



Role of Microcredit in Improving the Food Security Status of the Rural Poor Women: Evidence from Bangladesh

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ABSTRACT

Purpose- Rural poor women in Bangladesh were provided microcredit support by the microcredit providers for improving their living standard. However, it is still unclear whether the microcredit support really empowers the rural women in terms of economic and social aspects. The prime objective of this study was to assess the impact of microcredit on the household food consumption expenditure of the rural poor women in Bangladesh.

Design/methodology/approach- Primary data was collected from the landless, marginal and small borrowers from Gazipur and Mymensingh districts of Bangladesh. The Simple Random Sampling (SRS) technique was used to select the samples. The Propensity Score Matching (PSM) technique was used to assess the impact of microcredit on the household food consumption expenditure. Binary logistic regression was used to assess the opinions of the borrowers about the role of microcredit in enhancing their food security status.

Findings- This study showed that microcredit intervention made a significant contribution to increase the household food consumption expenditure of the borrowers.

Originality/value- This study helps in formulation and smooth implementation of the food security programs for the rural poor women in developing countries.

Keywords: Microcredit, food security, poverty, women.

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1.0 Introduction

1.1 Background of the study

The Sustainable Development Goals (SDGs) being the blueprint to achieve growth and continued development emphasize on achieving zero poverty, zero hunger and gender equality (Dzanku, 2018). However, a large proportion of the world population severely struggle to get access to the basic needs such as food, clothing and healthcare (Hilton et al., 2016; Mahmud et al., 2014a). For example, in the Sub-Saharan countries millions of people live without adequate access to food (Dzanku, 2018). The daily earnings of more than one billion people of the world is less than 1.25 USD (Morel & Chowdhury, 2015). Bangladesh is not an exceptional case. Incidence of poverty is quite high in Bangladesh. According to Ministry of Finance 2019, the poverty rate of Bangladesh is estimated as 21.8%. It shows that approximately, one-fifth portion of the total population of the country lives below the poverty line (Ministry of Finance, 2019). Undoubtedly, poverty is linked with food insecurity (Hilton et al., 2016). Ultra poor people have lack of assets, education and other resources which leads

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to food insecurity (Morel & Chowdhury, 2015). Elderly members of the food insecure households often suffer from low Body Mass Index (BMI) due to low calorie intake (Bhattacharya, Currie, & Haider, 2004). According to researchers, women are the worst victims of poverty (Mahmud et al., 2014a). Researchers also reported that women and children of farming communities are the worst victims of malnutrition (Ferdous et al., 2016). The likelihood to become food insecure is much higher for the ultra-poor women (Sraboni et al., 2014; McIntyre et al., 2011).

Mishra and Khanal (2017) reported that about 72% of the total population of Bangladesh live in rural areas. About 54% of their labor force is employed in agricultural sector and two-third of the per-capita income is spent on food consumption alone (Mishra & Khanal, 2017). In spite of increased agricultural productivity, approximately 25% of the total population of Bangladesh is still food insecure (Mishra & Khanal, 2017). There is no doubt that, food production increased in many folds; even then a significant proportion of the population of Bangladesh fail to meet their demand for food (Islam et al., 2016). The number of food insecure people will reach 37 million by 2020 which was 33 million in 2010 (Islam et al., 2016). They identified insufficient income and lack of access to credit facilities as the major reasons for which the rural households in Bangladesh fall into the state of food insecurity. Rising food prices, healthcare costs, seasonal fluctuation in earnings, various climatic shocks can also create a serious threat to the food security situation (McIntyre et al., 2011; Hossain, 2017).

The present study makes an attempt to assess the impact of microcredit on the household food consumption expenditure of the rural poor women in Bangladesh using primary data. The contents in the article are organized as follows: Section I introduces the concept of food security. Section II is devoted to describe the linkage between microcredit and food security. Section III, which is the Theoretical Underpinning, explains that, microcredit intervention increases the food consumption expenditure of the borrower leading to an increase in her utility. Section IV develops a conceptual framework and few hypotheses for analyzing the role of microcredit in increasing the food consumption expenditure of the rural poor women in Bangladesh. Section V describes the methodology of the study including information about the target group, location and time of survey, data collection and analytical techniques. Socioeconomic characteristics of the respondents, impact of microcredit on their household food expenditure and factors affecting their food security status have been discussed under section VI, Results and discussion. Section VII points out the limitations of the study and gives direction for future research on this concept. Finally Section VIII, Conclusion and policy implication, summarizes the discussions and indicates policies.

1.2 Concept of food security

Food security is a situation referring to the accessibility to safe, sufficient and nutritious food of all the citizens meeting their health requirements and sound life-style, as reported by FAO (Food and Agriculture Organization) in 2017. It is one of the pre-requisites for attaining overall human development and economic growth (Herforth, Lidder & Gill, 2015; Kim & Kang, 2017). Osabohien, Afolabi and Godwin (2018) reported four important dimensions of food security, viz: availability, accessibility, utilization and stability. Gani and Prasad (2007) reported that there exists a positive correlation between food availability, calorie intake, protein supply and human development. Increased agricultural productivity may even be associated with greater food insecurity if the other dimensions of food security are not met adequately (Annim & Frempong, 2018). For instance, increased agricultural productivity in sub-Saharan Africa is associated with parallel trends of increased malnutrition and food insecurity in that region (Yu & Nin-Pratt, 2011).

1.3 Statement of the problem

In Bangladesh, per capita food consumption is quite low (Hossain, 2017; Mahmud et al., 2014a). Being consistent with the goals of SDGs, the Government of Bangladesh (GoB) is committed to alleviate poverty, hunger and malnutrition (Ferdous et al., 2016) by creating effective partnership among the NGOs and donor agencies. The GoB formulated the National Food Policies (NFPs) to ensure food security for all the citizens focusing on the issues of providing credit support, intensification of agricultural production, development of market, etc. (National Food Policy Plan of Action and Country Investment Plan 2015, Ministry of Food). In fact, to ensure food security status GoB has been undertaking several programs such as Food for Work, Vulnerable Group Development and Test Relief (Hossain, 2017). Moreover, there was active participation of reputed NGOs like BRAC and Grameen Bank in a number of relevant assistance programs (Hossain, 2017).

In the rural settings of Bangladesh, women are still in backward position than their male counterparts in terms of economic and social indicators (De la Torre-Castro et al., 2017). Women are more food insecure than men and suffer from malnutrition (Mahmud et al., 2019). Women's economic activities are limited with household chores and they also have lack of mobility due to existing patriarchal norms of the society (Develtere & Huybrechts, 2005). The underprivileged women cannot come out of the situation of food insecurity until and unless they participate in income-generating activities (IGAs) through the development of their skills (McIntyre et al., 2011). It has been observed by researchers that to make the situation even worse, poor women have less access to the formal financial institutions than their male counterparts for obtaining credit support since they often fail to meet the collateral requirement (Mahmud et al., 2017).

Micro-credit is a form of micro-loans to the underprivileged, impoverished borrowers who typically lack collateral, steady employment and a verifiable credit history with a view to supporting entrepreneurship, income generation and poverty alleviation requiring much less paper works (Yunus, 2008; Mahmud, 2010). Microcredit is considered as one of the effective tools to alleviate poverty which provides credit facilities to the poor for pursuing Income Generating Activities (IGAs) without collateral (Hilton et al., 2016; Mahmud et al., 2017). Researchers reported that the poor rural women became successful in uplifting their living-standard in terms of social and economic aspects because of their participation in the microcredit programs (Mahmud et al., 2017). Micro-credit support can be helpful to possibly reduce feminization of poverty, resulted from the deprivation of capabilities and gender biasness in developing countries (Kabeer, 2005). In order to alleviate poverty, both government agencies and NGOs (Non-government agencies) disbursed huge amount of credit to the poor under microcredit system (Mahmud et al., 2014a). For example, Department of Women Affairs operates a program called Microcredit for Women Self-employment. Under this program 1, 35, 430 women received microcredit up to December 2019. Up to December 2019, Tk. 2,48,453.52 crore was disbursed by BRAC benefitting 7,496,383 borrowers, out of which 82 percent were female (Ministry of Finance, 2020).

Microcredit programs were also criticized by the researchers for its failure to reach the ultra-poor (Ahmed, 2009). Few evidences also demonstrate that micro-finance schemes failed to create sustainable small business ventures and has led many borrowers into a debt trap (Bateman, 2010). Garkipati (2008) reported that microcredit support aimed for the women, may even result in domestic violence because of the dependence on their male counterparts for payment of installments against loans. They also added that these microcredit support intended to focus on rural women could however diversify and increase total households' assets but could not elevate the status of women subsequently. Over-indebtedness (Ganle, Afriyie & Segbefia, 2015), loan-repayment pressure (Ahmed, Chowdhury & Bhuiya, 2001), lack of control of women over the use of loans (Develtere & Huybrechts, 2005), repeated loans for payment of higher interest rates against existing loans may even lead the female households to food insecurity (Namayengo, Antonides & Cecchi, 2018). Aromolaran (2010) estimated a negative effect of increasing women's share of income on calorie intake of the household. Marginal declines in food calorie intake by individual household members are likely to be resulted from increases in women's share of household income, they added.

1.4 Research gap and research question

Microcredit programs aim at poverty alleviation by improving the food security status of the poor households mainly focusing the poor women. It was hypothesized that the women borrowers would attain food security because of the microcredit intervention which is supposed to increase their purchasing power. As mentioned earlier, in many cases, microcredit programs in developing countries have also failed to bring desired outcomes on social and economic aspects among the poor borrowers mainly because of the small size of the loans and practicing the Weekly Repayment System (WRS). For example, many poor women borrowers of BRAC who received microcredit support even failed to graduate from poverty (Hilton et al., 2016). However, Hilton et al. (2016) also added that microcredit program assisted some of the borrowers to graduate from poverty but the impact of microcredit on their living-standard in terms of socioeconomic aspects was very small. As a result, poverty and food insecurity still persist among the poor microcredit borrowers. Therefore, whether the microcredit support really empowers women borrowers in terms of food security is a logical question to be raised. This study takes effort to explore the answers of the following questions:

Q1. Does microcredit increase the food expenditure of the poor women borrowers?

Q2. Do the borrowers really perceive that their participation in the microcredit program can improve their food security status?

The prime objective of this study is to assess the impact of microcredit on the food security status of the women borrowers using Propensity Score Matching (PSM) technique. It is also important to assess the borrowers' opinions whether they are food secure due to the intervention of microcredit programs. It is believed that the findings of this study will assist in policy formation and smooth implementation of the microcredit programs for empowering women in terms of food security in Bangladesh and elsewhere.

2.0 Linkage between microcredit and food security

Mahmud and Hilton (2020) found that in Bangladesh micro-credit increased both income and food expenditure of the poor fishermen in Bangladesh. Another study in Peru reported that, longer microcredit participation demonstrated positive impacts on the nutritional status of the female clients (Hamad & Fernald, 2012). It was observed by the researchers that transfer of assets, providing skill building trainings, temporary consumption support, micro-loans play a positive role in improving the income, asset and food security status of the ultra-poor people who live in the developing countries (Morel & Chowdhury, 2015; Raza, Das & Misha, 2012). Multilateral aid, grants and social and economic aid have a small positive impact on food security. Bilateral aid, concessional and micro-loans and agricultural aid are likely to foster food security in countries having good governance (Petrikova, 2015). Conditional cash transfers, micro-credit mechanism and social safety net programs have a positive impact towards stabilizing income and ensuring food security in Sub-Saharan

Africa (Devereux, 2016). Income is one of the key factors for improving the purchasing power of the household which will widen the economic access of the household to food (Namayengo et al., 2018). According to them microcredit plays a positive role in improving the food security status through increasing agricultural production and income. They also added that, consumption smoothening may be a potential outcome of micro-credit programs leading to food security.

Islam et al. (2016) observed that microcredit program played a positive role in improving the calorie intake and reducing the food poverty among the borrowers in Bangladesh. They indicated that women of reproductive age were less vulnerable to being underweight when they were covered under microcredit program. The authors also reported that microcredit program had failed to create a significant impact on the dietary diversity and long-term food security. Osabohien et al. (2018) observed the positive impact of credit facility in the production base of the Nigerian economy and agricultural production in particular that leads to the attainment of food security. Annim and Frempong (2018) reported that access to micro-credit during the planting season and other hard times can help the households to have access to food and non-food items according to their requirement. They found that the amount of loan received by the household is positively related to the nutritional component of food intake by the household. Moreover, they concluded that borrowing for food consumption was an investment for promoting income generation and human capital development. According to Annim, Dasmani and Armah (2011), long-term investment, purchase of seasonal inputs, and consumption requirements can be facilitated with access to credit. Credit facilities can have even perform better in attaining food security if they are designed with special attention to the vulnerable groups (Annim & Frempong, 2018).

Growth in agricultural output and subsequently food security is positively associated with the access of the rural population to agricultural credit (Osabohien et al., 2018). Micro-credit support is a stimuli for increasing the food production and food security (Ejemeyovwi, Osabuohien & Osabohien, 2018). Some researchers reported that, access to credit rendered a greater dietary diversity and calorie consumption per capita among the households in northern region of Bangladesh (Bidisha et al., 2017). Offer et al. (2020) observed that access to microcredit had a positive impact on the food security status of farm households in Nigeria. Chilimba et al. (2020) had similar findings. They observed that households in Malawi that participated in microfinance programs experienced improvements in their status of food security. They emphasized that microfinance programs should be targeted for the female as they play a vital role in attaining food security for the family than the male counterparts. Hamad and Fernald (2012) observed that microcredit played a vital role in increasing the nutritional status of the female borrowers. They added that longer microcredit participation was associated with higher BMI, higher haemoglobin levels and lower food insecurity of the female participants. Micro-credit had a positive impact on women's food security in rural Uganda (Meador & Fritz, 2017). It was observed by researchers that women under micro-credit program had a greater participation in income-generating activities (IGAs) in rural Bangladesh (Sultana & Hasan, 2010). The authors also reported that women under micro-credit support were more productive than women without micro-credit coverage. Doocy et al. (2005) had similar findings. They suggested that microfinance programs were successful in increasing the nutritional status and well-being of the female clients and their families in Ethiopia. Amwata, Nyariki and Musimba (2015) reported from a study in the dry lands of Kenya that in order to enhance food security status, central focus should be on women empowerment and increase of women's access to productive resources through micro-finance trusts. Women's ownership and control over the household assets play a positive role in increasing the food security status of the women by reducing gender disparity (Sraboni et al., 2014).

3.0 Theoretical underpinning

The female borrowers under this study were poor with low level of income demonstrating their low purchasing power, low consumption expenditure and low standard of living. Microcredit support would assist them to get out of this situation. Providing microcredit would give them the opportunity to increase their income, their purchasing capacity and would lead them to higher level of expenditure. This economic behavior is consistent with the utility theory.

In the figure 1, the initial utility maximization point of the consumer is M, which is the tangency point of the initial budget line (BL0) and the initial indifference curve (IC0). When her income increases due to the intervention of microcredit programs, her budget line shifts upward. She then reaches to utility maximization point N, which is the tangency point of the new budget line (BL1) and new indifference curve (IC1). Thus she reaches at a new equilibrium N, buying more of Good-X and Good-Y and enjoying a higher level of utility.

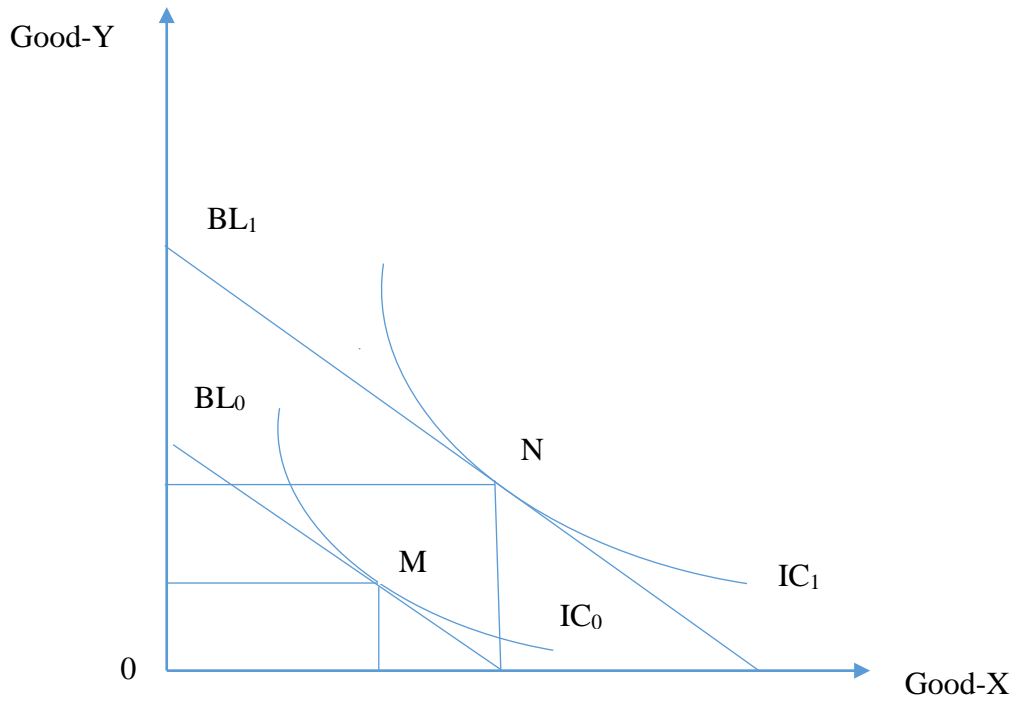


Figure 1. Graphical representation of utility theory

4.0 Conceptual framework and hypothesis development

Microcredit can be used as a stimulus to increase the household food consumption expenditure of the rural poor women. The proper utilization of the microcredit received by the female borrowers depends on the socio-economic factors and can be influenced by her age, education, training received, possession of assets, number of working members in the family, mobility, networking and government policy (Figure 2). An effective networking system among the different stakeholders of the society would be a suitable strategy in increasing the food security status of the rural poor women.

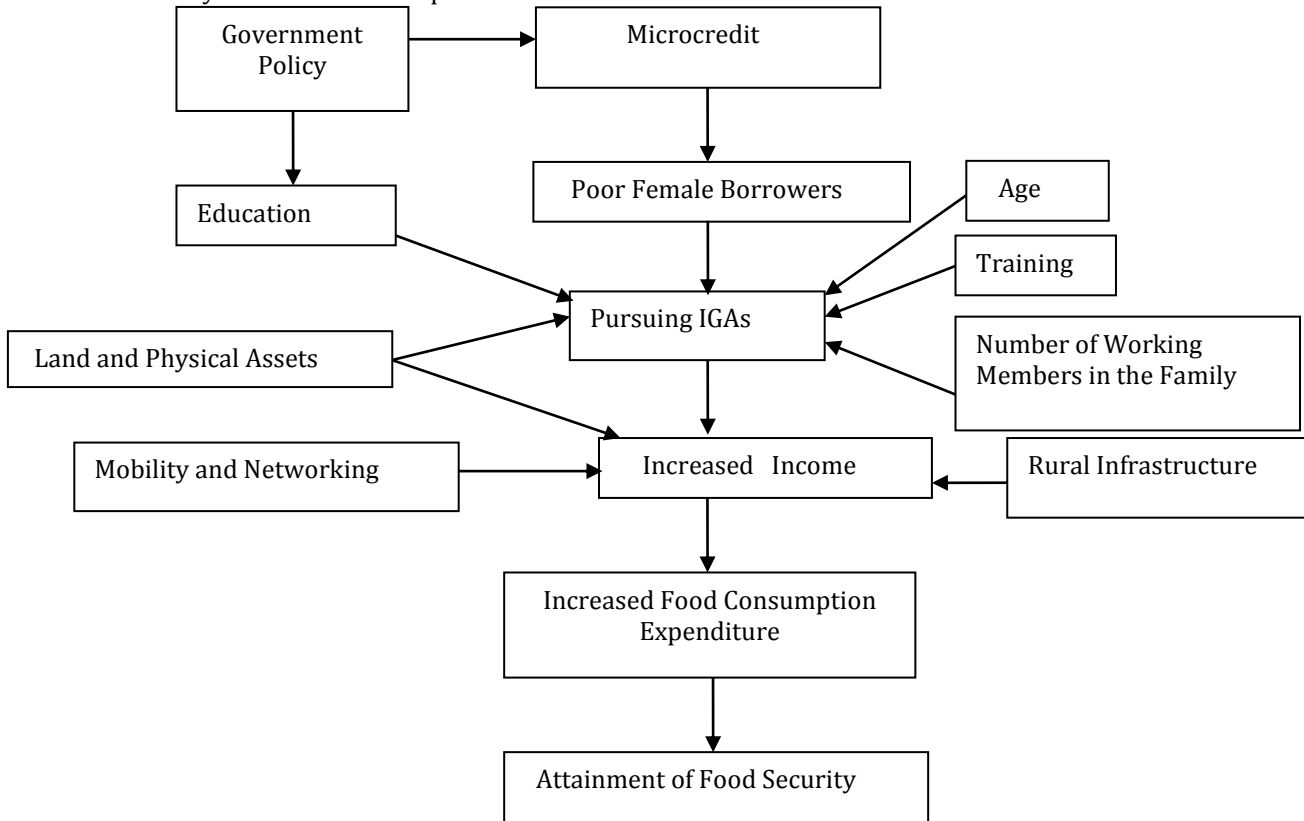


Figure 2. Conceptual framework for improving the food security status of the rural poor women. Adopted and modified from (Hilton et al., 2016; Mahmud et al., 2017; Mahmud & Hilton, 2020)

Microcredit is used as a tool to increase the income and expenditure of the households (Mahmud et al., 2017), which will ultimately assist them in spending more on food consumption. The investment opportunities, risk management and negotiation capacity of a household under microcredit coverage is generally higher than the one without microcredit coverage (Mahmud et al., 2017). Thus, it can be hypothesized that:

H1: Microcredit has a positive impact on the household food consumption expenditure.

Age is an important demographic factor relating to the experience, decision-making capacity and selection of IGAs of the household (Mahmud & Hilton, 2020). Since economic indicators as income and poverty are correlated with age (Rokhim et al., 2016), providers of micro-credit should critically analyze this factor before providing credit facility (Mahmud & Hilton, 2020). Based on the above arguments, a hypothesis can be drawn as:

H2: Age has an impact on the household food consumption expenditure.

Education has a positive impact on self-development through building awareness, competency and improving the standard of living of the borrowers (Mahmud & Hilton, 2020; Hilton et al., 2016). Moreover, education enables the borrowers to analyze the nature of IGAs leading to a higher return (Mahmud et al., 2014a), which will ultimately assist them in spending more on food consumption. Thus, it can be hypothesized that:

H3: Education has a positive impact on the household food consumption expenditure.

Trainings can improve the skill of the borrowers leading to more competitiveness in pursuing IGAs and higher productivity (Mahmud et al., 2014b; Hilton et al., 2016), which will assist them in increasing expenditure on food. Based on these arguments, a hypothesis can be drawn as:

H4: Training has a positive impact on the household food consumption expenditure.

Possession of land and other physical assets (e.g. furniture, jewelry) and biological assets (e.g. poultry, livestock, fishery farm) have a positive correlation with the standard of living of the rural household (Agarwal, 2018; Mahmud & Hilton, 2020). Mahmud et al., 2017 reported that household asset possession is an important determinant of assessing the impact of microcredit programs. Households having more agricultural land have a comparative advantage in terms of receiving training and credit, credit utilization, involvement in IGAs and having a higher consumption expenditure (Mahmud & Hilton, 2020). Thus, it can be hypothesized that:

H5: Possession of land is positively related to the household food consumption expenditure.

It can be assumed that, the higher the number of working members in the family, higher will be the family income. It helps to involve the households in multiple IGAs and diversify their employment opportunities (Mahmud & Hilton, 2020). Based on the above arguments, a hypothesis can be drawn as:

H6: Higher number of working members in the family increases the household food consumption expenditure.

Development of rural infrastructure would facilitate the mobility of the rural poor female borrowers, diversify their employment opportunities, widen their network with different stakeholders and increase their marketing efficiency (Mahmud et al., 2017). Thus, it can be hypothesized that:

H7: Mobility of the borrower is positively correlated with the household food consumption expenditure.

Government policies can play an important role in improving the food security status of the rural poor female households by providing legal, financial and technological supports. Thus, it can be hypothesized that:

H8: Government policy has a positive impact on household food consumption expenditure.

5.0 Methods

5.1 Target group

At the very beginning of the study, a list of NGO borrowers was collected from the branch offices of the NGOs located in the five upazilas (lowest administrative unit) under Gazipur and Mymensingh districts of Dhaka division in Bangladesh, which were selected as the location for survey purpose. Afterwards, a comprehensive borrowers list was prepared. Based on the collected list, borrowers were selected to be interviewed using Simple Random Sampling (SRS) technique. A total of 400 female borrowers were chosen as sample from the total population of 5000 borrowers using the online sample survey calculator conceiving 5% error at 95% level of confidence. The online survey calculator known as "Survey System" was used to determine the sample size in this study. This "Survey System" is also used by other researchers for determining the sample size (Mahmud et al., 2017; Mahmud et al., 2019). The sampling frame was developed using the following criteria: (1) landless, marginal and small female borrowers who were mainly engaged in agricultural activities, (2) female borrowers aged between 18 to 55 years, (3) female borrowers being a permanent resident of a village, (4) female borrowers who took loan for the first time in January 2016 from the NGOs and utilized the loan for at least 12 months and (5) female borrowers who took loans of 20,000BDT during the period January 2016 to December 2018. Similar criteria were also used by other researchers (Mahmud et al., 2017; Mahmud et al., 2019).

In this study, a comprehensive list of poor rural women mainly involved in agricultural activities was also prepared. From this list, purposively, out of 6000 women, 400 women were selected by using the SRS technique in forming the control group to maintain equal sample size. Criteria (1), (2) and (3) used in selecting sample for the treatment group, were used in selecting the sample of the control group. It is to be noted that the

respondents of the control group did not receive any credit support from any financial institution for the last 10 years.

5.2 Location and time of survey

A survey was conducted from April to May 2019, covering five upazilas under Gazipur and Mymensingh districts of Dhaka division in Bangladesh. Data was collected from Sreepur, Kapasia and Kaliakair upazilas under Gajipur district; and Bhaluka and Mymensingh Sadar upazilas under Mymensingh district. These five upazilas were selected purposively. One union parishad area (sub-upazila) from each of the upazilas was selected randomly. Then the names of the villages of the five union parishad areas were collected and two villages from each union parishad area were selected randomly where microcredit programs are run by NGOs. Onwards, a complete list of 5000 borrowers of the selected total ten villages of the five union parishad areas were collected which was used as the sample frame. Finally, a representative sample of 400 female borrowers were drawn randomly from the sample frame. A five-member research team conducted a survey among the members of the treatment group. During July to August 2019, another survey was conducted on the poor women residing in five other upazilas under the same districts- Gajipur Sadar upazila and Kaliganj under Gajipur district; Bhaluka and Muktagachha under Mymensingh district by the same research team to select the sample for control group. In the previous manner, data for control group were collected from total ten villages under these two districts. From each upazila, one union parishad was selected and from each union parishad two villages were selected to create the sample frame.

5.3 Data collection

In this study, primary data was collected using a structured questionnaire from the members of the treatment group and control group. Data was mainly collected on the female borrowers' livelihood in terms of demographic profile, possession of assets, resource base, household income, expenditure in different sectors, credit management and their opinion about their food security status.

5.4 Analytical techniques

In this study, the PSM (Propensity Score Matching) technique has been used to assess the impact of microcredit on the food security of the rural poor women. Rural poor women who received microcredit support were considered as "treatment group" and the rural poor women without microcredit coverage were considered as "control group". PSM focuses on the counterfactual scenario about the performance indicators of the treated group (Sohag et al., 2015; Mahmud et al., 2017; Mahmud et al., 2019, Mahmud & Hilton, 2020). Furthermore, PSM approach is based to identify individuals in the treatment group and in the control group who are indifferent with respect to control variables (Weber & Ahmad, 2014; Haque & Dey, 2016; Mahmud et al., 2017; Mahmud et al., 2019, Mahmud & Hilton, 2020). In PSM approach, it is necessary to match the unit of control group with the treatment group. For this purpose, nearest neighbor (NN) matching method, kernel matching method and radius matching methods were used. This method is extensively used by researchers to draw interpretation (Sohag et al., 2015, Mahmud et al., 2017, Mahmud et al. 2019, Mahmud & Hilton, 2020). The variables which were used for matching purpose are (i) age, (ii) family size and (iii) distance of rural market. These three variables were also used by other researchers for matching purpose (Mahmud & Hilton, 2020). PSM method estimates the average treatment effects on the treated (ATT). ATT can be estimated as:

$$ATT = E(Y_1 - Y_0 \mid X, I=1) = E(Y_1 \mid X, I=1) - E(Y_0 \mid X, I=1)$$

Here, Y_1 and Y_0 represent the outcomes of the treatment group and outcome of the control group respectively. X is the vector of exogenous explanatory variables (household characteristics), I is the treatment indicator ($I = 1$ if the individual rural women are participants of the microcredit program). Assumptions of conditional independence, fulfillment of balancing properties and presence of a common support justifies the validity of the PSM (Haque & Dey, 2016; Mahmud et al., 2017; Mahmud et al., 2019).

PSM is widely used by the researchers for impact analysis (Weber & Ahmed, 2014; Mahmud et al., 2017; Mahmud et al., 2019; Mahmud & Hilton, 2020). For example, Mahmud et al. (2019) used this approach to assess the impact of monthly repayment system on the household healthcare expenditure of the rural women borrowers and found that monthly repayment system failed to create any significant impact on the borrower's healthcare expenditure. Weber and Ahmed (2014) used this technique to determine the relation between loan cycle and women empowerment through microfinance. They derived a positive correlation between women's loan cycle and female empowerment.

Binary Logistic Regression (BLR) technique has been used in this study to assess the opinions of the female borrowers' under the microcredit program on their food security status. It is appropriate to use the BLR technique when the dependent variable is dichotomous (Mahmud et al., 2014; Mahmud et al., 2017; Mahmud & Hilton, 2020). Now-a-days researchers use this BLR technique extensively. For example, BLR technique has been used to assess the opinions of the zakat recipients about their food security status (Mahmud et al., 2014). Rahman and Ahmad (2010) used this technique to assess the opinion of the borrower's well-being. Mahmud et al. (2017) used BLR technique to assess the contribution of microcredit to the economic well-being of the female

borrowers under agribusiness program. Mahmud and Hilton (2020) also used BLR technique to assess the opinions of the fish farmers about their economic well-being under the micro-credit program. In this study, borrower's household was considered as food secured if they managed to have meals three times a day and coded as 'one'; otherwise, borrower's household was considered as food insecure which was coded as 'zero'. The model can be specified as:

$$\ln [P_i/(1-P_i)] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \mu \dots (1)$$

P_i =Probability that the borrower would be food secured; $1-P_i$ =Probability that the borrower would not be food secured ; X_1 = Years of schooling of the borrower (number); X_2 = Land possessed by the household in 2019 (decimal); X_3 = Livestock possessed by the household in 2019 (number) ; X_4 = Training received by the household on IGAs (number); X_5 = Distance of the rural bank from the borrower's house (kilometer); X_6 = Total value of assets of the household in 2019 (taka); X_7 = Distance of the rural market from the borrower's house (kilometer); X_8 = Total amount of microcredit received by the household after joining the program (Taka); X_9 = IGAs pursued by the household in 2019 (number); X_{10} = Total number of working members in the family in 2019 (number); X_{11} = Financial support received by the household from government agencies in 2019 (dummy: yes=1; no=0); μ =Error term of the equation (1); α = Constant of the equation (1); β_i = Coefficients of the independent variables.

6.0 Results and discussion

6.1 Socioeconomic characteristics of the respondents

There was negligible difference between the average age of the treatment group and control group. The average age of the treatment group was 34.62 years, whereas the average age of the control group was 33.85 years (Table 1). This signifies that microcredit providers had put more emphasis on the middle-aged women than the older women; considering them to be more active and energetic. In terms of risk-bearing, decision-making and driving towards a better standard of living, education plays an important role (Hilton et al., 2016; Mahmud et al., 2017; Mahmud et al., 2019). The average number of years of schooling for the treatment group and control group were 6.13 years and 4.76 years respectively (Table 1). So there was little variation among the two groups in terms of educational status. Family size (number of persons) of the respondents of the treatment and the control group were almost the same. The average family size of the treatment group was 5.14 and of the control group was 5.93, which are very close. Majority of the respondents, both in the treatment group and in the control group were married. This signifies that micro-credit providers prefer a married female borrower to an unmarried female borrower for disbursing credit (Mahmud et al., 2019). The percentage of married borrowers in the treatment group and in the control group were 91.65% and 79.22% respectively (Table-1). Income is also an important indicator of the living standard of an individual (Mahmud et al., 2017). The mean annual income of the treatment group and control group were 226517.82 taka and 219153.45 taka respectively (Table-1), which did not vary significantly.

In the context of Bangladesh, there is a positive association between the possession of land by the rural households and their quality of life (Hilton et al., 2016; Mahmud et al., 2017; Mahmud et al., 2019). Small amount of land possession by the rural households is the outcome of excess population (Mahmud et al., 2017; Mahmud et al., 2019). In this study, it has been found that the average land area possessed by the treatment and control group were 96.17 decimals and 85.72 decimals respectively (Table 1). So, there was little difference between the land possession of the treatment and control groups.

Table 1.

Profile of the members of treatment group and control group.

Indicator	Treatment Group		Control Group		t-value
	Mean	Percentage	Mean	Percentage	
Age of the respondent (years)	34.62	-	33.85	-	1.27
Number of years of schooling	6.13	-	4.76	-	5.41
Family size(persons)	5.14	-	5.93	-	1.16
Married person	-	91.65	-	79.22	
Annual Household income(taka)	226517.82	-	219153.45	-	1.62
Male-headed household (%)	-	82.35	-	93.28	
Total land area(decimal)	96.17	-	85.72	-	2.14
Possession of poultry (%)	-	77.29	-	62.53	
Possession of livestock (%)	-	41.32	-	27.74	
Possession of tube-well (%)	-	13.37	-	8.41	

Source: Survey, 2019

Note1: Taka indicates the currency of Bangladesh

Note 2: 1 USD= Taka 83.85 (Ministry of Finance 2019)

Bangladesh is a country where cultural heritage, social obligations and existing patriarchal norms lead to a situation where the male usually play the front role in running the family (Ali, Hata, Azman, & Islam, 2017; Mahmud et al., 2019). In this study, the percentage of male-headed household in the treatment group was 82.35% and in the control group was 93.28% (Table 1). In this study, there was slight difference in the possession of assets between the households of the two groups.

Household asset is an important indicator of the economic well-being of an individual (Haile, Bock, & Folmer, 2012; Rahman, Luo, & Minjuan, 2015). In this study, we have considered the possession of poultry, livestock and tube-well as asset for the households. 77.29% households of the treatment group had a possession of poultry; whereas 62.53% households of the control group had it (Table-1). Livestock was possessed by 41.32% households of the treatment group and 27.74% households of the control group (Table-1). Besides, tube-well was possessed by 13.37% households of the treatment group and 8.41% households of the control group (Table-1).

6.2 Impact of microcredit on the household food expenditure

As it was mentioned earlier, rural poor women under this study had low levels of income, lack of education, skills, physical and financial resources. Most of them generated income from agricultural sources (e.g. crop cultivation, poultry and livestock rearing, fishery, nursery and agribusiness). However, households also received income from non-agricultural activities such as, wage earning, handicrafts, small business, etc. Undoubtedly households with higher income are ahead of households with lower income in terms of economic and social aspects. (Khan and Ali, 2014; Mahmud et al., 2019; Mahmud & Hilton, 2020). Undoubtedly higher income ensures better investment and expenditure opportunities (Islam et al., 2016). Hence, it is expected that microcredit support to the rural poor women would increase their investment capacity to existing IGAs and also create diverse job opportunities leading to higher income.

Table 2.

Estimated results of PSM (Propensity Score Matching)

Indicator	Matching Technique	ATT	t-value
Food Expenditure	Nearest Neighbor	16279.21	1.99
Food Expenditure	Kernel	17358.76	3.02
Food Expenditure	Radius	16813.54	2.41

Source: Survey, 2019

In the context of rural Bangladesh, majority of the households do not have access to the basic minimum requirements for a healthy standard of living including food (Hilton et al., 2016; Mahmud et al., 2014b; Mahmud et al., 2019). The households under this study are food insecure with meager income. Generating insufficient income leads to reduced expenditure on food consumption (Mahmud et al., 2014a). In this study, the expenditure on cereals (e.g., rice and wheat), meat, fish, fruits, and vegetables together comprised the food expenditure of the household. This study revealed that household food expenditure of the rural poor women increased as per expectation due to microcredit support (Table-2). Household food expenditure of the borrowers increased by 16279.21 taka (Table-2), after matching based on Nearest Neighbor (NN) Matching (Table-2) method, than the non-borrowers. Under the Kernel and Radius matching methods, as it can be seen from Table-2, household's food expenditure had increased by 17358.76 taka and 16813.54 taka respectively, for the treatment group. This is because, in rural Bangladesh, households spend a large portion of their budget on food consumption (Hossain, 2017). Similarly Haile et al. (2012) indicated that, women in the developing countries mainly spend their income for the consumption of food items. It is important to note that the findings of this study is also consistent with the study of Mahmud and Hilton (2020). They also observed that microcredit played a positive role in increasing the food consumption expenditure of the fish farmers in Bangladesh.

6.3 Factors affecting food security status

In accordance with the discussion so far, land is a scarce resource in Bangladesh. The sampled households under this study are not exceptions. As land is a vital factor of production, scarcity of land often hinders the productivity of the rural poor farming communities. Because of land constraints, rural poor households obtain low levels of agricultural production, income and expenditure. It was expected that rural households having more land possession would be in an advantageous position than those having marginal land possession. This study revealed that the amount of land possessed by the household had a positive and significant impact on the dependent variable "food security status" (Table-3). The probability of the household to be food secured was 55.36% for obtaining each additional one unit of land (Table-3).

The samples of this study were credit-constrained. As a result they faced difficulties to invest in IGAs which lead to lower income and expenditure. It was logically assumed that credit support would undoubtedly help them to invest more on IGAs resulting in an increase in their household production, income and food consumption expenditure. This study confirms that the amount of microcredit received by the household had a positive and significant impact on the dependent variable "food security status" (Table-3), as expected. The likelihood for the household to be food secured is 78.36% for receiving additional one unit of credit (Table-3).

Similarly, Mahmud et al. (2017) found that in rural Bangladesh, female borrowers' net income, total factor productivity and expenditure increased due to the microcredit support provided to them.

Table 3.

Estimated results of the Binary Logistic Regression (BLR)

Variable	Coefficient	t-value	Level of significance	Odd ratio
Years of schooling (number)	0.003	0.25	0.802	1.003
Possession of land (decimal)	0.215	2.81	0.005	1.240
Number of livestock (Taka)	0.028	0.36	0.721	1.028
Number of training received	0.065	1.90	0.60	1.067
Distance of rural bank (kilometer)	-0.120	-0.60	0.546	0.886
Value of assets in 2019 (taka)	0.001	0.10	0.923	1.001
Distance of rural market (kilometer)	-1.79e-06	-1.17	0.242	0.999
Amount of credit received (Taka)	1.286	3.05	0.002	3.621
Number of IGA pursued in 2019	1.031	2.17	0.030	2.806
Number of working member in 2019	0.313	1.39	0.164	1.367
Financial support (dummy: yes=1;no=0)	0.464	1.15	0.250	1.590
Pseudo R-square	9.80%			
Hosmer Lemeshow Chi-Square :10.20 p-value:0.251				

Source: Survey, 2019

Note 3: Probability= $[\text{odd}/(1+\text{odd})]*100$

The households being involved in multiple IGAs would be in an advantageous position for investment, risk-management, technical efficiency and productivity. This would result in higher income generation and higher consumption expenditure. On the contrary, it is very obvious that households being involved in a single IGA would have lower productivity, higher risk and lower income. Therefore, it is important to increase the involvement of households in multiple IGAs for improving their economic capacity, increasing their income and expenditure. This study revealed that the number of IGAs pursued by the household is positively and significantly related to the dependent variable (Table-3). The probability of the household being food secured is 73.73% for each unit increase in the number of IGAs (Table-3). This finding is consistent with the findings of Husain et al. (2015) and Mahmud et al. (2010). They also observed that involvement in more IGAs would create the possibility of higher income, higher purchasing power and increased food consumption expenditure of the borrowers.

7.0 Limitations of the study and future research

Like other studies, this study is not absolutely perfect and out of question. It has few limitations.

(1) Microcredit programs are being operated throughout Bangladesh, covering all the divisions. However, due to constraints of time and money, this study was conducted taking the data from few upazilas under Gazipur and Mymensingh districts of Dhaka division only. In order to generalize the results, data should be collected from all the districts of the country taking other demographic, socioeconomic and regional dimensions (e.g. age, gender, occupation, location, etc.) into consideration.

(2) The rural poor female borrowers were included in this study. The male were out of the coverage of this study due to the structure and design of the programs set by the microcredit providers. Besides, the study focused on the women involved in agricultural activities. The result could be generalized if the non-farm sectors were also included. A more acceptable result could have been derived if a comparative analysis had been made focusing on the gender dimension.

8.0 Conclusion and policy implications

As it was mentioned earlier that the prime objective of this study was to assess the impact of microcredit on the food security status of the rural poor women, it was expected that the rural poor women under microcredit coverage would utilize this loan for pursuing income-generating activities (IGAs) leading to an increase in their income and food consumption expenditure. This study revealed that microcredit had a positive impact on increasing the food consumption expenditure of the rural poor women. It was also observed that majority of the respondents in this study had their opinions that they were better-off in terms of food security status because of the intervention of microcredit programs. Proper disbursement of credit to the needy women of the rural areas, utilization of credit for income earning by the borrowers and effective support from the NGOs were the main stimuli behind this success. It has also been revealed in this study that not only microcredit but other variables such as possession of land, number of IGAs pursued by the household, etc. act as significant factors for the better-off food security status of the borrowers. Policymakers should emphasize on the following aspects to improve the food security status substantially among the borrowers:

Firstly, land being a scarce resource hinders productivity. Women's possession of natural resources such as land can play a vital role in women empowerment. Necessary steps need to be taken by the GoB for initiating the provision of land leasing system, ensuring land rights of the women and arranging training on land management system.

Secondly, policymakers should also emphasize on the timely disbursement of credit and receipts from the debtors. A proper management of time in these matters can ensure a better outcome of the microcredit programs. Monthly installment facility with longer repayment period put the borrowers in a situation of ease. Adequate amount of credit disbursement as per the needs of the borrowers is also essential to increase investment and employment opportunities of the rural borrowers. In addition to providing credit, focus should be given on arranging training for skill development of the rural poor women which increase their efficiency. Necessary steps should be taken to increase the efficiency of the NGO workers at the field level in loan handling. Besides, awareness-building campaign on health and nutrition related issues in the rural areas through providing leaflets, organizing rallies and meetings, and poster-presentations can play an important role in disseminating information among the poor women across the country. Often it is found that, women prepare meal and feed the family but they themselves do not take healthy meal. This leaves them undernourished and may even cause sickness.

Finally, development of rural infrastructure (e.g. roads, culverts, bridges, educational institutions, banks, markets, etc.) can play an important role in enhancing the mobility and access to information of the rural poor women. It will further help them to establish linkage with the stakeholders and increase their networking capacity. This will lead to greater participation of women in income-generating activities (IGAs). Moreover, government and NGOs should work together to involve these women in multiple IGAs at the same time which may result in sustained higher income inflows. This increased income shall cause a rise in the food consumption expenditure of the family and help to attain food security.

Moreover, provision of insurance for the rural poor households can elevate their food security status. Food aid from the government in times of calamity can be an effective strategy to protect the rural poor households from situations of hunger and malnutrition.

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