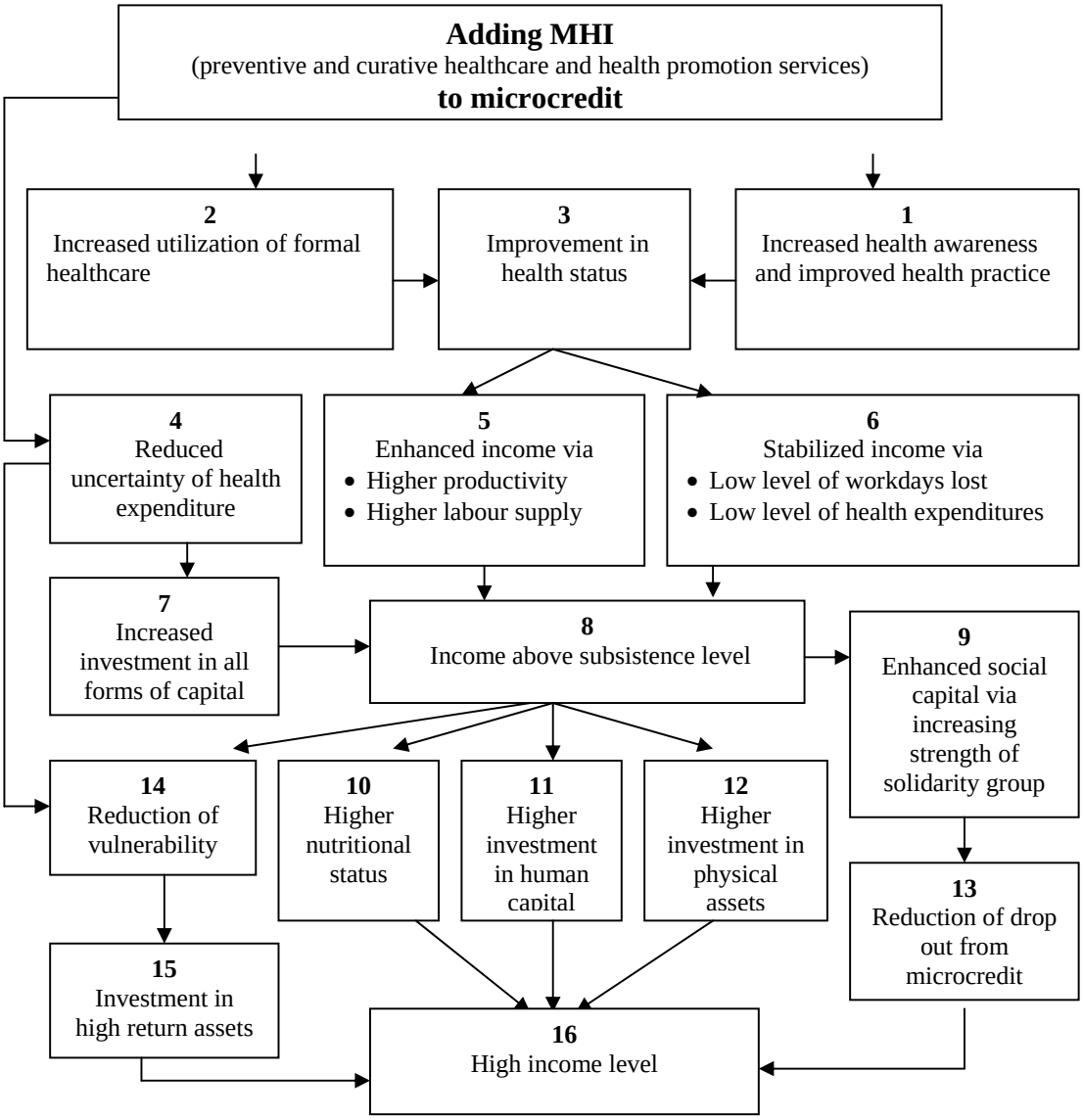

Figure 1: Potential effects of adding MHI to microcredit

Table-1: A picture of the key features of the MHI scheme of GB

Key features	Grameen Kalyan of GB
Area coverage	• December 2008: 39 unions of 25 sub-districts of 10 districts[1].
Mechanisms for providing health services	• Mainly through static clinics. • Also via mobile clinics, satellite clinics and domiciliary visits (by the health workers). • Limited emergency services through its static clinics • Referral services through making agreement with some hospitals.
Technical staff	• An MBBS (Bachelor of Medicine and Bachelor of Surgery) doctor. • A female DMF (Diploma in Medical Faculty) doctor. • An office manger, a female paramedic (RH), a laboratory technician and six community health assistants. • Some Trained Traditional Birth Attendants (TTBA) trained by Grameen Kalyan.
Categories of services covered	• Preventive including ANC and curative care. • Health promotion activities, family planning services; and all the basic diagnostic services including ultra-sonography.
Type of curative services provided	• Essential Services Package (ESP) including safe delivery.
Enrolment status	• Voluntary
Proof of enrolment	• Insurance card
Eligibility criterion	• GB member households or any villagers living within an 8 km radius of each health centre.
Access of non-insured households to curative care	• Yes
Premium	• Annual premium (covering up to 6 members) [2] ▪ For a GB member family: TK.120 (US $1.74) ▪ For a non member family: TK.150 (US $2.17) • Average wage ▪ Male: TK.90 (US $1.30) ▪ Female: TK.60 (US $0.87)
Benefit package for the card holders	• Co-payment: ▪ Medical consultation fee for a card holder: TK.10 (US $0.14) ▪ Medical consultation fee for a non-card holder: TK.25 (US $0.36) • Discount: Discount for basic medicine[3] on MRP: 25%, for pathological tests on listed price: 30-35%, and for referred consultation visit: 50%. • Hospitalization benefit: Annually up to 2000TK (US $29) for a family. • Free: Annual basic check up for head of the family; immunization against six-diseases, domiciliary visits by health assistants.
Additional health services package	• School health package, Eye Mega Camp for cataract operations, and regular cataract operation programs.
Financing mechanism	• An initial endowment fund of Grameen Bank. • Revenue generation from co-payment.
Cost recovery rate	• 100% (including the managerial costs and over head costs of Regional Office and Head Office) in most of the old health centre.

Source: Hamid *et al.*, 2005b; Ahmed *et al*., 2005; and various official documents of SSS and Grameen Kalyan of GB.

Note:

1. There are 64 districts in Bangladesh.
2. TK.20 is charged for each additional member.

Basic medicine: 15 essential medicines are enlisted in the schedule of Government of Bangladesh.

Table-2: Mean/ proportional difference in different poverty indicators between different groups of GB members

Different indicators of poverty measurement	Difference between GB-1 and GB-2	Difference between GB-1 and GB-3	Difference between GB-2 and GB-3
Mean per capita income	82.07***	102.32***	20.24
Mean value of per capita non-land assets	81.50***	65.33***	-16.16
Proportional difference in surplus of food	13.53	18.14	4.61
Mean value of productive assets	161.77***	121.83**	-39.94

Note: 1. *** Significant at the 1% level, ** significant at the 5% level, and * significant at the 10% level.
2. Two-tailed test is considered for each case.

Table-3: Percentage of households living above poverty line by MHI status

Different groups of GB members	Percentage of household above poverty level
GB-1 (established MHI)	80.88 (110)
GB-3 (no MHI)	69.44 (75)
Proportional difference (in percentage) between GB-1 and GB-3	11.44*

Note: 1. Figures in parentheses are the number of observations.
2. *** Significant at the 1% level, ** significant at the 5% level, and * significant at the 10% level.
3. Two-tailed test is considered.

Table 4: OLS estimation of log-per capita annual income, log-per capita non-land assets and log-productive assets

Explanatory variables	Dependent variable		
	Log of (annual) per capita income	Log of per capita non-land assets	Log of productive assets
Age of the household head (years)	-	-	-0.021** (0.010)
Sex of the household head (1 = male)	-	-	0.826*** (0.278)
Education of the household head (years)	0.026*** (0.009)	0.006 (0.023)	-0.003 (0.026)
Medium grade occupation of the household head (1= yes)	0.155*** (0.061)	0.215 (0.140) (p-value = 0.13)	0.154 (0.164)
High grade occupation of the household head (1 = yes)	0.285*** (0.084)	0.538*** (0.212)	0.250 (0.270)
Age of the microentrepreneur (years)	-	-	0.023* (0.014)
Education of the microentrepreneur (years)	0.012 (0.014)	0.067** (0.030)	0.007 (0.047)
Employment status of the microentrepreneur (1= employed)	-0.066 (0.071)	0.334* (0.189)	0.731*** (0.224)
The ratio of income earners and household size	0.182 (0.158)	0.663** (0.322)	0.358 (0.408)
No. of persons living abroad	0.480*** (0.088)	0.595*** (0.136)	0.471** (0.211)
Owned cultivable land (decimals)	0.002*** (0.001)	0.003*** (0.001)	0.006*** (0.002)
Owned homestead land (decimals)	0.003* (0.002)	0.011** (0.005)	0.009 (0.007)
Membership in GB microcredit (years)	0.008 (0.005) (p-value = 0.11)	0.016* (0.010)	0.026* (0.014)
Membership in any other microcredit program (1 = yes)	-0.065 (0.092)	0.038 (0.207)	0.132 (0.258)
No. of chronic diseased persons	-0.051* (0.030)	-0.066 (0.064)	-0.001 (0.081)
Village literacy rate (%)	0.006 (0.055)	0.021 (0.096)	-0.062 (0.108)
MHI status (1= established MHI, 0 = no MHI)	**0.110 (0.169)**	**0.171 (0.285)**	0.010 (0.328)
Constant	4.775** (2.050)	2.671 (3.533)	5.593 (3.926)
observations	244	244	244
F statistics	15.54***	7.38***	6.75***
R^2	0.421	0.268	0.273
RESET	F(3, 224) = 0.43 Prob > F = 0.735	F(3, 224) =1.86 Prob > F = 0.123	F(3, 221) = 1.98 Prob > F = 0.117

Note: 1. *** Significant at the 1% level, ** significant at the 5% level, and * significant at the 10% level.
2. Figures in parentheses are robust standard errors.

Table-5: Ordered probit estimation of food sufficiency level and probit estimation of head count poverty ratio

Explanatory variables	Dependent variable	
	Food sufficiency level (deficit = 0, neither deficit nor surplus = 1 and surplus = 2)	Poverty status (0 = under poverty line and 1 = above poverty line)
Education of the household head (years)	0.088*** (0.028)	0.058 (0.038) (p-value = 0.13)
Medium grade occupation of the household head (1= yes)	0.049 (0.179)	0.245 (0.208)
High grade occupation of the household head (1 = yes)	0.535** (0.244)	1.420*** (0.486)
Education of the microentrepreneur (years)	0.026 (0.039)	0.048 (0.058)
Employment status of the microentrepreneur (1= employment)	0.031 (0.213)	-0.090 (0.279)
The ratio of income earners and household size	0.094 (0.439)	0.319 (0.612)
No. of persons living abroad	0.367 (0.232) (p-value = 0.11)	0.968*** (0.374)
Owned cultivable land (decimals)	0.005*** (0.002)	0.010** (0.004)
Owned homestead land (decimals)	0.020*** (0.008)	-0.007 (0.009)
Membership in GB microcredit (years)	0.039*** (0.013)	0.009 (0.016)
Membership in any other microcredit program (1 = yes)	-0.392 (0.285)	-0.529* (0.289)
No. of chronic diseased persons	-0.004 (0.088)	0.054 (0.129)
Village literacy rate (%)	0.106 (0.172)	-0.013 (0.166)
MHI status (1= established MHI, 0 = no MHI)	0.759 (0.516) (p-value = 0.14)	0.320 (0.508)
Constant	-	0.444 (6.148)
_cut1	4.512 (6.358)	-
_cut2	6.259 (6.357)	-
Observations	244	244
Wald chi^2	90.43***	36.72***
Pseudo R^2	0.158	0.178
Log pseudo likelihood	-208.810	-110.976
RESET	Chi^2(1) = 0.01 Prob > chi^2 = 0.915	Chi^2(1) = 1.40 Prob > chi^2 = 0.236

Note: 1. *** Significant at the 1% level, ** significant at the 5% level, and * significant at the 10% level.
2. Figures in parentheses are robust standard errors.

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Appendix

Table-A1: Summary statistics of different poverty indicators

Different groups of GB members	Mean per capita income (in US $)	Mean per capita non-land assets (in US $)	Mean value of productive assets (in US $)
GB-1 (established MHI)	342.67 (174.63) [136]	223.49 (203.44) [136]	502.03 (486.50) [136]
GB-2 (new MHI)	260.60 (134.96) [85]	141.99 (106.24) [85]	340.25 (355.76) [85]
GB-3 (without MHI)	240.35 (121.44) [108]	158.15 (127.07) [108]	380.20 (408.55) [108]
GB (Total)	287.88 (155.59) [329]	180.99 (162.82) [329]	420.23 (435.01) [329]

Note: 1. Magnitudes in round parentheses are standard errors.
2. Magnitudes in the square parentheses are the number of observations.

Table-A2: Percentage distribution of households by food sufficiency level

Different groups of GB members	GB-1 (established MHI)	GB-2 (new MHI)	GB-3 (without MHI)
Deficit in whole year	2.21 (3)	7.06 (6)	5.56 (6)
Sometimes deficit	22.06 (30)	31.76 (27)	32.41 (35)
Neither deficit nor surplus	49.26 (67)	48.24 (41)	53.70 (58)
Surplus	26.47 (36)	12.94 (11)	8.33 (9)
Total	100.00 (136)	100.00 (85)	100.00 (108)

Note: Figures in parentheses are the number of observations.