

The Relationship between Access to Microfinance, Health-Seeking Behaviour and Health Service Uses: Evidence from Bangladesh

Abstract

This paper examines the extent to which participation in microfinance programs improves health service uses and health-seeking behaviour of participants. The study collects and analyses data from 439 households across 20 villages of four districts covered by three popular microfinance programs in Bangladesh. Our results suggest that participation in a microfinance program is positively associated with improvements in health services uses and health-seeking behaviour. Participation in microfinance programs is found to be associated with significant improvement in three health-related issues: antenatal care, diarrhoea remedial, and immunisation. A positive association between participation in microfinance and other health service uses is also found with weak statistical evidence.

Keywords: Microfinance, health-seeking behaviour, health service, Bangladesh.

1. Introduction

Bangladesh has played a pivotal role in the movement of microfinance and has shown the world that the poor are creditworthy enough to repay the debt and benefited from financial services (Faruquee & Badruddoza, 2011). Thus, microfinance institutions (MFIs) have become dominant financial service providers for the poor who cannot access to formal financial institutions in some parts of the world, including Bangladesh with about 1000 listed MFIs (InM, 2015). Apart from financial services, MFIs also provide other development activities, including primary health care to their members. Health services are a natural extension of MFIs' mission to provide financial security and social protection to their clients. Also, healthier

clients better serve the microfinance institutions' goals of growth and long-term viability (Leatherman and Dunford, 2010).

The evidence on the extent to which participation in microfinance programs affects health behaviour of their participants is scant. A few papers investigated the impacts of microfinance on child health and women health in Indonesia, Latin America, Africa (DeLoach and Lamanna, 2011; Collier, Tesfaye et al., 2014; Geissler and Leatherman, 2015). This study contributes to the literature by conducting a household survey to examine the effects of microfinance on health behaviour of participants in four popular MFIs in Bangladesh.

The remaining of the paper is structured as follows: Section 2 presents a brief review of literature; Section 3 describes the methods; Section 4 displays survey and data; Section 5 discusses results, and Section 6 concludes the paper.

2. Brief Review of Literature

Microfinance is expected to influence health-seeking behaviour and health outcomes directly by the ability to pay for health-related services, or indirectly by improving people's economic status and hence increase health inputs (e.g., nutritious food and leisure time). However, only a few previous studies examined the impacts of microfinance on health-seeking behaviour and access to health services (Ahmed, 2001; Ahmed et al., 2005). For example, Ahmed (2001) examined the effects of microfinance on morbidity prevalence, illness profiles and health-seeking behaviour of ethnic groups. Ahmed et al. (2005) found positive benefits of integration of health-related activities in development interventions such as microfinance and found the difference among the ethnic groups.

Despite the limited studies on microfinance and health-seeking behaviour, there is a considerable number of studies on the other aspects of health-related issues and microfinance participation. Hadi (2001), and Strobach and Zaumseil (2007) suggested that microfinance had

a positive impact on promoting health knowledge among the participants. Other studies revealed the high magnitude of the positive association between microfinance participation and health outcomes (Amin, Shah et al., 2010; Leatherman and Dunford, 2010). Leatherman and Dunford (2010) also found that MFIs were associated with an improvement in the treatment of diarrheal diseases in the Dominican Republic. Likewise, MckNelly and Dunford (1999) found that microfinance was related to better maternal health and nutrition practices in Bolivia. A qualitative study, conducted in Burkina Faso by Hennink and McFarland (2013), showed that microfinance enhanced the health behaviour and health expenditure choices of women. In Ghana, De La Cruz et al. (2009) found that microfinance institutions effectively contributed to the community and national malaria initiatives by increasing knowledge, leading to increased insecticide-treated bed net ownership and use by vulnerable members of the households (particularly pregnant women). Littlefield et al., (2003) also provided specific evidence for the impact of microfinance on health and concluded: “households of microfinance clients appear to have better nutrition, health practices and health outcomes than comparable non-client households” (p.4). Hamid, Roberts et al. (2011) investigated on Grameen Bank (GB), the largest MFI in Bangladesh, and found that adding micro health insurance to the microfinance schemes improved health outcomes of participants.

Moreover, some of the studies dealt with participation in microcredit and its impact on food security, dietary diversity and health shocks. For example, Bidisha et al.(2017) found that microcredit improved food security, dietary diversity, income as well as smoothed consumption, which thus contributed to eradicate hunger and poverty. A study found that households with access to microcredit appeared to be better able to cope with adverse effects of health shocks, and the significant effects were observed in both short run through direct consumption and long-run through reducing labour substitution (Thanh & Duong, 2017).

Overall, previous literature focused on health knowledge or awareness and health improvement and outcomes rather than examining health-seeking behaviour and access to health services.

3. Methods

Conceptually, the relationship between microfinance and health-related behaviour can be explained by employing a household economic portfolio model originally developed by Cohen et al. (1996). The model provides the interrelationship between resources, activities and outcomes of households, which allows us to examine the impact of social interventions such as microfinance as it will affect outcomes via an increase in household financial resources. Based on this framework, the effects of participation in microfinance on health-seeking behaviour and access to health services are created via changes in attitudes, and hence health-related activities of the households. Other factors that may determine the relationship between microfinance access and health-related outcomes of households include characteristics of households and villages. Thus, a general specification of this relationship is:

$$h_{ij} = \beta_0 + \beta_1 MF_{ij} + \beta_2 X_{ij} + \beta_3 V_j + \varepsilon_{ij}$$

where, h_{ij} represents changes in health seeking behaviour of the household i in village j after joining microfinance, in which one presents improvement and zero otherwise. The term MF_{ij} represents the participation of households in microfinance; X_{ij} is the household characteristics; V_j is the set of village characteristics; ε_{ij} is the random errors term; and β_1 , β_2 and β_3 are parameters to be estimated.

Since the outcome variable as coded as binary (1 if the household improves health and sanitation after participating in a microfinance program and 0 otherwise), we choose logistic regressions to estimate the above equation. The main advantage of this regression is

that the selected type of parameters (odd-ratio) is easy to interpret. We also apply robust estimation of standard errors to consider the presence of unknown heteroskedasticity.

4. Survey and Data

Bangladesh is the birthplace of the modern microfinance movement, and the country remains the world's capital of microfinance with more than 1000 registered MFIs. However, more than 70% of the Bangladesh microfinance market is covered by the "big four" major MFI: the Grameen Bank, the Bangladesh Rural Advancement Committee, Association for Social Advancement and Proshika. Apart from credits, these MFIs have pioneered in providing various other services such as micro-insurance, savings and other integrated development projects. They also lead the way in applying innovations such as mobile phone technology in microfinance services.

4.1 Sample selection

The four districts of Bangladesh were selected for the field survey using the main criterion that there must be a Micro Finance Institutions (MFI) with clear eligibility criteria in the district. Three NGOs were selected by applying a purposive sampling technique. The Development Initiative for Social Advancement (DISA) was chosen purposively because the organization received the first national promising MFIs award in the year 2009 from the Palli Karma- Sahayak Foundation (PKSF). The Grameen Bank (GB) and the Bangladesh Rural Advancement Committee (BRAC) were selected as they were the largest and most renowned MFIs in Bangladesh.

Member-households were sampled randomly from a list of microfinance members in each village. It was planned to select 25 households per village. However some households could not be found or had no adult at home and hence could not be

interviewed. This sample size provides a strong statistical power of 99.5% (i.e., Type-II error is 0.5%) using the *pwr* package in R (Champely et al., 2018) with the following assumptions:

- a) the Cohen's f^2 effect size (Selya et al., 2012), which is defined as the ratio of explained variance by the model over the unexplained variance, is 0.1;
- b) statistical significant level (Type-I error) is 1 %; and
- c) 10 independent variables (e.g., age, gender, education, occupation, income) will be used in regressions analysis.

Since the observed number of eligible households in each village was about 100, a sample rate of 25% was representative and feasible to conduct the interviews. Thus, the total number of households interviewed was 439, or about 22 households per village. It is noteworthy to mention that although most of the household heads were male, the respondents of the survey were primarily women who were engaged with microfinance. The necessary information regarding the amount of credit disbursement, the date of joining and the nature of membership of the participants were supplied by members of the selected microfinance institutions. In order to increase the efficiency of sampling, the choice-based sampling technique was applied (i.e., eligible households were over-sampled in both member and non-member villages). This sampling approach allowed us to obtain a representative sample with least cost associated with data collection (Lancaster & Imbens, 1991). In each village, 3 to 4 non-member households were selected and the remaining 18 to 19 households were members.

4.2 Variable selection

Dependent Variables

The dependent variables used in this study are health inputs, access to health service and health-seeking behaviour of the households. We measured ‘health seeking behaviour’ and ‘health input and service’ by antenatal care facilities, immunization, diarrhoea remedies for children, family planning services, maternal care services and malaria/TB treatment. We used sources of drinking water and toilet condition as a measure of health input, as evidence (Esmat Ara and Seddiky, 2015; Al Mamun and Adaikalam, 2011) suggested that these two factors are very important determinants of health status in low-income countries like Bangladesh. Changes in health-seeking behaviour and health inputs were measured by the extent of change occurred in nine selected dimensions of health behaviour, health services and health input of the households because of their involvement with the microfinance program of the selected MFIs.

The sources of drinking water status of the households comprised three items namely ‘deep tube well’, ‘shallow tube well’, and ‘river water’. These options were given in the order of water quality (e.g., the deep tube is better than the shallow tube, which in turn, is better than the river water). An improvement in sources of drinking water of a respondent had been determined by the change to a better water quality sources (e.g., from ‘the river’ to ‘the shallow tube’, or from ‘the shallow tube’ to ‘the deep tube’) after joining the microfinance program.

The toilet condition of the respondents comprised three items namely, ‘full sanitary’, ‘half sanitary’, and ‘open’. These options also listed in the order of sanitation. Thus, an improvement indicates the change towards a better sanitation choice of the toilet after joining the microfinance program (e.g., from the half to the full sanitation, or from the open to the half sanitation).

The health-seeking behaviour and health service, namely ‘antenatal care facilities provided’, ‘immunization provided’, ‘diarrhoeal remedies’, ‘family planning services’, ‘maternal care services’, ‘malaria/TB treatment’ and ‘medicines accessibility’ of the respondents comprised from two ‘yes’ and ‘no’ answers. An improvement in these variables reflects the change from ‘no’ to ‘yes’ in the response after joining the microfinance program (e.g., from having no family planning to practice family planning).

Independent Variables

In this study, our main independent variable of interest was the participation of households in microfinance programs offered by the Grameen Bank, BRAC and DISA which was measured by the duration of involvement with the microfinance program. This variable reflects the potential cumulative effects of participating in microfinance. We expected that households participate in microfinance program for the longer period will have more positive effects. Other independent variables included in the analysis were a log of household income per adult equivalent, the age of the household head, ethnic minority status, education of household head, education of spouse, occupation, types of employment of the household head and spouse, number of household member and dependency ratio. In addition to these variables, village level illiteracy rates, distance to the health centre, wheat prices and casual labour rate were used to control for village characteristics. Theoretically, these variables were expected to influence the household’s decision to health-seeking behaviour and health service use.

4.3 Descriptive statistics

Table 1 presents health input, service and health-seeking behaviour of the sample respondents and the percentage distribution of these dependent variables in the context of before and after joining the microfinance operations. Table 1 shows that 43% of the households

use shallow tube-well as a source of drinking water before joining the microfinance programs (MP). The number has reduced by 10%, and the proportion of households using deep tube-well has increased by 12% after joining microfinance programs. On the other hand, 30% of respondents have used full sanitary latrine before joining the microfinance while this figure increases by 99% after joining the microfinance program which could refer to outstanding development. Similarly, in the case of providing antenatal care facilities, 25% of respondents are provided with this services before joining microfinance programs while the number increases by 145% after joining the MP which shows tremendous improvement. The scenario of immunisation has turned out to be better after joining microfinance. Table 1 shows a 28% improvement in immunisation after the joining microfinance. A high increase (67%) on any diarrhoea remedies for children has been revealed after joining the microfinance program. Table 1 also shows that after joining the microfinance program, almost 60% of participants receive maternal care services which are 106% higher than before joining the microfinance operations.

Similarly, the number of participants who received family planning services has also increased by 87% after joining the microfinance program. The contribution of microfinance towards malaria/TB treatment has found to be 108% more than before joining the microfinance program. A very significant portion of improvement has been made in case of medicines accessibility/ affordability to cure diseases (77.7%) after joining the microfinance program which is 150% more than before joining the program. This can be thought as a positive transition of their lives.

Table 1. Descriptive Statistics of Dependent Variables

Variable	Range	Before Joining MP		After Joining MP		Wilcoxon test (p-value)
		N	%	N	%	
<i>Health Input</i>						
Sources of drinking water	Deep Tube=1	194	53.3	218	59.9	0.000
	Shallow=2	156	42.9	140	38.5	
	River=3	14	3.8	6	1.6	
Toilet condition	Full sanitary=1	110	30.2	219	60.2	0.000
	Half sanitary=2	185	50.8	135	37.1	
	Open=3	69	19.0	10	2.7	
<i>Health Seeking Behaviour and Health Service</i>						
Any antenatal care facilities provided*	Yes=1	92	25.3	225	61.8	0.000
	No=0	272	74.7	139	38.2	
Any immunization provided	Yes=1	249	68.4	318	87.4	0.000
	No=0	115	31.6	46	12.6	
Any kind of diarrhoea remedies for children	Yes=1	178	48.9	297	81.6	0.000
	No=0	186	51.1	67	18.4	
Any kind of family planning services provided	Yes=1	151	41.5	283	77.7	0.000
	No=0	213	58.5	81	22.3	
Any kind of maternal care services received	Yes=1	104	28.6	214	58.8	0.000
	No=0	260	71.4	150	41.2	
Malaria/TB treatment	Yes=1	91	25.0	189	51.9	0.000
	No=0	273	75.0	175	48.1	
Medicines accessible/affordable for cure diseases	Yes=1	113	31.0	283	77.7	0.000
	No=0	251	69.0	81	22.3	

Notes: Source: Authors' calculations based on the Field Survey, 2014. N= 439. Wilcoxon tests reveal that median responses of all health and sanitation conditions before and after participating in microfinance program were significant at 1% level. * For household without any women in reproductive age, this question refers to their awareness of antenatal care activities.

Respondents' health input, health services and health seeking behaviour are assessed by sources of drinking water, toilet condition, antenatal care, immunisation situation, diarrhoea remedies, family planning facilities, maternal care services, malaria treatment and medicines affordability. Since all variables of interest are categorical, we use the Wilcoxon test to examine the differences in their median before and after joining the microfinance program. The test shows that microfinance participation is associated with significant changes in all variables of interests. In particular, Table 1 shows that after joining the microfinance program there are significant changes in the situation of sources of drinking water although the

magnitude of changes is small. However, participation in microfinance program is associated with substantial improvement in toilet condition (the rate of the fully sanitary toilet is about double).

About the antenatal care facilities provided, 225 out of 364 respondents report that the antenatal care facilities are better than before joining the program. The rate of immunization has been improved substantially, which is almost 28% more compared to the previous situation, due to participation in microfinance program. There is also a significant association between participation in microfinance program and diarrhoeal remedies for children with the rate of treatment doubled.

Among other health-seeking behaviour and health service related variables, there is also a significant association between participation in microfinance and family planning services, maternal care services, malaria/TB treatment and medicines accessibility. The findings from this study indicate that there is a substantial improvement on the issues mentioned above after joining the microfinance program.

The descriptive statistics of the independent variables, presented in Table 2, show that the average age of the household head is 40 years, and 26 per cent of the household heads have secondary or higher level of education. The average household size is about 5, and the average number of working age household member is about 3. Among the households surveyed, 12% of the households are from an ethnic minority group. Further to note that 43% of the households belong to unskilled occupation (farmers or low skills) whereas 77% of the households possess full-time employment. It is also revealed from the analysis that the total number of microfinance member is having with an average 31 months in microfinance programs. The mean values of selected welfare indicators such as income per adult equivalent are BDT 97,978 per year (equivalent to US\$ 1260).

Table 2. Descriptive Statistics of Independent Variables

Variables	Unit/ Description	Mean	SD
Household characteristics			
Age of household head	Years	40.21	7.87
Ethnic minority	Yes=1	0.12	0.33
Education level	Secondary or above=1	0.26	0.44
Occupation	Farmers or low skills =1	0.43	0.50
Type of employment	Full Time = 1	0.77	0.42
Household size	Persons	4.79	1.29
People in labour age	Persons	2.84	1.17
Duration in microfinance	Months	31.66	28.28
Income per adult equivalent	BDT/year	97,978	55,285
Village Characteristics			
Illiteracy rate	Percentage	19.11	11.99
Distance to the health centre	Kilometre	12.03	26.05
Wheat price	*BDT/kg	23.40	5.05
Casual labour	BDT/day	300	75

Notes: Source: Authors' calculations based on the Field Survey, 2014; N=439; *BDT = Bangladesh Taka

Table 2 also shows that on an average the illiteracy rate in the village is 19%. The average distance between the health centre and the village is 12 kilometres. Further to reveal that the average wheat price is 23 BDT/kg, whereas the casual labour price is 300 BDT/day in the surveyed villages.

5 Results and Discussions

The detailed results of the logistic regressions are presented in Table 3. Overall, access to the microfinance is positively and significantly associated with an improvement in antenatal care, immunisation, and treatment of diarrhoea. Also, the effects seem to strengthen with the

duration of participation in a microfinance program. However, the effect of microfinance on the other indicators is not clear, and inconsistent.

Immunization Provided

Our results show that participation in a microfinance program significantly increases the odds of full immunization. In particular, the duration effect of microfinance on immunization is significant at 1% level, which suggests that the odds of improving immunization are 4:1 for members who joined microfinance program (MP) for 2 years, 3:1 for members who joined the MP for 3 years, and 4:1 for members who joined the MP for 4 years and beyond compared to the reference group (member for 1 year or less). The study also reveals that heads of households who have a secondary school education are more likely to have improved immunisation levels for their children, whereas spouse's secondary education level are negatively associated with the improvements in immunisation. Particularly, household head and spouse with secondary schooling have the odds of improving immunization by 2:1 and 0.5:1, respectively. Moreover, among the village characteristic variables, the village illiteracy rate, the distance to the health centre and wheat prices are significantly and negatively associated (as the odds ratios are less than 1) with improved immunization status. In particular, one percentage point increases in the village illiteracy is associated with the odds of improving immunization by 0.94:1, whereas the marginal effects of distance to the health centre and the wheat price are associated with the odds of 0.96:1 and 0.86:1, respectively.

Table 3: Effects of microfinance on health input, health-seeking behaviour and health services

Independent variables	Immunization		Diarrhoea		Antenatal care		Maternal care		Family planning		Drinking water		Toilet use		Malaria/TB		Medicines	
	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Join MP for 2 years	4.04***	1.94	3.66***	1.42	2.72***	1.04	2.01*	0.76	2.03**	0.72	1.94	0.95	1.42	0.80	0.95	0.37	0.63	0.21
Join MP for 3 years	3.82***	1.86	2.14*	0.83	3.16***	1.18	2.00*	0.75	1.30	0.46	2.90**	1.55	2.07	1.30	1.90*	0.71	0.66	0.22
Join MP for 4 years or more	4.26***	2.25	2.11*	0.93	3.51***	1.48	1.15	0.51	1.38	0.56	0.78	0.39	1.51	1.01	2.37**	1.00	0.50*	0.19
Household characteristics																		
Age of household head (years)	1.00	0.02	1.03*	0.02	1.00	0.02	1.00	0.02	1.05***	0.02	1.02	0.03	0.96	0.03	1.00	0.02	1.01	0.02
Minority ethnics (minority=1)	0.62	0.28	0.25***	0.12	1.36	0.49	0.74	0.30	0.36**	0.15	1.92	1.11	2.79	2.20	0.36**	0.17	0.38***	0.14
HH head Secondary school	2.13**	0.75	1.64	0.54	1.82*	0.58	3.08***	1.06	1.80*	0.57	1.20	0.59	3.46	2.83	1.42	0.47	1.95**	0.61
HH head High School	1.74	1.45	0.84	0.71	0.22	0.25	4.11*	3.22	1.19	0.90	1.64	1.89	1.23	1.58	0.82	0.66	1.39	1.04
HH head College/University	1.60	2.02	1.35	1.58	0.61	0.78	1.24	1.61	0.88	1.03					0.80	1.00	0.58	0.71
Education of spouse Secondary	0.51*	0.19	0.61	0.20	0.46**	0.15	0.29***	0.11	0.68	0.21	1.33	0.62	1.76	1.17	0.81	0.26	0.49**	0.15
Education of spouse High school	0.71	0.50	1.30	0.87	0.45	0.33	0.40	0.27	1.73	1.10	1.80	2.09	0.66	0.85	1.03	0.67	0.53	0.34
Occupation (farmers/labourers=1)	0.74	0.20	0.59**	0.15	0.97	0.23	1.29	0.32	0.88	0.21	0.76	0.27	0.80	0.34	0.63*	0.16	1.11	0.25
Type of employment(full-time=1 [±])	1.40	0.48	2.80***	0.91	0.80	0.23	0.61*	0.18	1.26	0.37	1.40	0.55	1.69	0.81	0.96	0.29	1.14	0.31
Number of people in the family	0.83	0.10	0.84*	0.09	0.95	0.10	0.82*	0.09	0.83*	0.08	0.98	0.14	1.03	0.17	0.80**	0.09	0.92	0.09
Dependency ratio	0.49	0.41	1.46	1.12	0.98	0.72	1.43	1.12	4.08*	3.12	2.80	2.90	6.38	7.87	0.94	0.74	2.46	1.76
Log of income per person	0.88	0.23	1.13	0.27	2.23***	0.20	1.91**	0.49	1.44	0.34	0.74	0.24	0.65	0.27	1.00	0.24	1.14	0.25
Village characteristics																		
Illiteracy rate (%)	0.94***	0.02	0.94*	0.03	0.99	0.02	0.96*	0.02	0.99	0.02	0.97*	0.02	1.01	0.04	0.99	0.02	0.98	0.02
Distance to health centre (km)	0.96**	0.02	0.99	0.02	0.89	0.06	0.77	0.24	0.77	0.26	0.92***	0.02	0.91***	0.02	1.01	0.01	2.55**	0.96
Wheat prices (Taka/kg)	0.86**	0.05	1.06	0.09	0.95	0.06	0.90	0.07	0.90	0.07	0.81***	0.05	0.81**	0.07	1.06	0.06	0.60***	0.07
Casual labour (Taka/days)	1.01	0.01	0.99	0.01	0.99	0.01	0.99	0.01	0.99	0.01	1.01	0.01	0.99	0.01	0.98**	0.01	1.03***	0.01
MFI=DISA [#]	0.97	0.31	0.93	0.28	1.24	0.37	1.04	0.32	1.39	0.42	0.63	0.29	0.55	0.31	1.35	0.42	0.72	0.21
MFI=BRAC [#]	0.83	0.34	0.96	0.36	1.57	0.58	1.26	0.48	1.65	0.60	0.82	0.47	1.34	1.05	1.41	0.55	0.93	0.33
chi2	27.38		56.95		43.72		43.07		37.87		16.17		20.77		20.84		22.29	
p	0.05		0.00		0.00		0.00		0.00		0.44		0.19		0.23		0.17	
Pseudo R2	0.069		0.119		0.090		0.093		0.078		0.060		0.101		0.048		0.044	

Notes: .01 - ***; .05 - **; .1 - *; N= 439; [#] Grameen Bank is used as a reference category.

[±] Full-time workers are mostly those who are involved with the farming.

Diarrhoeal remedies

The results from Table 3 show that participation in the microfinance program significantly improves the odds of remedial therapies to combat diarrhoea. The duration effect of microfinance participation on diarrhoeal remedy is significant at 1% and 10% level, respectively. It advises that the odds of improving diarrhoeal remedy are 3:1 for members who joined the MP for two years, 2:1 for members who joined the MP for three years and beyond compared to the reference group (member for one year or less). Among other variables, the age of the household head and their type of employment are also found to be positively associated with improved diarrhoeal remedies; whereas their status as belonging to a minority ethnicity, the occupation of the respondent, and the number of people in the family are significantly and negatively associated with efforts to mitigate diarrhoea. In particular, those who belong to a minority ethnic group have the odds of improving diarrhoeal remedy by 0.25:1 when compared with those in majority groups. Also, households with full-time employment have the odds of improving the diarrhoeal remedy by 2.8:1 compared to the households with part-time employment. Further, the occupation of the household head and the number of people in the family have the odds of improving the diarrhoeal remedy by 0.59:1 and 0.84:1, respectively. Moreover, among the village characteristics variables, village illiteracy rate is negatively associated with the diarrhoeal remedy, which suggests that one percentage point increase in the village illiteracy is associated with the odds of improving diarrhoeal remedy by 0.94:1, however, it is found to be significant at 5% level.

Antenatal Care

Our results show that participation in a microfinance program has a significant positive effect on the antenatal care services provided. In particular, the duration effect of microfinance on the antenatal care is significant at 1% level, which suggests that the odds of

improving antenatal care are 2:1 for members who join the MP for two years, 3:1 for members who join the MP for three years and beyond compared to the reference group (being microfinance member for 1 year or less).

Other significant determinants of antenatal care include education of household head and spouse, having a secondary school and income per person. The results show that the antenatal care improves significantly and positively if the head of the household has an education at secondary school level, whereas the level of spousal education (secondary school) is negatively associated with the improved antenatal care. In particular, the head of the household and the spouse of the household head who completed secondary schooling have the odds of improving antenatal care by 1.82:1 and 0.46:1, respectively. Moreover, income per person is found to be positively associated with receiving the improved antenatal care services. The results show that income per person has the odd of improving antenatal care by 2:1, which is significant at 1% level.

Maternal care

Table 3 shows that being a member of MP for more than two years but less than four years is positively related with improved maternal care. However, being a member of MFI for four years or more is not found to be statistically significant because, in all likelihood, the mother is no longer in childbearing age. Maternal care is likely to be improved for members who live in a household with heads who have completed secondary school and high school. On the other hand, the association is negative for the households where the spouse has completed secondary school. In particular, household heads with secondary and high schooling have the odds of improving maternal care by 3:1 and 4:1, respectively, whereas the spouses with secondary schooling have the odds of improving maternal care only by 0.29:1. Also, among the other household characteristics, income per person is significantly and positively associated with receiving improved maternal care services, where income has the odds of improving

maternal care by 2:1. However, the type of employment and the number of people in the family are significantly and negatively associated with the improved maternal care, which indicates that the type of employment and the number of people in the family have the odds of improving the maternal care of 0.61:1 and 0.82:1, respectively. Moreover, among the village characteristics variables, village illiteracy rate is significantly and negatively associated with maternal care, which suggests that the village illiteracy has only the odds of improving maternal care by 0.96:1.

Family Planning services

Table 3 shows that the length of the duration of participation with the MFI does not have any impact on improvement in family planning services. However, if the duration of membership of MP is higher than one year but less than three years, then it is more likely to improve the odds of accessing family planning services by 2:1 (5% significant). The probable explanation of this result is that senior members of microfinance schemes may be beyond the reproductive age (the average age is 40 years which is in the borderline of maximum reproductive ability), and hence less likely to require family planning. Although the odd-ratios for other years are also favourable (i.e. odds >1), but it is not statistically significant. Among the other variables, the age of the household head, secondary schooling having been completed by the head of the household, and the dependency ratio are also found to be positively associated with the better family planning services, whereas minority ethnicity and number of people in the family are significantly and negatively associated with improved family planning services. In particular, those who belong to ethnic minority have the odds of improved family planning services by 0.36:1 compared to Muslim. Also, the households with the highest number of people in the family have the odds of improving family planning services by 0.83:1, whereas the dependency ratio has the odds of 4:1. Also, household heads with secondary schooling experience a significant improvement in family planning services with the odds of 1.8:1.

Sources of drinking water

Our results show that participation in the microfinance program significantly increases the probability of improved sources of drinking water. In particular, the duration effect of microfinance on sources of drinking water is significant at 5% level, which indicates that the odds of improving the condition of sources of drinking water are 2:1 for members who joined MP for 3 years compared to the reference group (microfinance member for 1 year or less). Moreover, among the village characteristics variables, village illiteracy rate, distance to the health centre and wheat prices of the village are significantly and negatively associated with the condition of drinking water. In particular, the illiteracy rate has the odds of improved drinking water condition of about 0.97:1, but it is only significant at 10% level. Moreover, the distance to the health centre and wheat price have the odds of improving the drinking water condition about 0.92:1 and 0.81:1, respectively.

Toilet condition

Table 3 shows that the duration of microfinance membership has no significant effects on the improvement of toilet condition, although the association is positive. The probable reason for this result is that the members have been enjoying the improved toilet facilities before joining the microfinance due to government and nongovernment initiatives that have already been implemented in those villages. Moreover, among the village characteristics, the distance to health centres and the price of wheat in the village are significantly and negatively associated with toilet conditions. In particular, the distance to the health centre has the odds of improving the toilet condition by 0.91:1, whereas the wheat price has the odds of about 0.81:1.

Malaria/TB treatment

The microfinance programs are significantly associated with the increased probability of improving malaria/TB treatment. In particular, the duration effect of MP on malaria/TB treatment is significant at the 5% level, which indicates that the odds of improving the condition of malaria/TB treatment are 2:1 for members who joined MP for 3 years and beyond compared to the reference group (being microfinance member for 1 year or less). The improvement in access to malaria/TB treatment is less likely to occur if the household has more members and is from ethnic minority status. Those households who belong to the ethnic minority have the odds of improving malaria/TB treatment of 0.36:1 compared to the majority groups. Other significant determinants of malaria/TB treatment comprise occupation of the household head and the number of people in the family, which are negatively associated with the improvement of malaria/TB treatment. In particular, the heads of households' occupations as farmers/labourers have the odds to improve malaria/TB treatment of about 0.63:1 compared to other groups, whereas the number of people in the family have the odds to improve malaria/TB treatment of about 0.80:1. Also, among the village characteristic variables, the casual labour prices are significantly and negatively associated with malaria/TB treatment. Particularly, casual labour prices have the odds of improving malaria/TB treatment at about 0.98:1.

Medicines accessibility

Our results show that participation in MP has a significant negative effect on the accessibility of medicines. In particular, the odds of improving the accessibility of medicines - after joining the microfinance program for four years and beyond is 0.50:1 compared to the reference group of those who joined for one year. Also, households from ethnic minority and levels of spousal education of the heads of the household having secondary schooling are less

likely to have created better access to medicines, whereas household heads with secondary schooling are more likely to have improved access to medicines. The households from the ethnic minority and the variable employment have the odds of improving the accessibility to medicines by 0.38:1 when compared to Muslim majority groups. Household heads with secondary school education have the odds of improving access to medicines by about 2:1, whereas spouse's education has the odds of improving the accessibility to medicines by about 0.49:1. Moreover, among the village characteristics variables, distance to health centres and casual labour prices are found to be positively associated with the accessibility to medicines, while wheat prices are found to have a negative association. In particular, households with casual labour have the odds of improving access to medicines by about 1.03:1, whereas the distance to health centres have the odds of improving access to medicines by about 2.55:1.

Conclusion

This study has examined the impacts of microfinance activities on health-seeking behaviour and health service uses of the rural households in Bangladesh. We find that the health-seeking behaviour and health services of the households have improved significantly after joining the microfinance program. We recommend that the policymakers related to the health issues in developing countries should enhance their cooperation to achieve the millennium development goals and to strengthen the health system through inter-sectoral programming that utilizes a microfinance platform to reach the poor and underserved populations. Our results on the beneficial health practices among the participants of MP can be used as a starting point for further studies to investigate the links between microfinance and health-seeking behaviour and health services of the rural households. However, we are not able to disentangle, in this study, how much of this improvement in health care and health-seeking behaviour is the result of the activities of MP, or it is a general process of development

undertaken by the government and policymakers. Furthermore, it is essential for future research to explore whether there is a substantial difference in the health seeking behaviour between the treatment (member) and control (non-member) groups of the MFIs.

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