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Sustainable Empowerment Initiatives among Rural Women through Microcredit Borrowings in Bangladesh

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Abstract: Microcredit is an effective instrument that has been recognized to alleviate poverty, especially in developing countries such as Bangladesh. This study seeks to use microcredit as an instrument to bridge the gap between the accessibility of microcredit among poor rural women and sustainable socio-economic development, providing novelty to the concept of “sustainability of empowerment”. In addition, this study employed poor rural women to estimate the empowerment performance of microcredit borrowers compared to non-borrowers in the same socio-economic environment as it relates to microcredit in rural Bangladesh. A regression analysis was used to accomplish these objectives. This study also used propensity score matching techniques to find an easy way to access microcredit. The empirical results not only involve participation in microcredit accessibility but also the particular qualitative attributes of women empowerment. The results also suggest that sustainability is accompanied by affluence among microcredit borrowers, as indicated by women empowerment. The outcome of the empirical analysis shows that there is a significant impact of microcredit on increasing participation in the overall decision-making process, in legal awareness, independent movements, and mobility, as well as enhancing living standards to encourage sustainable women empowerment. This study recommends future investigations for microcredit providers to explore how to build an integrated, holistic approach to women empowerment in Bangladesh.

Keywords: microcredit; accessibility; women empowerment; impact assessment; sustainable development

1. Introduction

Women empowerment has become one of the key priorities for sustainable development around the world. Even in developed countries, this factor is also being considered, as women in developed countries experience several types of discrimination in different ways. For developing countries, gender inequality has been established as one of the most vital obstacles to progress. Indeed, women empowerment has been reflected as a significant indicator of the sustainability of women’s success and well-being [1]. Bangladesh is a developing country; until recently, it has been predominantly rural. In total, 66% of the population in Bangladesh lives in a rural area [2]. This creates vulnerability for women in the isolated areas of villages and thus necessitates a focus on the impact of microcredit that is accessible to the poor. Out of 144 countries, Bangladesh has been ranked 75th according to the 2015 gender gap index of the World Economic Forum [3].

Microcredit offers a functional method to generate income and reduce poverty and increase food security and women empowerment by boosting economic development [4]. Microcredit offers a way to begin participating in achievable income generation activities that are essential to securing working capital or a credit to assist the poor when they need assistance. Microcredit is a collateral-free investment, which is offered mainly to poor female clients to help them achieve the requirements for

their empowerment projects. Most poor women cannot access formal credit from traditional banks and other monetary organizations. As Yunus notes, this occurs “because untrained or illiterate poor are not poor; they are poor because they cannot retain the sincere returns of their labor. The reason is evident—the poor have no control over the capital that calls the tune, and poor rural women work for the benefit of someone else who controls the capital” [5]. The aim of microcredit schemes is to improve the lives of poor people by helping them select an inclusive financial organization to alleviate their poverty. Microcredit also helps poor women to set forth a path of transformational empowerment to enhance sustainable development. Subsequently, microcredit has reconstructed the economic and social configurations at the grassroots level by giving financial support to small-income households [6]. Accordingly, the study in [7] stated that the welfare of rural female borrowers has been significantly influenced by microcredit schemes in Bangladesh, consisting of household expenses, assets, and education. In addition, the work in [8] assessed that the prospective impact of microcredit programs is associated with decreasing the lack of rural households by suggesting to them the methods for easy consumption and income. Furthermore, microcredit has delivered significantly enhanced household incomes, crop production, livestock rising, expenditures, and employment to the agricultural and rural sectors in Bangladesh [9]. While Bangladesh has reached its maximum coverage of microcredit programs, it has still not reached a level of satisfaction for all rural women.

Women are the key targets of microcredit schemes. Microcredit for women is linked to stronger developmental impacts than microcredit for men [10–12]. Microcredit supports women in improving their self-confidence and self-esteem to help make them empowered. As a result, the decision-making power of women has developed in various areas, such as family planning, the marriage of their children, buying or selling properties, and education for their daughters. The authors in [13] indicated that the achievement “success” of women through microcredit is “highly impressive”. After becoming empowered, women are able to contribute to sustainable growth [14]. Microcredit institutions also empower women by stopping or decreasing domestic violence. A few cases have shown that women who did not get microcredit loans faced greater domestic violence. Microcredit might signify an enlightened path for poor women; following this path through borrowing would gradually decrease their income deficiencies and thus empower them to consider more risky investments and achieve decision-making power [15]. The work in [16] posits that microcredit initiatives are contributing to decreasing poverty encumbrance by stimulating women empowerment. In results, heterogeneity originates from approved empowerment definitions that are also used by microcredit organizations in various ways. Economic empowerment has become a vital implement for decreasing poverty and increasing the economic progress of women, as well as their output and effectiveness, by promoting their ability to attain rights and well-being [17,18]. As a current phenomenon in the zone of social sciences, it is very difficult and theoretically complex to define women empowerment; it is also operationally challenging to examine women empowerment. The objectives, significance, and suggestions for sustainable women empowerment vary according to social, political, regional, and cultural frameworks.

The objective of this study is to bridge the gap between the accessibility to microcredit for poor rural women and sustainable socio-economic development and to analyze the empowerment performance of microcredit borrowers compared to non-borrowers in similar socio-economic environments relative to microcredit in rural Bangladesh. The novelty of the current study is that it seeks to create a concept in microcredit literature that, depending on whether the credit is constrained, microcredit may garner an adjustment in psychosomatic self-efficacy (such as promoting prospective investments and sustainable development among the poorest people in Bangladesh). Providing access to, and the retention of, female microcredit borrowers in micro-credit schemes encourage sustainable socio-economic growth, which is linked to sustainable women empowerment. Sustainable women empowerment leads to, and re-boosts, sustainability in economic growth.

The rest of the paper is structured as follows. A review of the literature is presented in Section 2. The materials and methods are provided in Section 3. The results are outlined in Section 4.

The discussion is provided in Section 5, and the conclusions of this study and sketches for future recommendations are summarized in Section 6.

2. Literature Review

2.1. Microcredit and Women Empowerment

In its simplest form, microcredit is a provision of credit and other financial services for those who are deprived of a formal banking system [19]. It helps low-income or non-earning people obtain a financial loan and benefits their earning capabilities to help them meet their living standards. Considered to be an effective tool for poverty alleviation, as well as a method of financial inclusion for the poor and unbanked, microcredit was initiated by Professor Muhammad Yunus in the 1970s and later on gained popularity [20]. At an overwhelming rate worldwide, this financial process has increased the numbers of its users in developing countries, and, according to recent data sheets, more than 200 million people are direct or indirect beneficiaries of this system [21]. Microcredit assists its users' multidimensional well-being remarkably and improves rural living standards [22].

Since the term “women empowerment” is a crucial topic, it appears throughout the literature. Rural women empowerment refers to expanding women's assets and their capabilities to participate, sit at the table, negotiate, and both control and hold accountable the institutions that affect their lives [23]. Women's absolute and relative well-being is an observable dimension of women empowerment. Absolute well-being is the process of improving the success of women and is indicated by outcomes that measure the current status of literacy, health and nutrition, labor force participation, mobility, and ownership of assets, whereas relative wellbeing is the process of improving the position of women relative to men within the household and is indicated by women's involvement in household processes, such as decision-making, control over household income, assets, and loans [24]. Women empowerment begins when women understand how socio-cultural, economic, and political forces adversely affect them and thereby become aware of the socio-psycho-cultural inequity that is being imposed upon them. This process starts with the awareness and understanding of women's positive self-image, self-confidence, rights and duties, capabilities, and potential [25,26].

2.2. Linkages between Microcredit Accessibility and Sustainable Women Empowerment

Women empowerment through access to microcredit is considered an important factor for sustainable development strategies in developing countries. Sultana and Hasan [27] were among the first to consider empowerment via micro-financing in an econometric study while studying the Bangladesh Rural Advancement Committee's (BRAC's) microfinance program in Bangladesh. The authors measured three items: personal annual income, savings, and asset ownership. Every item was taken into consideration based on the imputed or estimated amount that a respondent possessed. Cash and non-cash savings and farm and non-farm annual income were considered when computing the estimated value for each item. The authors found that people who are engaged in BRAC had significantly higher levels of economic empowerment than the people who were not engaged in BRAC. The limitation of the study was its small sample size, as only 90 women were involved in the survey, and among them, 45 women belonged to the control group.

The work of Nwosu [28] reinforced the idea that hospitality education plays a vital role in women empowerment. The tourism industry shows active involvement in responsible business. Women are attaining knowledge and skills through capacity-building and are in a position now to take charge of their lives by engaging either in paid employment or as entrepreneurs. For example, a revolution within the hospitality sector has been taking place to create sustainable opportunities for self-realization among women in Nigeria. According to [29], capacity building and empowerment are the best ways to achieve sustainable community development. Therefore, NGOs, through programs such as micro-financing, capacity building, and self-reliance, are helping the community, as well as women, to become empowered.

The ability of the small-scale commercial hospitality businesses to act as a medium for the sustainable empowerment of women in the central region of Nepal was investigated in [30]. The research showed that, in an environment where women are a marginalized group, female tea house owners/managers provide higher levels of economic, social, and psychological empowerment, but their levels of political empowerment have to be improved. Further improvement relies on active involvement in the local and national political structures to communicate and ensure gender equality. Despite this, the pivotal elements within the four dimensions of empowerment appear to involve key points of economic empowerment. Increased levels of economic empowerment have had an immensely positive effect on the overall empowerment of women in the region.

Apart from a loan control assessment, the study in [31] conducted a survey to evaluate the agency dimension of empowerment by asking questions to women regarding their sense of self-worth. All the questions were based on qualitative statements, such as “Women should do all household work even if their spouse is not working”, or “Women should discuss domestic violence issues with people other than family members”. The survey was carried out in Vietnam, and the interviewees were asked to rate each item on a 5-point scale: “1” was “unimportant” and “5” was “extremely important”. The author discovered that the respondents were aware of their self-worth, as well as their rights and responsibilities, after four years in the program (except for the statement regarding household work, as mentioned above). After four years, the respondents placed more emphasis on their responsibility to the entire household’s work, suggesting that women’s perception of gender roles remained the same, albeit somewhat more intensified than before. The result is similar to the findings in [32,33], which observed that a microfinance program alone cannot change the status quo of gender stereotypes within households.

3. Materials and Methods

The survey of this study was conducted in the People’s Republic of Bangladesh, which is a South Asian country. Three different study areas (15 villages from 3 districts) were selected for this study. Five villages were chosen at random from each study area. The study areas were chosen due to the availability of different non-government microcredit organizations working on rural women’s development. Active and large microcredit institutions exist in the areas of active field research related to this study. A list of women who are microcredit borrowers from these institutions was randomly sampled. The survey was conducted in Bangladesh from July to December 2017. The field study areas are marked by stars on the map of Bangladesh (Figure 1). The names of the three study areas are as follows:

Dinajpur District in north-western Bangladesh.

Tangail District in the central region of Bangladesh.

Laksmipur District in south-eastern Bangladesh.

Data for the current study are based on primary sources. Primary data were collected through face-to-face survey interviews using structured questionnaires among rural female borrowers who were involved with microcredit programs over the ten years from 2007 to 2016. To compare the impact between the treatment and control groups, information on microcredit non-borrower women was also collected. A list of rural female borrowers was collected from the organizations that target poor rural women to provide microcredit services. The total sample size of this study was 428. Out of the total sample, 328 female borrowers (treatment group) involved in microcredit programs were selected randomly from each study area. The remaining 100 were non-borrower women (control group, i.e., those who did not receive microcredit services), who were selected randomly from each study area. To ensure the consistency of the survey, participants of both the treatment and control groups were chosen from among the same social backgrounds and economic conditions.

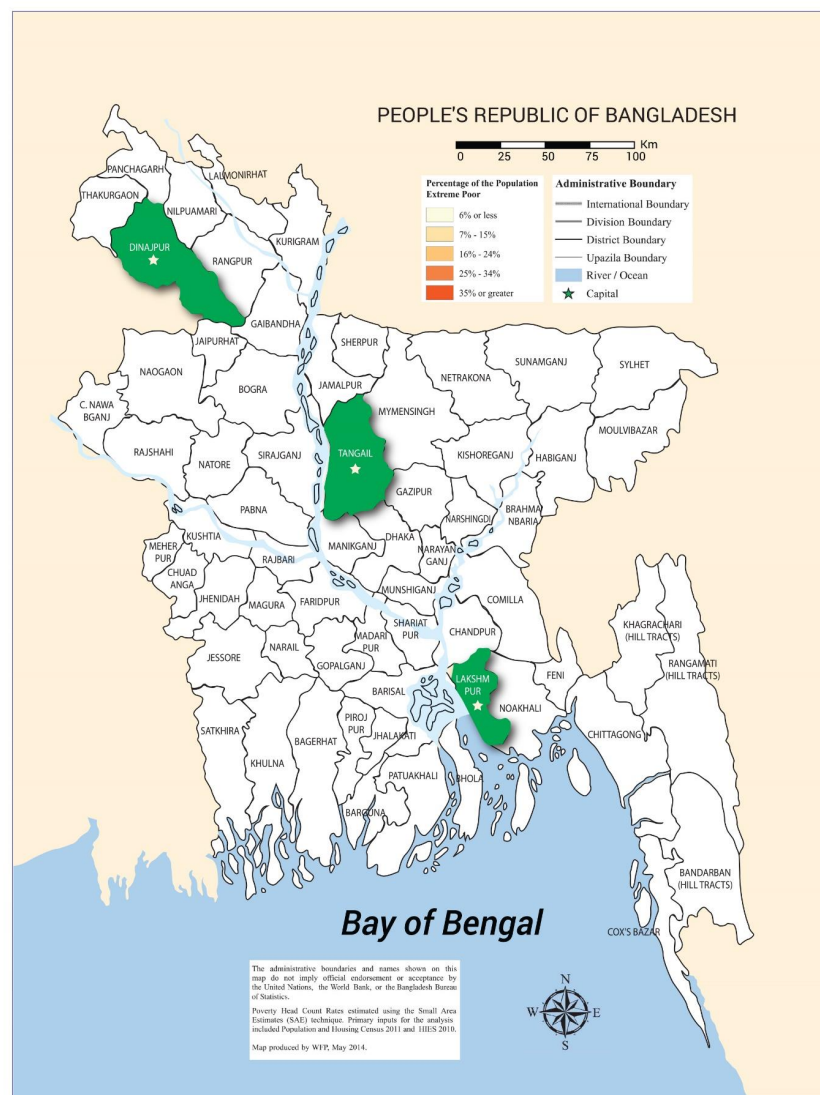


Figure 1. The study areas in Bangladesh.

Based on the selection criteria, low-income individuals from the study area received priority for accessing microcredit. Most of them are trapped in poverty or have limited financial resources and do not have enough income or savings to do business with traditional financial institutions. They also have very limited access to income generation activities and thus less opportunity to contribute to their household income or participate in their household decision-making processes. The accessibility of capital is critical to the emergence of entrepreneurship. Microcredit is a process that provides small sums to individuals or groups to help them become self-employed and to start or expand a small business. After successful repayments of microcredit loans, the borrowers might become eligible for a loan of a bigger amount.

In this study, six indicators were established from the responses of the rural women, and all the indicators of empowerment were assessed individually. These indicators are control over financial assets and properties, improved mobility, increased independent purchasing ability, improvement of living standards, increased participation in the decision-making process, and increased legal awareness. A five-point scale was used to record participant responses: strongly agree, agree, do not agree, disagree, and strongly disagree. Variable control over financial assets and properties was measured by the participant's response to the statement "when there is need, I can use my own income, cash savings, and properties". The ability of mobility is captured by the statement "I can visit family and friends

without permission from the male members of my family". This study examined the independent purchasing ability with the statement "I can independently purchase household things, for my children and also for myself". The status of living standards was measured by the statement "I try to maintain my way of living better than before". The ability to participate in decision-making processes was captured by the statement "I am able to participate in family planning, household expenses, my children's education and marriage, as well as in the purchase or sale of property, etc.". Additionally, legal awareness was measured by the statement "I am aware of legal issues and safety against domestic abasement". Finally, an impact evaluation was carried out to explore the results related to participation in income generation activities and some mechanisms of potential empowerment. It must be noted that the responses by women are conceptualized using "I" (she herself). The results are similar to the findings in [34].

This study uses both descriptive and econometric models to accomplish its objectives. This study also applied simple statistical data examination and propensity score matching (PSM) techniques to evaluate the impact of accessing microcredit's exceptional role in boosting women empowerment. To observe the post-treatment impacts, the PSM technique was used (PSM is used to facilitate experiments and evaluate treatment effects in non-experimental research) [35,36]. First, to determine the treatment, this study estimated the propensity of each individual. For example, PSM was used to compare the outcome variable "microcredit" in the sample, which was treated individually for the treatment and control groups. By using this method, this study compared every female microcredit borrower with each non-borrower. Moreover, the average difference of the outcome variable was taken as the average treatment effect. The PSM technique helps to balance the characteristic sample by removing selection bias, which hypothetically concludes the selection probability of female microcredit borrowers (the treatment group). This study used a probit model to balance for selection bias. The estimation of the probit model was used to acquire the propensity scores to be selected in microcredit projects [37]. To achieve this outcome, the propensity scores represent the anticipated possibilities. The selection bias is removed by executing bi-variate experiments against the outcome variable for all variables used in this study. The underlying propensity score matching approach only addresses the selection of observable factors, while the selection of unobservable factors is not addressed. Ultimately, this study removed selection bias successfully after balancing the differences for insignificant outcome indicators. In this way, the models used in this study were balanced. This research identically examined every sample of the borrowers with others from the non-borrowers by using the caliper matching technique (limiting the distance to 0.01). There are few dimensions for individual empowerment in terms of the treatment variable, which is expected when capturing the average treatment effect (ATT).

This study used a simple statistical method to discover the living situation (access to electricity, a toilet, and drainage) and household assets (including gold, land, livestock, and poultry) for both microcredit borrowers (treatment group) and non-borrowers (control group). Working capital was used to educate the borrowers. Participants were asked whether they are involved in microcredit programs, as well as several income generation activities (as a binary response; 1 = yes, and 0 = no). Participants were also asked whether they had bank accounts (representing financial enclosure). Focus group discussions (FGDs) through the office bearers of microcredit institutions (MIs) recorded extra information about the status of current loans, repayment cycles, and house visits by the staff of the microcredit institution. According to [38], the binary logistic regression model is beneficial when the dependent variable is dichotomous. The overall parametrical appearance of this model given as follows:

$$Y_{in} = \ln\left(\frac{P_{in}}{1 - P_{in}}\right) = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + \epsilon_{in} \quad (1)$$

where Y_{in} is the microcredit user (microcredit borrowers = 1; and non-borrowers = 0).

Accessing microcredit is a dependent variable for this study. To measure accessibility without any direct dimension, this study used household observations such as "borrowed microcredit" and "have not borrowed microcredit". This agrees with the former research that espoused observable receivers

and non-receivers as microcredit accessibility indicators [39]. Specifically, the value of the dependent variable is “1” for rural women who are involved with microcredit programs and “0” for women who are not involved with microcredit programs. In this study, X_i is the independent variable. To describe the independent variables (X_i), the individual-level characteristics of the household borrowers used in the analysis are X_1 = age of the borrowers; X_2 = education; X_3 = family size; X_4 = household income; X_5 = economic dependency; X_6 = self-employment; X_7 = savings; X_8 = assets; and X_9 = main income source of the borrowers.

Using the progress indicator, which is reliable and effective for women empowerment, to estimate policy intervention empowerment is very challenging [40]. There are two methods for this, process-based and outcome-based methods, which are frequently employed to assess the impact of women empowerment [41]. However, the process-based method has been criticized for using invalid proxy indicators of women empowerment. To measure the impact of microcredit accessibility on rural women empowerment, the current research followed an outcome-based method. This method was created based on a survey questionnaire based on real women’s behaviors. Thus, within a specific social context, this survey represents the empowerment process very successfully. The process of women empowerment was measured through direct responses to the survey questionnaire by rural women. To estimate the microcredit impact on the empowerment status of rural women borrowers, an empirical model was used as follows:

$$Y_i^* = \beta_0 + \beta_1 C_1 + \sum \beta_i X_i + u_i, \text{ where } u_i \sim N(0, 1), i = 1, \dots, n \quad (2)$$

$$Y = 1_{\{Y^* > 0\}} = 1 \quad \text{if } Y^* > 0, 0 \text{ Otherwise}$$

where Y_i = female empowerment indicators, which are dependent variables. In binary form, every indicator is either empowered = 1 or non-empowered = 0. C_1 = 1 if a microcredit borrower; 0 otherwise. X_i = independent variables.

4. Empirical Results

4.1. Descriptive Analysis

This section investigates the empirical findings descriptively. Defining the link between microcredit and women empowerment is the key objective of the current study. Accordingly, to better understand microcredit, women empowerment and accessibility, and develop an impact assessment of female microcredit borrowers, this study discusses the demographic and socio-economic characteristics of the sampled rural respondents. This discussion was carried out based on the data collected from the field study questionnaire, verifiable experiences, and the outcomes of the classification analysis (e.g., data frequency tabulation, comparing means).

The primary household variables summarized in Table 1 were used for the entire sample in this study to assess microcredit according to the respondents’ status. There were two groups of household characteristics: borrowers (treatment group) and non-borrowers (control group), consisting of dissimilar statistics whose mean value was derived using a *t*-test application. The relationship between the non-metric household variables that appears to be significant in accessing microcredit was investigated using a chi-square test. Without the inclusion of household asset values, the *t*-test results are not statistically significant at a level of 10%. Moreover, households’ accessibility to microcredit is far more connected to education, gender, self-employment, savings, distance, farm size, alternative sources of credit, and aversion to debt, as the chi-square tests were significant for these household variables at a level of 10% or greater.

Table 1. Chi-square test of the household characteristics of microcredit borrowers and non-borrowers.

Variable	Borrower (Treatment Group)		Non-Borrower (Control Group)		Chi-Square (χ^2)
	(n ₁ = 328)		(n ₂ = 100)		
	Count (n ₁)	%	Count (n ₂)	%	
Gender					$\chi^2 = 4.07^{**}$
Male	64	19.5	28	29.2	
Female	264	80.5	68	70.8	
Total		100.0		100.0	
Education					$\chi^2 = 17.183^{***}$
No Education	6	1.8	10	10.4	
Primary Education	303	92.4	77	80.2	
Secondary and above	19	5.8	9	9.4	
Total		100.0		100.0	
Age (in years)					$\chi^2 = 41.02$
24–35	72	21.9	32	33.3	
36–45	171	52.2	39	40.6	
46–55	79	24.1	16	16.7	
56–65	6	1.8	6	6.3	
66–72	0	0.0	3	3.1	
Total		100.0		100.0	
Mean	41.28				
Household Income (yearly)					
≤50,000 (BDT)	261	79.6	76	79.1	
50,001–100,000 (BDT)	56	17.1	19	19.8	
Above 100,000 (BDT)	11	3.3	1	0.1	
Total		100.0		100.0	
Mean	52,619				
Family Size					$\chi^2 = 4.18$
1–3	97	29.6	27	28.1	
4–6	226	68.9	65	67.7	
7–10	5	1.5	4	4.2	
Total		100.0		100.0	
Mean	4.16				
Self-employment					$\chi^2 = 3.92^{**}$
Yes	87	26.5	16	18.7	
No	241	73.5	80	83.3	
Total		100.0		100.0	
Economic Dependency ratio					$\chi^2 = 0.84$
r ≤ 1	254	77.4	80	83.3	
r > 1	74	22.6	16	16.7	
Total		100.0		100.0	
Mean	0.90				
Land Holding Type					$\chi^2 = 2.23$
Contracted	304	92.7	85	88.5	
Family Owned	24	7.3	11	11.5	
Total		100.0		100.0	
Assets (in BDT)					$\chi^2 = 13,667$
1000–15,000	241	73.5	51	53.1	
15,001–25,000	87	26.5	45	46.9	
Mean	12,278				

Table 1. Cont.

Variable	Borrower (Treatment Group)		Non-Borrower (Control Group)		Chi-Square (χ^2)
	(n ₁ = 328)		(n ₂ = 100)		
	Count (n ₁)	%	Count (n ₂)	%	
Main Income Sources					$\chi^2 = 3.76$
Farming Enterprise	246	75.0	77	80.2	
Non-Farming Enterprise	9	2.7	5	5.2	
Both	73	22.3	14	14.6	
Total		100.0		100.0	
Proximity to Financial Ins					$\chi^2 = 9.30^{***}$
10–30 min walk	233	71.0	83	86.5	
Above 30 min walk	95	29.0	13	13.5	
Total		100.0		100.0	
Savings					$\chi^2 = 10.86^{***}$
Yes	139	42.4	59	61.5	
No	189	57.6	37	38.5	
Total		100.0		100.0	
Aversion to Debt					$\chi^2 = 35.69^{***}$
Yes	79	24.1	54	56.3	
No	249	75.9	42	43.7	
Total		100.0		100.0	
Alternative Credit Source					$\chi^2 = 38.56^{***}$
Yes	188	57.3	88	91.7	
No	140	42.7	8	8.3	
Total		100.0		100.0	

Note: *** significant at 1% level; ** significant at a 5% level. Source: Statistical computations based on the authors' own questionnaire.

A total of 428 respondents from different household backgrounds were surveyed, and there were 328 microcredit borrowers among them (treatment group). According to gender, the survey sample contained 264 (76.6%) female borrowers and 64 (23.4%) male borrowers. In addition, the group of borrowers (treatment) mostly contained females (Table 1). The mean age of the survey sample was 41 years, whereas the participants' ages ranged from 24 to 72 years old. According to these ages, a significant number of microcredit borrower participants (76.6%) were aged between 36 to 55 years, whereas a larger portion of microcredit non-borrower participants (73.9%) were 24 to 45 years old. The mean age is very similar for both the microcredit borrower and non-borrower participants.

According to the classification of educational achievements, the field data target participants were divided into three groups. The first group had no education, and the other two groups had primary and secondary school education, respectively. The statistics show that only 3.8% of the participants had a secondary school education, whereas the majority of the participants had attained primary education. About 29.3% of participants had three or fewer members in their family, and very few (2.1%) had seven or more family members. Additionally, more than 70% of the household borrowers and non-borrowers had four or more members in their family, with little difference in terms of the average family size for both household groups. The outcome of the survey revealed that a few (24.3%) of the participants were involved in self-employment. Consequently, microcredit borrower participants (26.5%) had their own businesses comparatively more frequently than microcredit non-borrower participants (18.7%). The χ^2 test (equals 3.92) showed a strong relationship between the households' microcredit accessibility and self-employment attainment.

The economic dependency ratio (EDR), which is the ratio between household participants with no income to income earners, reflects a household's economic activity. Higher EDR households seem to be financially more strained than the households with lower ratios, so this ratio suggests that the

microcredit non-borrower household participants will be comparatively more economically active than the household participants involved with borrowing. According to EDRs, the non-borrower households' volume is higher than that of the borrower households, which is lower (by 16.7 and 22.6, respectively). There was no significant mean variance observed using the *t*-test (which equaled -0.73) among both household groups.

The household respondents' annual income from the survey is distributed into three parts (Table 1). For most microcredit borrower and non-borrower households, the highest annual income is below BDT 80,000, with 79.6% and 79.1%, respectively. The borrower households' mean annual income is BDT 20,752 higher than that of the non-borrower households. The *t*-test results revealed that this variance is not statistically significant. As a main income source, 323 participants (76.2%) depend on farming enterprises (e.g., livestock raising, crop farming, fishing), whereas only 14 participants (3.3%) are involved in non-farming income generation activities. About 22.3% of microcredit borrowers earn their income through both farming and non-farming enterprise activities, while 14.6% of microcredit non-borrowers source their income through non-farming enterprise activities.

As per the accumulated data, the total mean asset value is BDT 12,592, whereas the participants' household asset values range from BDT 1000 to BDT 25,000. This analysis reveals that the non-borrower households have assets valued at more than BDT 15,000, whereas the borrower households have assets of a comparatively lower value. Notably, most (73.2%) of the borrowers have assets worth less than BDT 15,000. Statistically, this mean difference is significant at a level of 5%, as the value of the mean household assets of microcredit non-borrowers is larger than that of borrowers (BDT 13,667 versus BDT 12,278). The majority of the participants (92.7%) have agreements for farming land, whereas 7.3% of participants have their own land. The non-borrowers have comparatively more money in their savings accounts with the microcredit program than the borrowers (61.5% versus 42.4%). For shareholding, the non-borrowing participants hold larger shares compared to the borrowers (78.3%). According to the alternative credit source and aversion to debt factors, the non-borrower participants are normally highly averse to having debt and are also more easily able to access alternative sources of credit than the borrower participants (Table 1).

This study provides a variety of information about microcredit loans, obtained from the participants from microfinance institutions (MFIs; Table 2). A small portion of the borrowers acquired microcredit loans using a single loan with a maximum amount. The borrowing volumes of the household borrowers (29%) are similar; most could borrow no higher than BDT 10,000 to BDT 10,001 and BDT 25,000 or between BDT 25,001 and 50,000. Very few microcredit borrowers (13.7%) acquired microcredit loans above BDT 50,000 as a single loan. Furthermore, the household borrowers' total borrowed average loan amount is BDT 44,012. About half of the borrowers' microcredit loans are categorized as short term (repayment within one year) loans. Interestingly, the authors in [42] suggest that there is no agreement between the stability and expansion of long-term users from the perspective of microcredit. There is no need for any collateral among the vast majority (92.1%) of microcredit loans. The loans distributed with the requirement of collateral use chattel mortgages, mortgage properties, co-signers, and promissory notes as collateral guarantees to MFIs (Table 2).

Usually, after a potential borrower submits his or her loan application, the microcredit loan (89.3%) is approved within one week of the processing period. Table 2 indicates that the key reason that household borrowers seek microcredit loans is to invest in agricultural enterprises, including livestock raising, farm cropping, the purchase of farming machinery, and harvest processing. Most household borrowers (72.6%) capitalized their loan-related agricultural activities, and only (2.7%) used it on related non-agricultural activities (like household consumption, children's education, financing self-run enterprises). For both agricultural and non-agricultural purposes, about 25% of microcredit borrowers invest their loans.

Finally, for the repayment of microcredit loans, the majority of the participants (61.3%) repay their loans annually; very rarely (nearly 2%), loans are refunded weekly. Among the category of credit-funded activities, the refunding timetable for microcredit loans is acceptable [43]. This study

shows that most microcredit loans are capitalized in agricultural activities and their repayment timetables are very closely connected to their production circle. For the loans that are used to develop small-scale self-employment, the duration of repayment can be short as monthly or semi-annually. It has been proposed that a flexible schedule of repayment will support activities to generate more fruitful income. This result is similar to the results of previous studies [44,45], which observed that the repayment duration of agricultural production microloans is about one year or longer, whereas microloans related to non-agricultural activities, such as handicrafts and self-run businesses, are generally refunded within a year or less (as low as three months).

Table 2. Details of microcredit loans.

Particulars	Categories	All Borrowers (N = 328)	
		Total	%
Single Loan Amount	≤10,000 BDT	96	29.3
	10,001–25,000 BDT	92	28.0
	25,001–50,000 BDT	95	29.0
	>50,000 BDT	45	13.7
	Total		100.0
Loan Term	Short term (≤1 year)	197	60.1
	Long term (>1 year)	131	39.9
	Total		100.0
Collateral	Mortgage Property	2	0.6
	Chattel Mortgage	2	0.6
	Promissory Note	10	3.0
	Co-signer	12	3.7
	Total	26	7.9
Loan Processing Time	Within 1 week	293	89.3
	More than 1 week	35	10.7
	Total		100.0
Payment Frequency	Weekly	7	1.7
	Monthly	75	23.2
	Semi-annually	46	13.9
	Annually	200	61.2
	Total		100.0
Loan Purpose	Farming activities	238	72.6
	Non-farming activities	9	2.7
	Both	81	24.7
	Total		100.0

Source: Statistical computations based on the authors' own questionnaire.

This study exemplifies the descriptive statistics of women empowerment, some attributes shared by both microcredit borrowers and non-borrowers in Table 3. This study indicates that female microcredit borrowers are more successful in their creation of financial assets or attainment of property. Microloans also improved their mobility, increased their independent purchasing ability, increased their participation in decision-making processes, improved their living standards, and increased their legal awareness of domestic abuse. In addition, for non-borrower women, taking further risks is an essential variable of empowerment.

Table 3. Female empowerment attributes.

Empowerment Attributes	Description
Control over financial assets and property	Control over own income, cash savings, and property
Improved mobility	Can visit family and friends without husband's permission
Increased independent purchasing ability	Can independently purchase household things, both for their children and for themselves
Improvement of living standards	Improved way of life and maintaining a level of standards
Increased participation in decision-making processes	Increased participation in family planning, household expenses, children's education and marriage, the purchase or sale of property
Increased legal awareness	Can seek legal safety against domestic abuse

Source: Statistical computations based on the authors' own questionnaire.

Despite the possibility of a sample bias between microcredit borrowers and non-borrowers, a comparison of means is not sufficient to determine the real outcome. The borrowers (treatment group) and non-borrowers (control group) could be different in all of their characteristics [46]. Most of the households that chose microcredit services to empower themselves possess socio-economic attributes that are related to necessity.

4.2. Microcredit Accessibility

This study used a probit regression model to evaluate the impact of the characteristics of rural women, who are the primary key determinants in accessing productive microloans to start up new businesses. The results of the probit model estimation in Table 4 indicate access to microcredit based on the household samples. Both the pseudo R^2 and goodness of fit are rationally high and thus signify a good fit. The variables include age, the individual level of household borrowers at the time of joining, age square, the number of family members measured for the level of education, family size, household income, economic dependency, self-employment, household savings, household assets, and the main income source of each individual respondent.

Table 4. Outcomes of the Probit regression analysis for access to microcredit (1 = borrowers or treatment group, 0 = non-borrowers or control group).

Variable	Coefficient	P > z
Age	−0.35 *	0.10
Age Square	0.01 ***	0.00
Education	0.05 **	0.02
Family Size	0.17 *	0.06
Household Income	0.02	0.15
Economic Dependency	0.15	0.15
Self-employment	0.36 ***	0.00
Savings	0.24 **	0.00
Assets	0.04	0.12
Main Income Source	0.05 **	0.02
Constant	5.78 ***	2.15 ***
No. of Observation	428	
LR Ch ²	46.20 ***	
Log Likelihood	−304.93	
Pseudo R ²	0.11	

Note: *** significant at a 1% level; ** significant at 5% level; * significant at 10% level. Source: Statistical computations based on the authors' own questionnaire.

The results of this study suggest that both the age and age square of microcredit borrowers at the individual level have a strong relationship with accessing microcredit. A non-linear association

with age is indicated by a statistically significant square term. Education helps borrowers increase the probability of accepting a microcredit loan significantly. The family size of the respondents also indicates a significant relationship. The household income, economic dependency, and assets of the household borrowers indicate an insignificant association with accessing microcredit. Household savings and self-employment also show a significant relationship with access to microcredit loans.

4.3. Impact Assessment

This study provides a direct impact evaluation for accessing microcredit based on sustainable female empowerment in rural Bangladesh. The representatives of microcredit programs are skilled in the concept of door-step banking, thereby allowing microcredit to spread evenly across all the regions up to very remote areas. Microcredit representatives frequently visit far-off villages to propose microcredit loans and collect the installments of the borrowers' reimbursements.

After running the regression models, the propensity participation was calculated using the program. This study treated borrowers with non-borrowers to estimate their differences through the same propensity score by using caliper matching. We estimated the mean of the differences between borrowers and non-borrowers as the ATT (average treatment of the treated). We also estimated the effect of accessing microcredit on several attributes of women empowerment. As a result, this program culled the appropriate variables.

When estimating the difference of the mean using *t*-statistics between the borrower (treatment) and non-borrower (control) groups (Table 5), before matching, the microcredit borrowers and non-borrowers varied significantly in their maximum variables. However, after matching, both groups did not vary in any variable. Thus, by using caliper matching of the propensity score, we were able to successfully reduce the sample bias.

Table 5. Differences in the mean estimation between the borrowers and non-borrowers before and after matching.

Variable	Unmatched/Matched	Mean of Borrower	Mean of Non-Borrower	<i>t</i> Statistic	<i>p</i> > <i>t</i>
Age	U	32.28	35.83	−7.13 ***	0.00
	M	32.28	31.97	0.70	0.48
Age square	U	842	890	−5.37 ***	0.00
	M	842	824	0.78	0.43
Education	U	5.36	4.96	1.25 *	0.06
	M	5.36	4.36	0.57	0.50
Family size	U	1.15	1.09	3.02 ***	0.00
	M	1.15	1.15	0.08	0.94
Household income	U	1.45	1.43	0.68	0.31
	M	1.45	1.39	0.60	0.30
Economic dependency	U	1.75	1.73	0.88	0.32
	M	1.75	1.71	0.80	0.30
Self-employment	U	5.08	3.94	1.57 ***	0.00
	M	5.08	2.59	0.70	0.38
Savings	U	1.73	1.75	0.85	0.75
	M	1.73	1.71	0.80	0.46
Assets	U	7.25	7.55	0.34	0.45
	M	7.25	7.28	0.58	0.38
Main income source	U	1.39	1.04	3.92 ***	0.00
	M	1.39	1.11	0.08	0.96

Note: *** significant at a 1% level; * significant at 10% level. Source: Statistical computations based on the authors' own questionnaire.

The findings of this study are shown in Table 6. The impact assessment of microcredit borrowing improving income generation activities through participation is comparatively higher than the result for microcredit non-borrowers. Microcredit borrowers, for example, showed greater household savings than microcredit non-borrowers. These outcomes showcase the differences in empowerment after participating in microfinance; higher responses indicate better outcomes. To develop sustainable empowerment (in terms of probability), the *t*-test reveals that there are significant improvements in all empowerment measures after contributing to microcredit programs. A Wilcoxon test also confirmed that the medians of the responses for all criteria differ at a 1% significance level [47].

Table 6. Participation impact of microcredit between borrowers and non-borrowers based on various empowerment indicators.

Variable	Borrowers	Non-Borrowers	Difference %	t Stats
Participation in income generation activities	2.49	1.39	1.08 ***	2.88
Increase in household savings (Bangladeshi Taka)	17,668	10,509	25.26 ***	8.80
Control over financial assets and property	2.60	1.70	10.10 *	1.89
Improved mobility	2.43	1.62	1.81 ***	2.97
Increased independent purchasing ability	2.70	1.84	2.86 *	1.88
Improvement of living standards	2.50	1.55	2.95 **	1.29
Increased participation in decision-making processes	2.52	1.65	1.87 ***	1.97
Increased legal awareness	2.57	1.57	1.89 ***	2.77

Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level. Source: Statistical computations based on the authors' own questionnaire.

In addition, the results of Table 6 reveal that the microcredit borrower women improved their mobility, increased their participation in decision-making processes, and also increased their legal awareness of violence issues significantly at a 1% level. The findings also show that microcredit female borrowers improved their living standards significantly at a 5% level and also increased their independent purchasing ability and control over their assets significantly at a 10% level. Earlier, we observed poorer mobility, no participation in decision-making processes, and less awareness about legal issues among the poor rural women. After involving income-generating processes with the help of microcredit loans, rural female borrowers developed better living standards and empowered themselves compared to non-borrower women [48,49].

4.4. Robustness Testing

This study used a doubly-robust test to combine the matching for both propensity scores and the regression model. By using this test, this study first trimmed the data that would have problematized solo matching but retained the matching weight. Some empowerment capability attributes were used as dependent variables, with borrowers (1 = for borrowers and 0 = for others) and non-borrowers in probit models as independent variables (Table 4). The coefficients in Table 7 offer different dependent variables than those used by various regression models. The results show precisely the same as above: the microcredit borrowers are more involved than non-borrowers in increasing their monthly incomes, increasing their household savings, helping in asset creation, improving their mobility, increasing their independent purchasing ability, improving their living standards, increasing their participation in decision-making processes, and improving their legal awareness about violence-related issues.

Table 7. Outcomes of doubly robust regression models.

Dependent Variable	Regression Outcome for Microcredit Borrowers		
	Coefficient	t-Statistic	p-Value
Participation in income generating activities	0.13 ***	5.33	0.00
Increase in household savings	0.35 ***	3.23	0.00
Control over financial assets and property	0.38 **	3.54	0.00
Improved mobility	0.25 ***	2.47	0.01
Increased independent purchasing ability	0.16 ***	2.29	0.02
Improvement of living standards	0.21 ***	4.28	0.00
Increased participation in decision-making processes	0.14 ***	2.54	0.04
Increased legal awareness	0.33 ***	3.76	0.00

Note: *** significant at a 1% level; ** significant at a 5% level. Estimates are based on propensity score matching.

Source: Statistical computations based on the authors' own questionnaire.

In short, this research suggests that women empowerment through microcredit is a key example of the way poverty can be reduced by supporting an atmosphere of women empowerment, which helps rural poor women to come out from low-level balance traps [50–52]. This helps provide a mission statement to access microcredit in developing countries with persistent poverty traps like Bangladesh. This study, using impact assessment methods, has attempted to determine whether accessing microcredit can improve “sustainable female empowerment”. This finding is agreed with by this study [53]: Microcredit is sustainable and contributes significantly towards the empowerment of rural women in Bangladesh.

5. Discussion

This study reveals that, with the involvement of a microcredit program, poor rural women are coming outside of their houses and participating in different activities related to income-generation. The current research indicates that the income of female microcredit borrowers has improved significantly, which has increased women's participation in household decision-making processes. By taking part in the microcredit program, the rural female participants were able to develop their decision-making abilities, self-employment, savings, and participation in financial decisions in the family. Consequently, microcredit has become an influential weapon for sustainable women empowerment from a socio-economic perspective. The outcome of this study is supported by the previous literature [54,55], which has also noted the significant relationship between accessing microcredit and women empowerment.

This study demonstrates that, after joining a microcredit program, availing micro-credit development has generated a positive impact on the livelihoods of rural women in Bangladesh, including their income and level of empowerment. It is the potential to achieve sustainable empowerment once the difficulties faced by poor women are addressed effectively [56,57]. Therefore, to evade difficulties like delaying loan sanctions, insufficient loan amounts, a shortage of skilled training, and problems in marketing products, we recommend adopting the necessary measures to generate effective results and sustainable empowerment in rural Bangladesh. According to [58], after availing microcredit, the borrowers contributed to their family incomes much more significantly than non-borrowers. The study in [59], on the other hand, warns against the negative impacts of microcredit with regard to incurring unbearable levels of debt. Thus, to convert small borrowers into large borrowers for different types of ventures, it is very important to increase the loan quantum and enhance the knowledge and skill in management. In terms of income and empowerment, this might powerfully increase the impact of microcredit.

In summary, the empirical findings of this study confirm the results of previous studies [60–62], suggesting that women empowerment through accessing microcredit exerts a progressive and significant impact across various measurements. Primarily, the empirical outcomes suggest that utilizing microcredit helps rural women to have more agency over their financial assets, like income,

savings, and properties, which are mentioned in the literature as forms of economic empowerment. This result is significant since the literature shows that the foundation of women empowerment is always formed by economic empowerment through other measures [63–65]. Additionally, being a microcredit borrower significantly contributes to enhancing women's independence and awareness of legal issues, even after controlling for knowledge-related variables, such as education levels. Women whose main income source is farming benefited significantly more through microcredit; the literature indicates a particular sense of empowerment by participating in microcredit programs [66,67]. These findings also suggest that in Bangladesh, the women who do not have liberty or freedom in their mobility and movement are the most vulnerable women [68,69]. Finally, this study indicates that microcredit has contributed positively and significantly towards the sustainable empowerment of rural women in Bangladesh.

6. Conclusions and Future Recommendation

This study evaluated the accessibility of microcredit and the impacts of microcredit in rural Bangladesh. The data investigation and impact estimation both demonstrated that the living situations of female microcredit borrowers were improved and that their household poverty was reduced. Despite their usually-impovertised conditions, poor rural women can become more confident and risk-averse. Surrounded by these socio-economic situations, microcredit helps female borrowers escape poverty-associated feelings of misery. Microcredit is fueled by rural women who are facing a lack of empowerment and usually initiate income-generating activities to overcome society's expected gender roles. Microcredit programs have great potential in offering small loans with fast repayment sequences, thus providing recurring loans with a high frequency.

The findings of the current study indicate that self-employment and savings have a positive relationship with microcredit accessibility. To evaluate the impacts of microcredit, this research considered the six attributes of empowerment: the creation of financial assets, mobility, purchasing independently, participation in household decision-making processes, improved living standards, and legal awareness against violence. The results indicate that by borrowing microcredit, rural women are able to establish their decision-making power, increase their legal awareness against violence issues, improve their living standards, and allow them greater mobility and movement by visiting family and friends without permission. By establishing these improvements, female microcredit borrowers become more empowered than non-borrower women. The remaining indicators show some mixed results. The mixed results indicate that availing micro-credit is not primarily significant for empowering women. There are two types of limitations in the whole process. Firstly, risk-averse and non-innovative income-generating activities themselves remain partially embedded in the socio-economic framework; second, microcredit institutions are highly concentrated on repayment rates and their own progress, thus transferring the burden of risk to the rural poor. These limitations should be further addressed by microcredit institutions to facilitate the prospective goal of socio-economic growth and sustainable women empowerment.

For future recommendations, certain procedures are required to address microcredit programs as a motivator for women empowerment. Microcredit organizations should offer suitable and socially acceptable training, adequate monitoring, and prepare rural women borrowers to bear the related hazards (mentally and financially), which are crucial for women empowerment in rural Bangladesh.

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