



Effect of microcredit on health and nutritional status of rural people in Bangladesh

Obaidur Rashid, Rokeya Begum, Nannur Rahman, Shahnaj Parvin and U.K. Prodhan

Department of Food Technology and Nutritional Science, Mawlana Bhashani Science and Technology University, Santosh, Tangail-1902, E-mail: rokeya15@yahoo.com

Abstract: Microcredit service is becoming important aid to increase the earnings of rural people in many of the developing countries. This small loan for poor people has already been proved as an actor of poverty reduction. Many studies have analyzed the impact of microcredit on poverty alleviation but very few studies have conducted to see the impact of microcredit on health and nutritional status. Even some studies give dispute information regarding change of nutrition and health status through microcredit loan. Therefore, this study was conducted to examine the effectiveness of microcredit on improving health and nutritional status. A cross sectional study was conducted among rural people in the selected area. To compare the exact effect of microcredit support, a program group engaged with microcredit and a control group from the same area was selected and interviewed. The maximum number of respondents was representative of 13-59 years of age group. Overall health practices among program households were satisfactory. Visiting health care center and utilization of local health care services were significantly higher among program group at 5% significant level. Sanitary and hygienic practices were also significantly higher among program group though the percentage (58%) was not praiseworthy. The overall prevalence of under-weight was 71.65% among the program children of which 26% was severe underweight. Besides, 92.5% children were found to be underweight among control group of which 30% was severe underweight. The stunted children were almost same in both group but the prevalence (57%) was very alarming. The chronic malnutrition was also prevalent in both the group. About 16% children was found to be wasted among program group whereas 40% in the control group indicates nutritional status of the program group was better than control group at 5% significant level. A strong correlation ($P < 0.05$) was existed between microcredit and nutritional status, and sanitary practices.

Key words: Microcredit, Stunting, underweight; wasting.

Introduction

Improving the nutrition and health of the poor is a supreme public health concern worldwide, importantly spot-on in the developing countries where the impact of disease is very high (Hirvonen *et al.*, 2017). Children and women are more vulnerable to poor health and malnutrition when they experienced in depth poverty (Jacobson, 2018; Merchant and Kurz, 2018). The health and nutritional well-being of large part of the population is still being neglected because of insufficient access to sufficient, safe and nutritious food (Pryer, 2017). As a result, children and women in Bangladesh continue to suffer from high levels of malnutrition and micronutrient deficiencies, including low birth weight (LBW), under nutrition (underweight, stunting and wasting), vitamin A deficiency, iodine deficiency disorders and iron deficiency anemia (Pryer, 2017). Moreover, over nutrition, obesity and related health problems are emerging as multiple public health problems. Malnutrition not only affects individuals but its effects passes from one generation to the next as malnourished mothers give birth to infants who struggle to develop and thrive. If these children are girls, they often grow up to become malnourished mothers themselves (Hoffman *et al.*, 2017). Globally, a significant number of child and women deaths are caused due to malnutrition (Unicef, 2018; Willcox *et al.*, 2018; Mohan and Mohan, 2017).

The underlying causes of malnutrition include the inability of households to purchase sufficient food to meet their needs; poor maternal and child care practices, and inadequate provision of food for adolescent girls, pregnant and lactating women (van der Pols *et al.*, 2017). Late recognition of the signs of malnutrition or disease, inadequate access to quality health services including family planning, immunization and medical services, and poor access to sanitary facilities and potable water also made the situation very complicated (Unicef, 2018).

In Bangladesh around 25% people are living with poverty of which 13% are extremely poor (BBS, 2017). Many of them are involved with microcredit activities especially

income generating activities to alleviate poverty and living quality. Many NGOs are giving microcredit support to alleviate poverty and improving health, and nutrition status. BRAC, ASA and Grameen Bank are the biggest NGOs in Bangladesh have been covering most of the people's microcredit support in Bangladesh since 1990 along with education, nutrition, health and sanitation support.

Microcredit refers to making small loans or financial services available to the poor to meet their particular needs and circumstances (Morduch, 2002). Apart from loans, it includes savings, micro insurance and other financial innovations to easy activation of agriculture, artisanal crop production and small farming of fish, livestock and poultry. Accesses to financial services enable poor people to increase their income and smooth consumption flows, which increase their ability to respond crisis (Mayoux, 2001). Microcredit is increasingly being considered as an important tool for poverty reduction, especially when it is implemented with education, health care and other social services (Hamad and Fernald, 2012).

Though microcredit supports are supposed to improve the health and nutrition status of the poor households by increasing their earnings, many of credited family have experienced no significant changes in their living quality (Hamad and Fernald, 2012). Even some families reported to be worse after taking the microcredit loan from the microfinance organization (Rahman, 1999). However some households have significantly alleviated their poverty after using credit loan effectively but their health and nutritional status has not that much improved (Morduch, 2002). Some other studies also controversies that the clients become trapped in a cycle of debt as they needed new loan for paying old one when they were unable to use loan in a productive business (Brau and Woller, 2004; Snow and buss, 2001). Thus, this study was conducted to examine the effects of microcredit on the health and nutritional status of the rural people who are engaged in small loan.

Materials and Methods

Study area: A seven village namely Charikhola, Bengmari, Khetuyapara, Battala, Shipaypara, Mollapara and Mokterpara under two unions of Nilphamari district in Bangladesh were selected for the study. This area was selected because several NGO's are giving different support to them for improving quality of living, health and nutritional status.

Study design: A cross sectional survey was conducted among the rural people of the selected area where some renowned NGO's like BRAC, Grameen bank etc. are providing microcredit support. The main survey components were socio economic condition, health awareness, hygiene & Sanitation and nutritional status.

Study population: About 2500 households were taken microcredit support from Grameen bank and BRAC in the selected area. Thus, the sample size for the study was selected from the known population using following equation-

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right)}$$

(Where, N = population size, e = Margin of error (percentage in decimal form), P = population proportion and z = z-score at 95% confidence interval).

After calculation, 575 Households were determined to study. Out of them 475 households were selected randomly from microcredit beneficiaries (program) and about 100 households were selected randomly from household in the same area as control group who did not take credit support. As children represent the nutritional status of the family as well as the community, anthropometric measurements were taken for all under 5 children from the respective program and control households. There were a total of 234 under 5 children living in the selected households, 194 children in program group and 40 children in control group.

Study Instrument: A well-defined and structured questionnaire was used to collect data by interviewing mother of the selected family. Anthropometric measurements were taken with standard procedure using standard instrument such as lever balance (Detecto scales) and stadiometer. Body weight was recorded to the nearest

0.1kg on bare foot with minimum clothing. Height was measured with a standard scale to the nearest 0.1 cm in standing position, with bared heels close together, legs straight, arms at the sides, shoulders relaxed and looking straight ahead.

Data analysis: The collected data were edited and coded properly. The data were then analyzed using various techniques of MS Excel, SPSS and ANTHRO software.

Results

Household member distribution by age group: Figure 1 shows the age structure of the population in the study area. The average age was calculated to be 21.47 years in the program group and 20.10 in the control group. The majority of the population was young belonging to productive age group of 19-59 years. The below five years children were almost same (15%) in both program and control group.

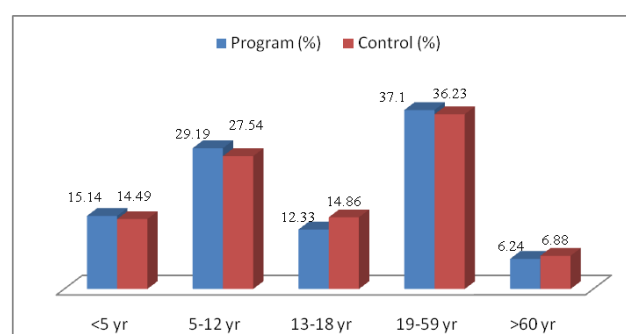


Figure 1. Distribution of household member according to age group

Health Practices of the population under study:

Appropriate health care facilities for mothers and children are not available to most of the people, although health care facilities are very much important to improve the health and nutritional situation of the community. About 90% of the program household had visited the nearby health care center whereas 66% of the control household visited the health care center (Table 1). The visiting rate of control (34%) household was higher than program households (10.30%) in government hospital. The difference of visiting health care center was strong at 95% confidence level ($P < 0.05$).

Table 1. Percentage (%) of household visiting health care center at least once

Health Centre	Program		Control	
	Number	Percent	Number	Percent
Community clinic	426	89.70 ^a	66	66.00 ^b
Hospital	49	10.30 ^a	34	34.00 ^b
Total	475	100.0	100	100.0

Table 2. Household distribution by place of delivery of pregnant mother

Place	Program		Control	
	Number	Percent	Number	Percent
House	272	57.30 ^a	66	66.00 ^b
Hospital	203	42.70 ^a	34	34.00 ^b

The Table 2 presents that only 42.70 percent and 34.00percent pregnant mothers in the program and control households respectively delivered their child in hospital. Majority of pregnant mothers in both groups delivered at home. Home delivery was slightly lower in program group than control group. The difference in both cases were statistically significant ($P<0.05$).

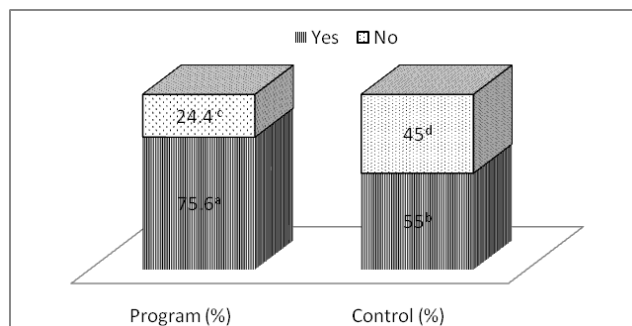


Figure 2. (%) of Household received local health care service at least once

Figure 2 showed that 75.6% of the program people has received local health care services at least once whereas only 55% of the control group received the services which

is significantly lower than program group. On the other hand, about 24% people of the program group did not receive services, but they know about local health care services.

Childhood, pregnant and others vaccination has noticeably increased in Bangladesh. Table 3 also supports the statement. Among surveyed households around 95% of program group and 89% of control group immunized their children (>5 years) by taking vaccination. About 96.5% of pregnant women from program group were taken vaccine whereas 86.4% of control group were taken vaccine. Though the percentage among control group was appreciable, it was significantly lower than program group at 5% significant level. About 82.5% of the adolescent from program group were also immunized whereas only 65.5% of the control group adolescent were immunized which is significantly lower than program group.

The program people were more aware about the use of iodized salt than control people showed in the Table 4. About 72% of the program household used iodized salt in cooking and eating whereas only 53% of the control household used iodized salt.

Table 3. Household distribution by taking vaccination of under 5 children

Vaccination	<5 years children		Adolescent		Pregnant mother	
	Program	Control	Program	Control	Program	Control
Yes (%)	94.5 ^a	89.0 ^b	82.0 ^a	65.5 ^b	96.5 ^a	86.4 ^b
No (%)	5.5	11.0	18.0	34.5	3.5	13.6

Table 4. Household distribution by using iodized salt

Iodized salt	Program		Control	
	Number	Percent	Number	Percent
Yes	340	71.60 ^a	53	53.0 ^b
No	135	28.40 ^c	47	47.0 ^d

Table 5. Types of materials used to wash hand after defecation

Material used	Program		Control	
	Number	Percent	Number	Percent
Ash	283	59.60 ^a	29	29.00 ^b
Soap	171	36.00 ^c	32	32.00 ^c
Soil	18	3.80 ^d	35	35.00 ^c
Sand	3	0.60 ^e	4	4.00 ^e
Total	475	100.0	100	100.0

Sanitary and hygienic practices of the population under study

The Figure 3 shows that use of sanitary and hygienic latrine was significantly higher in the program group than control group. Though many households are still using unsanitary latrine and open field for defecation, about 58% household are using sanitary latrine in the program group. The types of materials used to wash hands by the population of the selected area after defecation is summarized in the Table 5. The materials used to wash hand are soap, ash, sand and soil. The percentage of used soap to wash hand in program group and control are almost same. About 60% households of program group

used ash to wash their hands after defecation which is significantly higher than control group (29%).

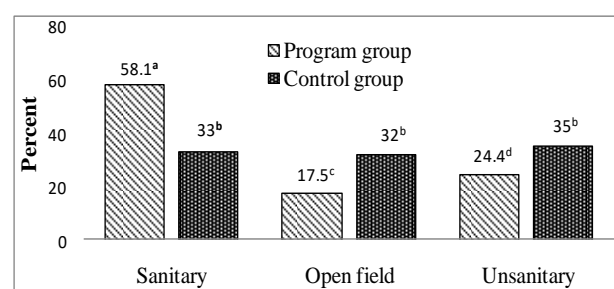


Figure 3. Types of toilet used by the studied population

About 38% program households examined their tube well water for the presence of arsenic against 35% in control group, shown in the Figure 4. It indicates that program people were more cautious about arsenicosis than control people. Though many people of program group and control group are concerned about the presence of arsenic in their tube well water, but they did not check.

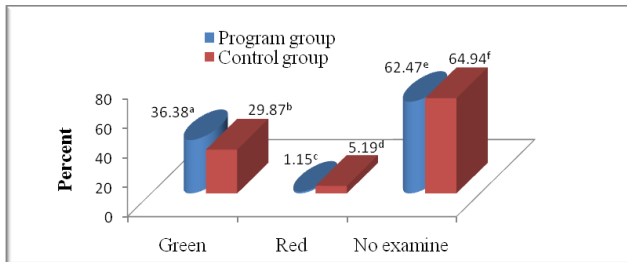


Figure 4. Presence of arsenic in the tube well water of studied people.

Nutritional status of studied people: Anthropometric indices such as weight, height and age of under-five year's

Table 6. Reliability comparison of anthropometric data with survey 2005

Parameter	Credit		Non-credit		Survey'2005	
	Mean	SD	Mean	SD	Mean	SD
Height(cm)	80.56	11.78	80.63	13.11	83.0	12.7
Weight(kg)	10.79	2.82	9.95	2.71	10.4	3.0
Muac(cm)	12.9	8.75	13.1	8.96	12.9	0.5
HAZ	-2.95	2.18	-2.97	2.17	-1.79	1.56
WAZ	-1.8	1.64	-2.32	1.28	-1.70	1.15
WHZ	0.08	1.31	-0.79	1.85	-0.96	1.26

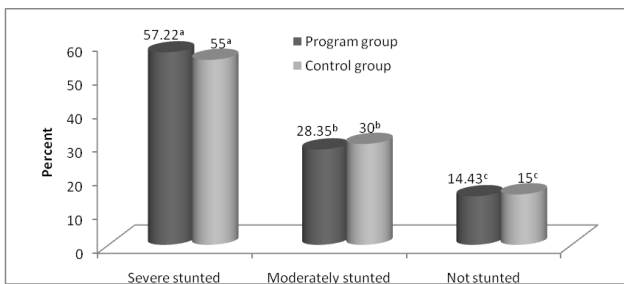


Figure 5. Nutritional status of Children according to height for age Z- score

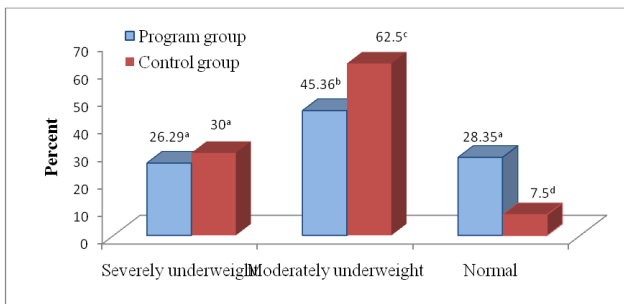


Figure 6. Nutritional status of children by Weight for Age Z score (WAZ)

According to weight for age Z- score the nutritional status of children is slightly better among program group. The normal weight children were found to be 28% in the program group whereas it is found to be only 7.5% in the control group (Fig. 6). A considerable number of severe

children were used to determine nutritional status. Table 6 summarized the data which has used to test the reliability of anthropometric data by comparing the data of Survey 2005. The mean value and standard deviation (SD) for all anthropometric indices of this study and 'survey 2005' were almost same. The mean height and weight of the children of program and control group were also same which were respectively -2.95 percent and -1.8 of NCHS mean height for age and weight for age. The mean weight for height was 0.08 and -0.079 of NCHS reference weight for height among the children of program and control group respectively.

There is no significant difference in nutritional status among program group and control group children according to height for age Z score (Fig. 5). In both group the percentage of severe stunted children was very high (57% in program and 55% in control) which is very alarming. The percentage of normal (not stunted) children was around 15% in both program and control group.

and moderate underweight children was found in the control group. The overall prevalence of under-weight was 71.65% among the program children as against 92.5% among their control counterparts. The severe underweight children in the program group (26%) were also lower than control group (30%).

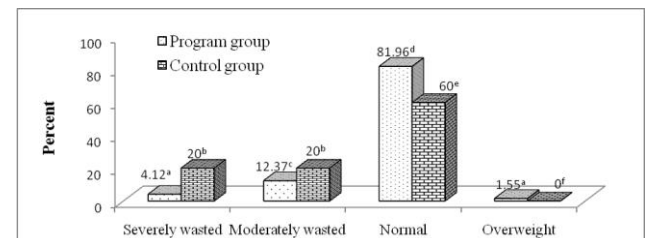


Figure 7. Nutritional status of children according to weight for height Z score (WHZ)

The prevalence of wasting children among the program group (16.49%) was lower than among control children (40%). Wasting indicates chronic malnutrition which was higher in control group. The normal children were found to 82% among program group whereas only 60% in the control group which indicates very worst situation (Fig. 7). Although there are no internationally accepted cut-off points for classification of malnutrition by MUAC, 13.5 cm is most commonly used cut-off point to define malnutrition. MUAC below 12.5 cm has been used to define extra, severe malnutrition. Table 7 shows the distribution of children age 12-59 months by different ranges of MUAC. A 34.02% of children in control group

and 47.50% in program group were normal with MUAC more than 13.5cm. With MUAC less than 12.5 cm might be regarded as extremely severely malnourished. 48.46%

control and 35.00% program children were severely malnourished with MUAC below 12.5 cm (Table 7).

Table 7. Nutritional status of the children according to MUAC

MUAC (cm)	Program group			Control group		
	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)
<12.5	7.50	27.50	35.0 ^b	18.56	29.90	48.46 ^a
12.5-13.5	7.50	10.00	17.5 ^c	5.67	11.86	17.53 ^c
>13.5	20.0	27.50	47.5 ^a	21.65	12.37	34.02 ^b
Total (%)	35.00	65.00	100.0	45.88	54.13	100.0

Table 8. Pearson correlation between microcredit and other variables

Correlation	P values
Microcredit and nutritional status	0.03*
Microcredit and sanitary practices	0.04*
Microcredit and health practices	0.07
Microcredit and education	0.07

*Denotes significant at 5% significant level

Table 8 shows correlation between microcredit and different variables. A strong correlation was existed between microcredit and nutritional status and sanitary practices where P value is <0.05. On the other hand, the P value is 0.07 for the relation between microcredit and education and health practices which is not significant.

Discussion

Over the world, microfinance programs are trying to uplift the status of women. Experiences of these programs show that provision of micro credit and savings facilities, when efficiently utilized, enables the poor to increase their income, to improve quality of life and participate in economic growth (Khandker, 2005). It also contributes greatly to the empowerment of the poor, especially women, and helps to raise awareness and aspirations for education, health care, nutrition and other social services (Kumar *et al.*, 2015; Sultana *et al.*, 2010; Zaman, 1999). Considering these achievements, microfinance is increasingly being considered as an important tool for poverty reduction. If poverty alleviates then health, nutrition and education status will be improved (Unesco, 1997).

The family size and characteristics of the households were almost similar among the program and control group. The groups were taken from the similar settings and the households were ultra-poor. The educational levels of the program people were little bit higher than those of the control rural residents. It could be due to improving earning sources through which they can spend extra money for educational purposes (Kumar *et al.*, 2015). Appropriate health care facilities for mothers and children were not available to most of the surveyed households. Overall health practices among program households were satisfactory. Visiting health care center and utilization of local health care services were significantly higher among program group. The microfinance organization implements health education program for beneficiary simultaneously with microcredit program. The health education program makes the program people aware about visiting local health clinic and center from where they

utilized best local health support (Chowdhury and Salleh, 2017). On the other hand, admission of pregnant mother into hospital for delivery was higher among program group than control group. It is because of increasing economic solvency after engaging in the microcredit program (Khan and Rahman, 2016). There was complete domination of program group people to the control group for immunization and getting vaccine.

According to the present study, the sanitation and hygiene condition of program group better and it was satisfactory. It may be due to some social development activities (safe water supply, sanitation etc.), carried out by the NGO's besides providing credit. It was a good observation that almost all the people used something to wash their hand after defecation. Even an appreciable number in both groups used soap and ash to wash their hands which is hygienic though program group people were much ahead using sanitary materials. It is due to implementation of hand wash program for the program people by NGOs through which people learned and gained knowledge about the health benefits of using sanitary materials (Tofail *et al.*, 2018).

Anthropometric measurements of children aged 12-59 months showed that the nutritional status of programed children was better. However, according height for age Z score the nutritional status almost same for both groups. In both cases, the stunted children were more than 85% which is very alarming. It could be due to lack of knowledge about nutrition and unable to utilize their earning source in nutritional purposes. This result also supported by the study of Islam *et al.* (2016). The prevalence of wasted and underweight children was higher in control group. The nutritional status of program children was also better than control group children according MUAC though the result was not support that it is the result of microcredit because they do not have adequate knowledge about nutrition and health.

Conclusions

Poverty is not solely a matter of lacking income or access to sustainable financial services. The complex process of poverty eradication cannot be resolved by successful intervention in any one area. Improving food security, tackling malnutrition, reducing disparities in income and education, reducing gender disparities and improving protection against inevitable shocks are the key elements in Bangladesh to fight against hunger. Various studies show that adequate food and nutrient intake would be a problem for ultra-poor whose earning sources are limited but many households are suffering from inadequate nutrient intake though they have capacity. Hence, lack of

adequate nutritional knowledge is also an important cause of malnutrition in Bangladesh. Thus, it is appeared that a more effective strategy for addressing malnutrition is necessary to improve health and nutritional status beyond microcredit support for the rural people. To fight the situation, special microcredit with nutrition and health support should be introduced to reach the hard-core poor.

References

- BBS, 2017. The Bangladesh Bureau of Statistics survey, 2017.
- Brau, J.C. and Woller, G.M., 2004. Microfinance: A comprehensive review of the existing literature. Chowdhury, M.A.M. and Salleh, M.C.M., 2017. The impact of micro credit on financial condition and socio-economic of women entrepreneurs in Bangladesh. *International Journal*, 2(6), pp.38-49.
- Hamad, R. and Fernald, L.C. 2012. Microcredit participation and nutrition outcomes among women in Peru. *J Epidemiol Community Health*, 66(6), pp.e1-e1.
- Hirvonen, K., Hoddinott, J., Minten, B. and Stifel, D. 2017. Children's diets, nutrition knowledge, and access to markets. *World Development*, 95, pp.303-315.
- Hoffman, C.Y., Phillips, M.D., Daigle, L.E. and Turner, M.G., 2017. Adult consequences of bully victimization: are children or adolescents more vulnerable to the victimization experience. *Youth violence and juvenile justice*, 15(4), pp.441-464.
- Islam, A., Maitra, C., Pakrashi, D. and Smyth, R. 2016. Microcredit program participation and household food security in rural Bangladesh. *Journal of Agricultural Economics*, 67(2), pp.448-470.
- Jacobson, J.L. 2018. Women's health: The price of poverty. In *The Health of Women* (pp. 3-32). Routledge.
- Khan, H.T. and Rahman, T. 2016. Women's participations in economic and NGO activities in Bangladesh: an empirical study on the Bangladesh demographic and health survey (BDHS). *International Journal of Sociology and Social Policy*, 36(7/8), pp.491-515.
- Khandker, S.R. 2005. Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, 19(2), pp.263-286.
- Kumar, D., Hossain, A. and Gope, M.C. 2015. Role of micro credit program in empowering rural women in Bangladesh: A study on Grameen Bank Bangladesh Limited. *Asian Business Review*, 3(4), pp.114-120.
- Mayoux, Linda. 2001. "Tackling the down side: social capital, women's empowerment and microfinance in Cameroon." *Development and change* 32.3 (2001): 435-464
- Merchant, K.M. and Kurz, K.M. 2018. Women's nutrition through the life cycle: social and biological vulnerabilities. In *The Health of Women* (pp. 63-90). Routledge.
- Mohan, P. and Mohan, S.B. 2017. Management of Children with Severe Acute Malnutrition in India: We Know Enough to Act, and We Should Act Now. *Indian pediatrics*, 54(10), pp.813-814.
- Morduch, J. and Haley, B. 2002. Analysis of the effects of microfinance on poverty reduction. New York: NYU Wagner Working Paper, 1014.
- Pryer, J.A. 2017. Poverty and vulnerability in Dhaka slums: the urban livelihoods study. Routledge.
- Rahman A. Micro-credit initiatives for equitable and sustainable development: who
- Snow, D.R. and Buss, T.F. 2001. Development and the role of microcredit. *Policy Studies Journal*, 29(2), pp.296-307.
- Sultana, B., Zaaba, Z. B. and Umamoto, K. 2010. Women's Empowerment through the Development of Micro Entrepreneurship in Rural Bangladesh. *Social Science*, 5: 1-9. DOI: 10.3923/sscience.2010.1.9.
- Tofail, F., Fernald, L.C., Das, K.K., Rahman, M., Ahmed, T., Jannat, K.K., Unicomb, L., Arnold, B.F., Ashraf, S., Winch, P.J. and Kariger, P. 2018. Effect of water quality, sanitation, hand washing, and nutritional interventions on child development in rural Bangladesh (WASH Benefits Bangladesh): a cluster-randomised controlled trial. *The lancet child & adolescent health*, 2(4), pp.255-268.
- UNESCO, 1997. MICRO CREDIT SUMMIT, Feb 1997. Washington, DC, by UNESCO.
- Unicef, 2018. Malnutrition in children-Unicef data.
- van der Pols-Vijlbrief, R., Wijnhoven, H.A., Bosmans, J.E., Twisk, J.W. and Visser, M. 2017. Targeting the underlying causes of undernutrition. Cost-effectiveness of a multifactorial personalized intervention in community-dwelling older adults: A randomized controlled trial. *Clinical nutrition*, 36(6), pp.1498-1508.
- Willcox, M.L., Kumbakumba, E., Diallo, D., Mubangizi, V., Kirabira, P., Nakaggwa, F., Mutahunga, B., Diakit , C., Demb l , E., Traor , M. and Daou, P. 2018. Circumstances of child deaths in Mali and Uganda: a community-based confidential enquiry. *The Lancet Global Health*, 6(6), pp.e691-e702.
- Zaman, H. 1999. Assessing the poverty and vulnerability impact of micro-credit in Bangladesh: A case study of BRAC.