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NGO-Promoted Microcredit Programs and Women's Empowerment in Rural Bangladesh: Quantitative and Qualitative Evidence

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In response to the continuation of poverty and gender inequity in the distribution of resources, a growing literature is emphasizing planned interventions at the grass-roots level aimed at improving the socioeconomic condition of women.¹ The credit-based income-generating project, which mobilizes and organizes women at the grass-roots level and provides access to supportive services, is becoming a leading mechanism of planned intervention for poverty alleviation.² Often owing to their flexibility and grass-roots-level organizing ability, nongovernmental organizations (NGOs) are entrusted with the task of administering microlevel development programs to mitigate poverty and to enhance women's empowerment. Bangladesh is no exception to this growing trend, in which an ever increasing number of NGOs are providing collateral-free microcredit to poor women in order to improve their livelihood and economic status.³

The advocates of microcredit programs for poverty alleviation emphasize that this approach is appropriate not only to fight poverty but also to improve

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women's status and empowerment⁴ They also have given a renewed emphasis to targeting women in microcredit programs in order to improve women's access to material resources and their control over the sources of power⁵ Often microcredit and other development programs are launched with the dual objective of promoting both the economic betterment and the empowerment of poor women⁶ Since they also seek to improve women's access to material assets and their awareness of their own rights, the programs are likely to alter the traditional expectations that provide little scope for women's participation in the household decision making that affects their everyday lives To the extent this transformation occurs microcredit programs for poor women are likely to bolster women's attempts to overcome the control of the prevailing patriarchal system in order to assert themselves and to demand some share of family resources⁷

Most of the NGOs in Bangladesh follow the Grameen Bank's minimalist credit strategy in providing women with access to credit⁸ The unique aspect of Grameen Bank's strategy is not its financial intermediation of credit for the poor, but its social intermediation in which the viability of the former is ensured by the latter That is, the Grameen Bank has replaced the requirement of material collateral by group responsibility in which an individual's access to credit is determined by the formation of a group and the group's repayment behavior⁹ To strengthen the group's influence on individual members Grameen Bank provides social development inputs for the members in order to make them individually and socially accountable These social inputs include social interaction and group training aimed at promoting not only the high repayment of loans and their effective and efficient utilization but also the raising of a loanee's social and political consciousness and literacy level The ultimate policy aim of the group formation is the empowerment of poor women a goal with both gender as well as class implications Case studies suggest that changes have occurred in the rural power structure as a result of the Grameen Bank's injections of capital into the poorer social strata¹⁰ One implication of these changes in the rural power structure is that the targeted credit can be used as a mechanism for enhancing poorer women's existing socioeconomic conditions, and thereby altering the relations between gender and class, a benefit for the weaker parties Critics contend however that while a marginal increase in income and assets can enhance well-being and economic security, the increase may be too small to alter entrenched political and economic relations¹¹ But to the extent that the introduction of credit into existing socioeconomic relations is combined with consciousness-raising efforts that enhance poor women's recognition of their rights, it may also increase poor women's knowledge of how to go about securing such rights The ability to attain these rights may also be augmented through the supportive environment created by the group formation group interaction and group solidarity associated with credit activities

The objective of the present study is to explore the relationship between poor women's participation in microcredit programs and their empowerment by using empirical data from rural Bangladesh This is done by examining quantitative data collected from a representative sample of the female loanees as well as qualitative data from selected female loanees in five NGOs from rural Bangladesh

We compare NGO credit members from an NGO program area with nonmembers from a nonprogram area with respect to women's empowerment in order to see if there is any influence of NGO credit membership on women's empowerment. Similarly, nonmembers from NGO program areas are compared with nonmembers from nonprogram areas in order to look at the diffusion effect of NGO credit membership on women's empowerment among nonmembers.

Research Hypotheses

We hypothesize that participation in credit and credit-related activities by NGO credit members leads to greater empowerment of credit members compared to noncredit members, and that the duration of credit membership is positively associated with women's empowerment. Also, individual noncredit members who live within a credit program village are likely to be more empowered than nonmembers in the control areas, owing to the diffusion effect of the credit program from the credit members to nonmembers within a credit program village. This diffusion effect as well as the women's empowerment effect of NGO-promoted microcredit programs may differ by region. Thus, the southern and eastern regions, where early proselytizers of Islam in Bangladesh settled, are historically more conservative, imposing more rigorous restrictions on women's movements outside the home, their sharing in household decision making, and their participation in economic activities outside the home.¹² Consequently, in the southern and eastern regions, the interaction between women's participation in NGO credit programs and sociocultural conditions is likely to be less conducive to women's empowerment than it is in other, less traditional regions.

By requiring the women to come out of their houses and to participate in peer group meetings as a condition of credit eligibility and by providing them with independent sources of income, microcredit programs can reduce their socioeconomic dependence and traditional seclusion.¹³ This effect can take on an even greater significance when the income-generating projects are made an integral part of larger social mobilization efforts such as consciousness-raising, functional literacy training, and group formation. Indeed, the combination of sources of income outside the household, peer-group association, social support from outside one's own family, and peer group solidarity that NGO-promoted microcredit programs generate can empower women in several dimensions. First, by providing independent sources of income outside the home, microcredit may have reduced women's economic dependency on their husbands and thereby increased women's autonomy from their husbands. Second, the same independent sources of income together with their exposure to new sets of ideas, values, and social support may make these women more assertive of their rights than are other women who confine themselves to domestic life. Finally, by providing women with control over material resources, microcredit programs may increase women's domestic prestige and their importance in the eyes of their husbands, thereby increasing interspouse consultation in household matters. The present paper seeks to explore all these different dimensions of women's empowerment as influenced by women's participation in NGO-promoted microcredit programs.

Past studies on the impact of microcredit programs on women's empowerment in rural Bangladesh have been beset with many conceptual and methodological problems. First, the concept of women's empowerment has often been too narrowly defined to be of much practical significance.¹⁴ Second, these studies either relied on ethnographic data or on small samples from localized areas, a procedure that precludes any meaningful statistical estimates of how each facet of women's empowerment is affected by microcredit programs.¹⁵ The present study's focus on different facets of women's empowerment by using large sample survey data is likely to overcome many of the shortcomings of past studies and to arrive at a better understanding of the impact of the NGO-promoted microcredit programs on women's empowerment.

Data and Measurements of Women's Empowerment

As mentioned earlier, this study uses both quantitative and qualitative data. Since quantitative analysis cannot always reveal the perceptions of the people involved in innovative behavior, the quantitative analysis of the survey data in the present study has been complemented by qualitative data gathered from focus group sessions with selected interviewees who participated in the standard household survey. The advantages of focus group sessions in revealing underlying attitudes, opinions, and behavior patterns are well known.¹⁶ Since the grass-roots-level participatory interventions by NGOs are expected to create a new sense of identity, new group dynamics, and other positive reactions among beneficiaries that may profoundly change their lives, focus group sessions are considered to be appropriate to capture these qualitative dimensions of life.¹⁷ The quantitative data of this study come from a mid-1995 survey of 3,564 married women under age 50. Two separate samples were drawn, using a random multistage stratified cluster sampling design to include villages from regions where five small- or medium-sized NGOs have had on-going rural credit programs for poor women. Each of the five NGO programs was treated as a separate stratum. These five NGOs are the Association for Social Advancement (ASA), Rangpur Dinajpur Rural Service (RDRS), Development Center International (DCI), Community Development Association (CDA), and Village Education Resource Center (VERC). Although these NGOs differ in the range of services offered, they all have a common program element, which is to provide microcredit for poverty alleviation. The program intervention areas of these five NGOs are geographically separated from each other.

One sample consists of loanees and nonloanees from each of the five NGO program areas, and the other sample consists of nonloanees from counterpart nonprogram areas with no significant presence of any NGO program. The criteria for the selection of counterpart nonprogram areas were that they be located in the respective neighboring geographic areas of the program areas and that they have similar communication facilities and other socioeconomic characteristics including literacy rate, topography, access to electric power, and presence of other development programs.

From some 50 selected program areas of the five NGOs, 1,164 loanees and 1,200 nonloanees were randomly drawn using systematic sampling procedures.

following a multistage stratified cluster sampling design. Another 1,200 nonloanees from 50 nonprogram areas were selected using the same procedures. The combined sample size of 2,364 women from NGO credit areas together with their comparison group of 1,200 women in nonprogram areas, represents a fairly large number of currently married poor women to consider in analyzing the impact of NGO credit programs on women's empowerment. A more detailed description on the sampling procedure is available elsewhere.¹⁸ The survey, which was funded by the United States Agency for International Development (USAID) and conducted by Associates for Community and Population Research (ACPR), a private research firm in Bangladesh, collected detailed information on the respondents' socioeconomic backgrounds, their income-generating activities, their decision-making authority and autonomy, and their knowledge of, attitudes toward, and practice of family planning. Some of the characteristics of the respondents by NGO membership or nonmembership in both NGO program and nonprogram areas are presented in table 1. The descriptive statistics in table 1 reveal that the sample is typical of the poor in rural Bangladesh. A large percentage of respondents is land poor, average household income is low (the equivalent of US \$624 annually for the sample as a whole) and less than one-quarter of respondents report ever attending school. The mean age of respondents is 29, and the mean age at first marriage is 14.6. On average, the women in the sample have 3.1 living children.

Among women in the program area, those who are credit members are older (mean age of 33, compared with 26 for the nonmembers), are of higher parity (3.6 children vs. 2.7 for nonmembers), and are of higher socioeconomic status than nonmember women (average annual income of US \$763 vs. US \$584). The mean length of membership in the credit program is 48 months.

In the present paper, the concept of women's empowerment has been split into three components and measured separately in order to arrive at a better understanding of their underlying factors and their relationship to women's empowerment.¹⁹ These three separate indices are the interspouse consultation index, individual autonomy index, and authority index.

The questions on interspouse consultation in the first panel of table 2 seek to represent the extent to which husbands consult their wives in household affairs. The questions in the second panel are used to construct an autonomy index to represent women's self-reported autonomy either in their physical movement outside the home or in their spending of some money on their own. Both activities are heavily restricted under the traditional patriarchal family system of rural Bangladesh. Finally, the questions in the third panel are used to construct an authority index to represent women's self-reported actual decision-making power over some important aspects of their family life. Again, under patriarchy, decision-making power within families has traditionally been in the hands of men, on whom women are totally dependent.²⁰ Only under modern influence or as a by-product of participation in extrafamilial income-earning activities may women have gained some power to participate in household decision making.

The seven questions of the consultation index are expressed in trichotomous options by design. These three options were given different weights—"generally" was assigned a value of 1, "never" a value of 0, and "occasionally" an intermediate

TABLE I
CHARACTERISTICS OF CURRENTLY MARRIED WOMEN ACCORDING TO THEIR RESIDENCE IN PROGRAM AREAS OR NONPROGRAM AREAS
AND THEIR MEMBERSHIP OR NONMEMBERSHIP IN CREDIT PROGRAMS, RURAL BANGLADESH, 1995

CHARACTERISTIC	TOTAL (N = 3 564)	PROGRAM AREAS		t value ^a	NONPROGRAM AREAS	
		Member (N = 1,164)	Nonmember (N = 1 200)		(N = 1 200)	t value ^a
<i>Socioeconomic variables</i>						
Percentage owning land	85.4	94.6	80.7	10.23	81.3	9.89
Average household income (U S dollars)	624	763	584	10.73	529	15.27
Average size of land (in decimals)	59.8	60.0	60.7	0.18	58.7	0.25
Percentage with husbands in nonagriculture job	54.8	61.5	54.6	3.40	49.1	6.06
Percentage with concrete or corrugated iron building structure	37.2	44.8	37.0	3.86	29.9	7.49
Percentage ever attended school	21.2	23.1	22.3	0.46	18.2	2.94
Mean years of school	0.9	0.9	1.0	0.63	0.8	2.34
Mean years of husband's schooling	2.0	2.3	2.1	1.78	1.7	4.79
<i>Demographic variables</i>						
Mean age	28.9	33.1	26.4	19.53	27.2	17.44
Mean age at first marriage	14.6	14.4	14.8	4.41	14.6	2.93
Mean number of living children	3.1	3.6	2.7	12.02	3.1	6.54
Mean number of births	3.7	4.2	3.2	11.93	3.6	6.71

^at test of differences between members and nonmembers within NGO program areas
^bt test of differences between members within NGO program areas and nonmembers within comparison areas
 100 decimals constitute one acre of land
 *p < 05 **p < 01

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TABLE 2
DISTRIBUTION OF WOMEN'S RESPONSES IN PERCENTAGES TO QUESTIONS ON INTERSPOUSE CONSULTATION INDEX
INDIVIDUAL AUTONOMY INDEX AND AUTHORITY INDEX, RURAL BANGLADESH 1995 (N = 3 564)

INTER-SPOUSE CONSULTATION INDEX					AUTONOMY INDEX					AUTHORITY INDEX				
Frequency of respondent's consultation by her husband on the following matters	Generally	Occasionally	Never	Total	Frequency of husband's restrictions on the following matters	Generally	Occasionally	Never	Total	Decision maker on the following matters	Husband Alone	Wife Alone	Joint Decision	Total
Buying household furniture and utensils	59.8	17.6	22.5	100.0	Visiting respondent's parental home	3.8	13.5	82.7	100.0	Voting in election	65.5	11.1	23.4	100.0
Purchase of land	60.5	22.6	16.9	100.0	Visiting hospital	9.8	17.6	72.6	100.0	Child's education in school	11.9	9.3	78.8	100.0
Education expenses of children	67.2	21.0	11.8	100.0	Visiting village market	62.5	16.0	21.5	100.0	Family planning	9.1	5.5	85.4	100.0
Medical treatment of family	71.1	21.1	7.8	100.0	Helping a relative with money	17.3	25.3	57.4	100.0	Family day to day expenditures	29.1	6.6	64.3	100.0
Purchasing women's clothes	63.9	28.1	8.0	100.0	Setting aside money for respondent's own use	9.8	16.6	73.6	100.0	Going outside of home	45.6	14.6	39.8	100.0
Purchasing children's clothes	63.6	27.6	8.8	100.0						Medical treatment	21.2	9.3	69.5	100.0
Purchasing daily food	67.8	23.5	8.8	100.0						Entertaining guests	9.1	24.0	66.9	100.0
										Buying respondent's traditionally favorite things	77.8	17.1	5.1	100.0

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score of 5. Similarly for the trichotomous options for the autonomy index, generally was assigned a value of 0, 'never' a value of 1 and 'occasionally' an intermediate score of 5. Finally for the authority index questions, 'wife alone' was assigned a value of 1, 'husband alone' a value of 0 and 'joint decision' an intermediate score of 5.

Correlations among the three indices were examined to ensure their conceptual and statistical distinctiveness from each other (see appendix 1). No intraindex correlation coefficient is higher than 0.31. Similarly Cronbach's α -coefficients were used to measure the 'reliability' or internal cohesion of these indices. All measures would be viewed as reliable.²¹

One possible problem with a cross-sectional study like the present one is selectivity bias. For example, if an NGO credit program tends to recruit women who are already empowered, then any relationship found between credit membership and women's empowerment could be spurious rather than causal. Since the random assignment of credit participants is not feasible, researchers often have to rely on cross-sectional data from natural settings. But such a natural setting can be a potential source of bias as a result of nonrandom program placement. If credit programs are allocated across the program areas in nonrandom ways, for example in villages nearer accessible roads or with inhabitants having more modern attitudes and beliefs, the failure to control for village characteristics may lead to selectivity bias, owing to the effects of village characteristics on women's empowerment. Nevertheless, we can take some precautions to minimize such a selectivity effect and other biases that may distort the research findings.

In the present paper, several steps have been taken to minimize selectivity bias. First, to minimize the differences between credit members and nonmembers that may distort results, we follow a sample design that combines credit members and nonmembers in NGO program areas and compares them with women of similar socioeconomic status in comparable nonprogram (comparison) areas. Each of the nonprogram areas is in the same general vicinity as each of the corresponding randomly selected program areas, providing some assurance against any systematic area-level differences between them, although these differences cannot be entirely ruled out. Second, to further minimize the possibility of community-level selection bias, credit members and nonmembers within NGO program areas are compared with respect to women's empowerment. Finally, least-square regression models are used to adjust for differences in the socioeconomic and demographic characteristics of women in each of the groups. Many of these steps to minimize selectivity bias have been adopted in earlier studies.²² Despite these steps, short of random assignment of program beneficiaries and nonbeneficiaries of the credit program and a longitudinal data set, any association between the credit program and women's empowerment may reflect both selection effect and program effect. Which of these two effects is stronger cannot be determined from the present analysis. But since NGO credit programs are fast covering a growing number of poor women in rural Bangladesh, any positive relationship of these programs with women's empowerment is likely to lead to a faster than normal improvement in the empowerment of poor women.

Results

NGO Credit Programs Women's Characteristics, and Their Empowerment

Table 3 shows the mean scores on the three indices of women's empowerment by NGO program areas, NGO membership, and other characteristics of the respondents. The NGO credit members are ahead of the nonmembers in all three indices of empowerment irrespective of nonmembers' residence in program areas or nonprogram areas although the difference in the consultation index is very small. Moreover, the nonmembers within NGO program areas show a higher level of empowerment on the autonomy and authority indices than do the nonmembers within the comparison areas. Overall, it is evident from table 3 that part of the higher autonomy and authority indices in the NGO program areas in contrast to the comparison areas is accounted for by the contribution of both NGO credit members and nonmembers in the NGO program area. Being empowered by their new sources of financial income and related credit-group supports, female recipients of NGO credits may have asserted their autonomy and authority vis-à-vis their husbands' restrictions and dominance in relevant household affairs.²³

The table further shows that socioeconomic status, as reflected in education, house type and yearly income, tends to be positively associated with the autonomy and authority indices. Also positively associated with the autonomy and the authority indices are duration of NGO credit membership and nonagricultural occupations. Finally, both the autonomy and the authority indices vary by age and region. Age is positively associated with both indices, and both indices are higher in the central, north-central, and northern regions compared to the north-eastern or southern regions. While heavy concentration of NGO activities in the central and north-central regions may have raised women's empowerment, it is also well known that the relatively higher female autonomy in the northern region may result from less Islamic influence.²⁴ On the other hand, the relatively lower concentration of NGO activities in the north-eastern and southern regions together with the traditional restrictions existing there against women's movement outside the home and against women's involvement in household decision making may have both been working as obstacles to female empowerment. Similar cultural constraints were also found to be associated with lower fertility control in the north-eastern and southern regions.²⁵

Table 4 reveals that in each of the five regions NGO members are ahead of nonmembers on the autonomy and authority indices and on the consultation index except for the central region.

Multivariate Analysis Since the gross results of tables 3 and 4 do not reveal the net effect of NGO credit membership and other factors on women's empowerment, we performed a multivariate analysis (table 5). Excluded from this analysis are those variables that show either a very weak relationship or an ambiguous relationship with the autonomy and authority indices. According to table 5 even after the control of background variables, NGO credit membership and residence in an NGO program area are significantly and positively related to both the autonomy and the authority indices although the effect of NGO program area is not significant on the authority index. Moreover although income has a

TABLE 3
MEAN VALUES OF THREE INDICATORS OF WOMEN'S EMPOWERMENT BY SELECTED CHARACTERISTICS

SELECTED CHARACTERISTICS	EMPOWERMENT INDICES			Number of Women (N) ^a
	Consultation Index	Autonomy Index	Authority Index	
Program area				
NGO program area	5.32	3.67	3.21	2,360
Nonprogram area (comparison)	5.39	3.25	2.82	1,200
	F = 1.15	F = 104.69**	F = 63.16**	
Membership				
NGO member from NGO program area	5.40	3.81	3.53	1,162
NGO nonmember from NGO program area	5.25	3.54	2.90	1,198
	F = 3.83	F = 33.14**	F = 115.88**	
Regions of the country				
Central	5.29	3.73	3.31	773
North-central	4.75	3.44	3.14	389
North	5.50	3.53	3.06	1,677
North-east	5.14	3.49	2.59	218
South	5.86	3.21	2.80	250
	F = 18.99	F = 13.79	F = 14.86**	
Age				
13-25	5.32	3.38	2.76	1,351
25+	5.36	3.62	3.29	1,973
	F = 0.26	F = 39.86**	F = 124.81**	
Women's education (years)				
No education	5.31	3.48	3.08	2,589
1-5	5.51	3.64	3.02	594
5+	5.46	3.87	3.34	141
	F = 3.18	F = 7.50**	F = 3.27**	
Husband's education (years)				
None	5.27	3.44	3.09	2,082
1-5	5.54	3.64	3.01	751
5+	5.38	3.68	3.14	491
	F = 6.56**	F = 9.72	F = 1.47	
House type				
Hut	5.37	3.48	2.99	2,058
Concrete or corrugated iron	5.31	3.60	3.21	1,266
	F = 0.87	F = 2.69	F = 19.94**	
Household income (per year in U.S. \$)				
≤ \$375	4.99	3.37	2.95	821
\$376-\$450	5.30	3.44	3.08	829
\$451+	5.55	3.64	3.14	1,674
	F = 26.60**	F = 19.38	F = 5.50**	
Occupation of women's husband				
Agricultural	5.41	3.48	2.92	1,431
Nonagricultural	5.29	3.55	3.19	1,893
	F = 3.48	F = 1.03	F = 33.53**	
Duration of NGO membership				
≤ 36 months	5.33	3.77	3.51	395
37-60 months	5.39	3.76	3.48	475
60+ months	5.58	4.02	3.70	208
	F = 1.14	F = 6.93	F = 1.62	

^aN differs owing to missing values in the different questions

*p < 0.05

**p < 0.01

TABLE 4
INDICES OF WOMEN'S EMPOWERMENT BY NGO MEMBERSHIP AND REGION

REGION	NGO MEMBERSHIP STATUS	EMPOWERMENT INDICES		
		Consultation Index	Autonomy Index	Authority Index
Central	Member	5.00	3.84	3.74
	Nonmember	5.12	3.69	3.05
	t value	-0.75	1.83	5.52
North central	Member	4.81	3.76	3.90
	Nonmember	4.65	3.18	2.84
	t value	0.69	3.88	5.74
North	Member	5.70	3.87	3.47
	Nonmember	5.50	3.62	2.93
	t value	1.83	3.73**	6.49
North east	Member	5.52	4.00	3.04
	Nonmember	4.92	3.67	2.36
	t value	2.07	2.73	3.99
South	Member	5.88	3.43	2.90
	Nonmember	5.80	3.16	2.76
	t-value	0.24	1.41	0.68

*p < 05

**p < 01

positive relationship with the consultation index no such relationship is evident between NGO credit membership and the consultation index. Other variables that have a significant positive relationship with either the autonomy index or the authority index are concrete or corrugated building, area of residence outside the southern and eastern regions, nonagricultural occupation, respondent's education and respondent's age.

TABLE 5
DETERMINANTS OF WOMEN'S EMPOWERMENT: STANDARDIZED β COEFFICIENTS FOR AUTHORITY, AUTONOMY AND CONSULTATION INDICES FROM MULTIPLE LINEAR REGRESSION ANALYSIS

INDEPENDENT VARIABLE	INDEX		
	Authority Index	Autonomy Index	Consultation Index
Age (years)	.151	.072	.010
Highest class passed by wife	.031	.071	.024
Highest class passed by husband	-.019	.023	.014
Income	-.036	.041	.084**
Nonagricultural occupation	.071	.032	-.022
Areas outside southern and eastern regions	.110**	.070	-.034
Concrete or corrugated iron building	.052**	.029	-.030
NGO credit membership	.169	.179	-.029
NGO nonmember from NGO program area	.026	.0112	-.044
Adjusted R ²	.076	.059	.009
F Statistic	29.76**	22.76**	4.11**

*p < 05

**p < 01

Qualitative Evidence on Women's Empowerment The quantitative data presented earlier have shown that NGO membership is positively associated with women's empowerment. In order to understand why NGO membership may lead to higher empowerment, we conducted a series of focus group sessions with the female recipients of NGO credits. The discussions in these focus group sessions concentrated largely on women's status and rights, their membership in an NGO credit association, the benefits they derive from NGO membership, and the terms and conditions of credits.

Most respondents explained how NGO credit membership empowers them. Some of the comments made by the poor women follow.

Women have more confidence now because of their NGO membership. They are more intelligent now and no longer sit idle like some men (ASA loanee).

We women can stand on our own two feet now. We can join different associations and can have equal rights like men (RDRS loanee).

Women are very clever and smart nowadays. They can organize associations and participate in jobs outside their homes (CDA loanee).

Because of joining associations outside the home, women can now stand on their own two feet (DCI loanee).

Women now have greater courage. They can stand on their own two feet (VERC loanee).

Women are less shy now. They understand their own rights and what is good for their welfare because of their membership in credit associations (ASA loanee).

The foregoing observations made by the loanees themselves support the positive relationship found between NGO credit membership and women's empowerment in our earlier quantitative analysis and indicate a number of positive elements associated with NGO credit membership that may lead to women's empowerment.

Perception about Benefits Derived from NGO Activities When asked to discuss the benefits that people are deriving from NGOs, most of the loanees pointed out their various positive elements. According to them, NGOs not only provide loans, but also provide various other welfare services. A sample of observations includes the following.

The loan is given on easy terms and no deduction is made from the loan money. They give us the loan without a hassle and we go back home with the loan (ASA loanee).

The staff is very cordial in dealing with us. They educate us about nutrition, family planning, and child immunization. The loans we received are helping us to earn income and to send our children to school (ASA loanee).

They teach us how to sign our name and give us a water-sealed latrine, good vegetable seeds, wheat, and a tubewell (RDRS loanee).

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Poor people can get a loan on easy terms the interest rate is less than what the village moneylender charges they give us potato wheat and vegetable seeds (RDRS loanee)

The interest rate charged is low a grace period is given if any difficulty arises in the repayment of interest the NGO staff offers help if any loanee is having a problem (CDA loanee)

The interest rate is low The installment payment has to be given only once a month so we get more time to repay the loan (VERC loanee)

The interest is low and they do not deduct money at the time of giving the loan If our cow is attacked by any disease their staff comes and arranges proper treatment (DCI loanee)

Summary and Conclusion

A growing number of NGOs in rural Bangladesh are reaching out to a vast multitude of poor women with collateral-free credit programs either by integrating them with their preexisting social welfare programs or by adding the welfare programs to the credit programs, thus providing a comprehensive range of services including consciousness-raising, functional literacy training, and group formation. It has been argued that the provision of such an integrated range of socioeconomic services not only reinforces the social and economic well-being of the poor women but also empowers them. The data of the present study suggest that women's membership in NGO-promoted credit programs, their residence in an NGO program area and in nonsouthern and noneastern regions, their higher socioeconomic status, and their age tend to be positively associated with women's empowerment. Our indices of women's empowerment are found to be significantly and positively associated with NGO credit membership and residence in an NGO program area. This significant positive relationship of women's empowerment indices with NGO credit membership may stem from the poor women's participation in an NGO credit program.

Part of the positive relationship of NGO credit membership with indices of women's empowerment may indicate the power that the poor women achieve as a result of their increased contribution to the economic survival of their families—power that is reinforced by their credit-related movement outside the home and their participation in NGO consciousness-raising efforts. The power derived from credit-membership may also have diffused to other women who are noncredit members in the NGO program areas, partly explaining their higher empowerment vis a vis women in the comparison areas without NGOs. However, a potential confounding of this finding owing to the nonrandom program placement cannot be ruled out.

Rural Bangladeshi women have often been described as living in conditions of extreme isolation, deprivation, and gender subordination.²⁶ While these conditions may still largely exist in many parts of rural Bangladesh, some attenuation of gender subordination seems to be associated with women's participation in NGO-promoted credit programs. The present study shows that this attenuation occurs in terms of individual autonomy, individual authority, or interspouse consultation in household affairs as manifested in greater movement outside home and in other

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matters affecting a woman's day-to-day life. While other factors such as higher socioeconomic status, region, and nonagricultural occupation also positively affect women's empowerment, NGO credit membership seems to have the strongest effect in explaining the variation in women's empowerment. Reasons for this effect may have emerged in the focus-group sessions undertaken by the present study. Most of the NGO credit loanees in these sessions say that the women who have become members of NGO-credit programs are more confident, assertive, intelligent, self-reliant, and conscious of their rights, that they value NGO membership for its advancement of their welfare, autonomy, and self-confidence, and that their credit needs are adequately met by the NGOs. These comments by the NGO clients themselves reflect the fact that target-oriented NGO programs are reaching their beneficiaries with the intended effects, not only satisfying the women's economic needs, but also empowering the women. The implication of this finding is that NGO credit programs targeting women, which are spreading quickly throughout rural Bangladesh, are likely to bring about not only a rapid economic improvement in the situation of women, but also their faster than normal empowerment—without the long wait for female advancement through education or employment in the formal sector, where progress is often not sufficiently rapid to make an important impact.

Appendix

PEARSON'S CORRELATION COEFFICIENTS FOR THE CONSTRUCTED INDICES OF WOMEN'S STATUS

	Consultation	Autonomy	Authority
Consultation	1.00		
Autonomy	0.211	1.00	
Authority	-0.13	0.308	1.00

* $p < .01$

NOTES

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6 Baltiwala "Meaning of Women's Empowerment"

7 M. E. Hawkesworth *Beyond Oppression: Feminist Theory and Political Strategy* (New York: Continuum, 1990); Margaret Schuler and Sakuntala Kadirgamar Rajasingham, eds. *Legal Literacy: A Tool for Women's Empowerment* (New York: OEF International, distributed by UNIFEM, 1992)

8 Minimalist credit is a stripped down collateral free credit program for the poor which entails little or no evaluation of the merits of investments for which an applicant wishes to borrow and no technical or business assistance. In it the burden of the selection process for loanees and loan recovery is shifted from the credit program to the peer groups of borrowers themselves. Although groups might give opinions on a member's purpose for borrowing, their ultimate acceptance of the member is based on an assessment of that person's likelihood of repaying, regardless of the viability of the proposed project. Group members are not necessarily jointly liable for each other's loans, but the group may not receive subsequent loans until all are paid up.

9 See Shahid R. Khandker, Baqui Khalily, and Zahed Khan *Is Grameen Bank Sustainable?* (Washington, DC: Human Resources Development and Operations Policy Division, World Bank, 1994). A great number of NGOs and other agencies, both within Bangladesh and throughout the rest of the world, have adopted the approach used by Grameen Bank (GB) of forming a five person or similar credit group and replicating GB's collateral free loan strategy for poverty alleviation. This strategy has proven to be effective not only in loan recovery and loan recycling, but also in improving household output, income, and consumption. The result is the increasing acceptance of a self-sustaining poverty alleviation strategy that is reaching beneficiaries in the thousands. Many NGOs in Bangladesh that have included income generation as one of their program agendas are following in the footsteps of GB's group formation based revolving loan program. By the mid 1990s, GB's own credit program for the poor in Bangladesh had covered about two million women.

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17 M A Rahman *People s Self Development Perspective on Participatory Action Research* (Dhaka Bangladesh University Press 1994)

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19 See Deborah Balk Individual and Community Aspects of Women s Status and Fertility in Rural Bangladesh " *Population Studies* 48 (March 1994) 21-45 The present indices are to a certain extent similar to those of the 1994 study by Balk Unlike the earlier study however this study uses sample data from wider areas in which five NGOs—Association for Social Advancement (ASA) Rangpur Dinajpur Rural Service (RDRS) Development Center International (DCI) Community Development Association (CDA) and Village Education Resource Center (VERC)—have microlevel development programs for the poor It also uses a wider set of questions in the construction of empowerment indices and more control variables than were used in the earlier study

20 Mead Cain Syeda R Khanam and Shamsun Nahar Class Patriarchy and Women s Work in Bangladesh " *Population and Development Review* 5 (September 1979) 405-38

21 Edward G Carmines and Richard A Zeller *Reliability and Validity Assessment* (Thousand Oaks CA Sage 1972) V L Green and Edward G Carmine "Assessing the Reliability of Linear Composites " in *Sociological Methodology* ed K F Schuessler (San Francisco CA Jossey Bass Publishers 1979)

22 Schuler and Hashemi *Credit Programs Women s Empowerment and Contraceptive Use* Ruhul Amin Mohammed Kabir and Jamir Chowdhury Impact of Poor Women s Participation in Credit Based Self Employment on Their Empowerment Fertility Contraceptive Use and Fertility Desire in Rural Bangladesh " *Pakistan Development Review* 34 (Summer 1995) 93-119

23 Sarah G White *Arguing with the Crocodile Gender and Class in Bangladesh* (Dhaka Bangladesh University Press 1992) Tahrunnessa A Abdullah and Sondra A Zeidenstein *Village Women of Bangladesh—Prospects for Change A Study* (Oxford Pergamon Press 1982)

24 Cleland Phillips Kamal and Amin *Bangladesh Reproductive Change*

25 Ibid

26 Abdullah and Zeidenstein *Village Women of Bangladesh* Cain Khanam and Nahar *Class Patriarchy and Women s Work in Bangladesh*

NGO-Promoted Women's Credit Program, Immunization Coverage, and Child Mortality in Rural Bangladesh

Ruhul Amin, PhD
Yiping Li, MA

ABSTRACT A growing number of non-governmental organizations (NGOs) are adopting the collateral-free credit programs by anchoring them with their social development programs aimed at improved program effectiveness and sustainability. Drawing upon a sample of 3,564 targeted poor households covered by five small NGOs in rural Bangladesh, this study finds that the NGO credit-members as well as those who reside in the NGO program area are higher adopters of child immunization than those in the non-program area. Similarly, the study found that infant and child mortality is lower among the NGO credit members than among the non-members and that under five-year deaths of children progressively decline with the increase in the doses of vaccines. Implications of these findings are discussed in the study. [Article copies available for a fee from The Haworth Document Delivery Service 1-800-342-9678. E-mail address: getinfo@haworth.com]

INTRODUCTION

The credit-centered income-generating programs are becoming increasingly popular as a response to the recent shift towards gender-sensitive social and economic policies of the donor agencies (UNIFEM, 1995, Summit on the Economic Advancement of Rural Women, 1992, Mayoux,

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1995, WHO, 1995) Because women are more prone to look to the interest of their children, any measure that puts resources directly into the hands of women or strengthens their autonomy is likely to improve children's health and well-being. This should be more so in the area-focused integrated development strategy of the NGOs that provide not only the collateral-free loans—which require no material collateral of the kind used in the loan lending operations of the formal sector of the economy—but also give information and referral services in child survival strategies. The present study seeks to assess the impact of the area-focused collateral-free credit program for the poor women of five small- and medium-sized NGOs on child immunization coverage and infant and child mortality in rural Bangladesh. All the five NGOs have adopted the collateral-free loan system of Grameen Bank, the largest poverty development bank in Bangladesh, which replaces the requirement of material collateral by group responsibility, where individual access to credit is determined by group repayment behavior (Khandker et al., 1994). These five NGOs are Association for Social Advancement (ASA), Rangpur Dinajpur Rural Service (RDRS), Development Center International (DCI), Community Development Association (CDA), and Village Education Resource Centre (VERC).

Although Bangladesh was one of the signatories in the 1978 Alma-Ata Conference (World Health Organization, 1978), it was not until the late 1980s that a massive national Expanded Program on Immunization (EPI) against neonatal tetanus, measles, pertussis, diphtheria, polio, whooping cough, and tuberculosis was initiated in Bangladesh. But once the massive EPI campaign was initiated, the government of Bangladesh sought to increase and improve the coverage of the EPI by forging partnerships with the NGOs, private sectors, voluntary association, and other groups (Huq, 1991). Each of the five NGOs of the present study has been involved in an integrated package of development services, which include information and motivational services in primary health care, including child immunization. They stand out as "successful" NGOs in that the donors have found them to be honest, open, and highly capable and effective in their credit program with a recovery rate of above ninety percent (Mannan, 1995). They, however, do not directly supply actual health care services. Instead, they rely on existing government infrastructures and supply sources. Consequently, any favorable association of the NGO-promoted credit participation with childhood immunization coverage and infant and child mortality reduction is more likely to be due to its influence on the demand-side rather than the supply-side of the child survival strategies.

Past studies indicated the positive effect of women's credit programs on their contraceptive use and nutritional status (Amin et al., 1994, 1995,

Schuler and Hashemi, 1994, Quanine, 1989). This positive effect of the women's credit program on contraceptive use and nutritional status was found to be via the mechanisms of increased empowerment and autonomy of the women. By drawing women out of their secluded lives, giving them credits, and allowing them to interact with a more diverse set of people, the women's credit program increases not only their ability to earn income, but also to improve their status and decision-making power (Amin et al., 1995, Schuler and Hashemi, 1994). These same mechanisms could also partly contribute to a decrease in child mortality through increased immunization. Moreover, since both contraceptive use and nutritional status of a woman can positively contribute to the survival prospect of her children, the latter could be indirectly enhanced by her participation in the credit program. Similarly, the fortnightly or monthly awareness training program, which is routinely conducted by the NGOs as a part of their credit-plus strategy—which entails the provision of a comprehensive range of services to its beneficiaries rather than the provision of credit alone—could also strengthen women's demand for the child survival strategies and thereby reduce their infant and child mortality. An adequate examination of the variation of immunization coverage and child mortality by the NGO-promoted credit program may not only reveal the latter's reinforcing effect on the former, but also a cost-effective means of promoting maternal and child health. This study presents the results of such an examination by utilizing data from a 1995 household survey conducted in rural Bangladesh.

DATA AND MEASURES OF VARIABLES

The data for this study come from a survey of 3,564 married women under age 50, which was conducted in mid-1995. Two separate samples were drawn, using a random multi-stage stratified cluster sampling design to include villages from the regions where the five selected NGOs had on-going rural credit programs for the poor women. These five NGO programs—ASA, RDRS, DCI, CDA, and VERC—were treated as separate strata. One sample consists of loanees and non-loaneees from the program areas of each of the five NGOs, the other was made up of women from areas where no nongovernmental organization had any significant presence. The criteria for the selection of the non-program areas were that they were located in the respective adjacent geographic areas of the program areas of the five selected NGOs and had similar communication facilities and socioeconomic characteristics, such as literacy rate, topography, access to electric power, and presence of other development programs.

Eleven hundred sixty-four loanees and 1,200 non-loaneees from the 50 selected program areas of the five selected NGOs and another 1,200 non-loaneees from their respective 30 non-program areas were randomly drawn by a systematic sample procedure following a multi-stage stratified cluster sampling design. At the first stage, thanas (administrative sub-districts) of program areas of the five selected NGOs—ASA, DCI, CDA, VERC, and RDRS—were selected by a systematic sampling procedure (random start and fixed interval). At the second stage, unions (administrative areas below thana level) of program areas of the five selected NGOs and that of their counterpart non-program areas were selected randomly. In the third stage, villages with the concentration of loanees of any of the five selected NGOs were randomly selected from a list of villages in a union provided by the relevant NGOs. Once selected, all households in a village were listed. From the lists of all households in the selected program villages, a specified number of households with female credit-program members or nonmembers were randomly selected. One adult female was interviewed from each selected household. Once a certain number of respondents from a program area were selected, an additional number of respondents from its corresponding comparison area, which is roughly proportionate to its share of the number of respondents from its own program area to that of all the program areas, were randomly selected and interviewed. Because of the larger size of the pool of loanees of ASA and RDRS, 480 loanees and non-loaneees were interviewed from each of their program areas, totalling 960. For the remaining three NGOs—DCI, CDA, and VERC—no more than 91 female loanees and non-loaneees from each of their program areas were interviewed. The combined sample size of 2,364 women from the NGO-program areas, together with their comparison group of 1,200 women, represents a fairly large number of currently married poor women for analyzing the impact of credit programs on child immunization coverage and infant and child mortality.

The survey, which was funded by the U.S. Agency for International Development (U.S. AID) and conducted by Associates for Community and Population Research (ACPR), a private research firm in Bangladesh, collected detailed information on the respondents' socioeconomic backgrounds, their income-generating activities, duration of their NGO membership, their pregnancy histories, and immunization coverage of their children. In the present paper, the impact of the NGO credit program on child immunization and infant and child mortality was measured by the infant mortality rate, the proportion of children died, under-five death rate, and extent of immunization against major childhood diseases.

RESULTS

Descriptive statistics for the respondents of the study by credit membership and program area are presented in Table 1. The sample is typical of the poor in rural Bangladesh. A large percentage of residents own land, average household income is low and less than one-quarter of respondents reported ever attending school. The mean age of respondents was 29, and the mean age at first marriage was 16.7. On average, the women in the sample had 3.1 living children.

Among women in the program area, those who were credit members were older, were of higher parity, and were of higher socioeconomic status than nonmember women. The mean length of membership in the credit program was 48 months and the credit members registered higher empowerment scores than did non-members or nonprogram women.

Infant and Child Mortality

Tables 2 and 3 compare the infant mortality rate and proportion of children dead, respectively, by the NGO program areas and NGO memberships. In Table 2, the data for more than one year have been grouped to minimize the effects of sampling variation.

Data in Table 2 show that infant mortality rates tend to be slightly lower in the NGO program area than in the comparison area, which could be partly due to lower infant mortality rates among the NGO credit members. Within the NGO program areas, the NGO credit members also have lower infant mortality rates than the non-members. Similarly, Table 3 shows that the NGO credit members have lower proportions of their children dead among women above age 39 than the corresponding women among the non-members. Because of their higher immunization coverage of the earlier period, when the nation-wide massive EPI campaign was not initiated, the older NGO credit members might have had lower proportions of children dead compared to the non-members because of the NGO credit members' higher utilization of EPI. In other words, the lower EPI coverage of the earlier period, *vis-a-vis*, the higher quality of the NGO information and referral services for the EPI might have led to the NGO members' higher adoption of child survival measures, although some older women's NGO membership might have happened when their children passed the ages with highest risk of mortality, reducing their mortality. It is also possible that, in the earlier periods, only smaller and selected early innovators were simultaneously pre-disposed to adopt credit and immunization, resulting in a spurious negative relationship between the NGO credit membership and proportion of children dead. While data constraints of the present

TABLE 1 Descriptive Statistics for the Poor Women from the Program and Non-Program Areas of the Five Selected NGOs, Rural Bangladesh, 1995

Variables	Whole Sample (N = 3 564)	NGO program area			Non program area (Comparison Areas)	
		Member (N = 1 164)	Non Member (N = 1 200)	^a	Non Member (N = 1 200)	^b
% of respondents ever attended school	21.2	23.1	22.3	0.46	18.2	2.94**
Mean years of schooling of respondents	0.9	0.9	1.0	0.63	0.8	2.34*
Mean years of schooling of husbands	2.0	2.3	2.1	1.78	1.7	4.79*
Mean age at first marriage	14.6	14.4	14.8	4.41*	14.6	2.93
Mean age of respondents	28.9	33.1	26.4	19.55*	27.2	17.44
Mean number of living children	3.1	3.6	2.7	12.12	3.1	6.54*
Mean number of children born	3.7	4.2	3.2	11.33*	3.6	6.71*
Mean months of NGO membership	NA	47.9	NA	NA	NA	NA
Average size of land in decimals	59.8	60.0	60.7	0.18	58.7	0.25
Last year's average household income (U.S. dollars)	624	763	584	10.73**	529	15.27**
% of husbands in non-agriculture job	54.8	61.5	54.6	3.40*	49.1	6.06*
% with concrete or corrugated iron building structure	37.2	44.8	37.0	3.86**	29.9	7.49*
% owning land	85.4	94.6	80.7	10.23*	81.3	9.89
mean empowerment score ^c	0.9	1.0	0.9	5.30*	0.9	10.57*

a. t test of differences between members and non-members within NGO program area.

b. t test of differences between members within NGO program and non members within comparison area.

c. This empowerment index has been constructed from a series of questions on a respondent's autonomy her movement outside home and her participation in household decision makings such as buying household things or making day to-day family expenditures

p < 05 **p < 01

TABLE 2 Infant Mortality Rates per Thousand Live Births by NGO Program Area, NGO Credit Membership, and Years, Rural Bangladesh, 1990-94

Year	Whole Sample	Program Area			Non-program Area (Comparison Areas)
		Both	Member	Non Member	Non Member
1992-94*	87	88	72	96	88
1990-91*	90	82	68	94	103
1990-94	88	85	70	96	93

Three years average
Two years average
Five years average

TABLE 3 Proportion of Ever Born Children Dead by the NGO Program Area and NGO Membership, Rural Bangladesh, 1995

Age of Mother	Whole Sample	Program Area			Non-program Area (Comparison Areas)
		Both	Member	Non Member	Non Member
15-19	131	121	093	128	144
20-24	107	106	097	112	107
25-29	141	150	130	167	125
30-34	147	142	135	154	155
35-39	187	170	180	152	159
40-44	197	187	177	210	221
45-49	213	198	185	251	296
All	154	155	153	158	152
N*	11 882	7 911	4 535	3 376	3 971

Number of ever born children

study do not allow the further specification of some likely spurious relationships, it is only in the recent period that the nation-wide immunization coverage has been achieved and that a vigorous nation-wide NGO-government collaboration has been forged, which may have led to an incremental effect of the NGO-credit membership on the recent decline in infant and child mortality. Thus, the 1992-94 infant mortality rate of 87 per thousand live births for the whole sample in Table 2 is the same as in the 1993

Demographic and Health Survey of Bangladesh (Population Council and Macro International, Inc., 1995), indicating that some of the recent decline in infant mortality could be due to the contribution of the NGOs. Similarly, the rate of 72 per thousand live births among the NGO members in the Table is lower than that of the national average rate of that period.

What could be the factors which might have contributed to the recent lower infant mortality of the NGO program area and that of the NGO credit members compared to those of the comparison area and the non-members, respectively? Since the NGO credit programs did not have any special health facility other than that of promoting child immunization and primary health care, the latter could have lowered infant mortality by increasing the demand for, and awareness of, child immunization and primary health care. To explore this issue further, the variation of child immunization and its impact on infant and child mortality by the NGO membership and NGO program areas are analyzed below.

Child Immunization, NGO Credit Membership, and Child Mortality

Table 4 shows that child immunization coverage in each of the five vaccines against major childhood diseases is somewhat higher among the NGO credit members and in the NGO program area than those of the non-members and comparison area, respectively. The rate of coverage per hundred children is higher for a most recently born child than that of an earlier one, reflecting both the higher coverage of the recent period compared to that of the earlier period as well as the non-eligibility of some of the older children due to their age being over 23 months.

The comparison between partial doses (1 or 2 doses) and more completed doses (2+ doses) in TT, DPT, and Polio across the program and comparison areas in the Table shows that the residents of the NGO program area are higher users of more completed doses of vaccines than those of the comparison area, indicating the possible positive effect of the NGO credit program on the more completed doses of the vaccines. Similarly, single dose of TB or Measles, which is treated as a completed dose, is higher among the residents of the NGO program area than those in the comparison area. Within the NGO program area, the NGO credit members have higher completed doses of vaccines than those of the non-members. This higher use of completed doses by the credit-program members may partly reflect the effect of program participation. However, living in a program area without participating in a credit program appeared to influence higher use of completed doses compared to the non-members in the comparison area.

Overall, although the coverage rate for the NGO program area and

TABLE 4 Percent of Last Born and Last but One Born Between 1990 and 1995 Who Were Immunized by Different Doses of Vaccine by the NGO Program Area and NGO Credit Membership, Rural Bangladesh, 1995

NGO program area and NGO credit membership	Child number	Total number of children	Tetanus Toxoid			DPT			Polio			TB	Measles vaccine	Possesses health card of vaccination
			2-3 doses	1 dose	Total doses	3+ doses	1-2 doses	Total doses	1-2 doses	3 doses	Total doses			
Whole sample	Last born	2048	49.1	22.6	71.1	58.5	21.8	83.3	58.7	22.6	81.3	77.9	57.5	54.5
	Last but one	786	44.9	15.2	60.1	56.8	12.1	68.9	57.2	13.1	70.3	67.7	59.6	34.4
Total program area	Last born	1262	54.5	22.9	77.4	64.8	20.0	84.8	64.9	20.0	84.9	83.2	62.4	58.8
	Last but one	433	51.0	16.6	67.6	64.4	11.8	76.2	64.9	11.3	76.2	75.3	66.7	38.3
Credit member	Last born	510	58.0	21.6	79.6	69.8	18.8	88.6	69.8	18.6	88.4	88.0	67.8	59.6
	Last but one	174	51.7	19.5	71.2	67.8	10.9	78.7	67.8	10.9	78.7	78.7	71.8	36.8
Non member	Last born	752	52.1	23.8	75.9	61.4	20.7	82.1	61.5	20.9	82.4	79.9	58.8	58.2
	Last but one	259	50.6	14.7	65.3	62.2	12.4	74.6	62.9	11.6	74.5	73.0	63.3	39.4
Total non program area (Comparison area)	Last born	778	40.4	22.1	62.5	48.5	24.9	73.4	49.0	26.9	75.9	69.3	49.4	47.7
	Last but one	353	37.1	13.6	50.7	47.3	12.5	59.8	47.6	15.3	62.9	58.4	50.7	29.5

NGO credit members is higher than that of the comparison area and non-credit members, respectively, the difference is not very high between the NGO credit members and non members within the NGO program area. Since the NGOs themselves do not provide any additional supply facilities of child immunization of their own other than those available from the normal government supply sources, any advantage that the NGO credit members are likely to have over their counterpart non-members is likely to be in the information and referral services rather than actual services. Consequently, because of the possible continuing supply constraints, the NGO credit programs may not have led to the universal or the near universal coverage of child immunization. On the other hand, since there is little or no controversy about child immunization either on religious or social ground, the massive government inputs in the EPI may have led to the present widespread immunization coverage across all socio economic groups, minimizing their differences in the latter. Nevertheless, with the immunization coverage ranging from about 62 percent for measles to 85 percent for DPT, the NGO credit members or the non members in the NGO program areas come very close to the corresponding national coverage of 68 percent and 85 percent, respectively, which were found in the Demographic and Health Survey (Population Council and Macro International, Inc., 1995).

Since simple cross-tabular data analyses in Tables 2 through 4 do not disentangle the effect of other variables not included in them, additional analyses of child immunization and infant and child mortality within a multivariate context have been done in Table 5. Here dependent variables—immunization coverage and infant and child mortality—are treated as dichotomous variables. Thus, if a live birth ended in a death, it is coded 1 and zero for being alive. Similarly, if a child is immunized with more completed doses, it is coded 1 and zero if no dose or incomplete doses. All independent variables are treated continuous, except residence in the NGO program area, the NGO credit membership, immunization coverage, and building structure, which have been coded 1 if yes and zero otherwise. A continuous variable of empowerment has been constructed from a series of questions on a respondent's autonomy, her movement outside home, and her participation in household decision-makings such as buying household things or making day-to day family expenditures. Each of the three responses to a question was given the following weights generally positive = 1.0, occasionally positive = 0.5, never positive = 0. Each of these three responses to a question given by a respondent is assigned a weight proportional to the total number of respondents giving answer to that question divided by the total number of respondents giving responses

to all the questions. Total score of a respondent has been obtained by adding her scores on all the questions and thus avoiding the biasness of any arbitrary score. Since the dependent variables are dichotomous, the multiple logistic regression models have been used in Table 5.

Data in Table 5 show that even after the control of other socio-economic variables, NGO membership has a significant positive effect on child immunization. NGO credit membership also has a statistically significant effect on the reduction of infant and child mortality before the control of immunization coverage in equation 3. But the comparison of the question in column 3 with that of column 4, after the control of immunization coverage, shows that part of this negative effect of the NGO credit membership on infant and child mortality is due to members' higher immunization coverage. On the other hand, the net effect of residence in the NGO program area is not significant. This absence of the significant effect of the NGO program area on infant and child mortality may, again, stem from the

TABLE 5 Logit Regression Coefficients of the Effect of NGO Program Area and NGO Membership on Child Immunization Coverage and Infant and Child Mortality, Rural Bangladesh, 1995

Independent variables	Dependent variables			
	Immunized child		Incidence of infant and child mortality	
	(1)	(2)	(3)	(4)
Age of child's mother	-.088**	-.088**	-.010	-.018
Residence in NGO program area	.161	.163	.103	.206
Residence in non-NGO program area (comparison area) ^a	—	—	—	—
NGO credit membership	.223	.228*	-.433	-.303
Immunized child	—	—	—	-.808*
Education of child's mother	.023	.024	.024	.042
Education of child's father	.001	.001	-.066*	-.070
Concrete or corrugated iron building structure	.084	.085	-.222	-.192
Empowerment of child's mother	—	-.025	-.007	-.028
Size of the land owned	.001	.001**	.000	.000
Constant	1.555	1.613	-1.882	-1.301

* p < .05 ** p < .01

^aReference category

nationwide massive EPI inputs that equally cut across groups and localities (Huq, 1991) On the other hand, the very fact that the poor NGO-credit loanees have maintained an infant and child mortality level lower than that of the national average, despite their disadvantaged socio-economic conditions, indicates the favorable effect of the NGO credit membership on the reduction of infant and child mortality It seems that after the initial motivated immunization clients of the EPI are recruited by the national EPI, an NGO credit type of community-based program can overcome the resistance of the left-out hard-core non-adopters

Child Immunization and Infant and Child Mortality

Table 6 shows under five year deaths per thousand live births by the different doses of immunization, NGO credit membership, and NGO program areas The data in the table clearly show that infant and child mortality progressively declines with the increase in doses of various vaccines This decline is higher with the complete and proper dose or doses of any vaccine To the extent that immunization coverage is higher among the NGO credit members than the corresponding coverage among the non-members, the former may explain its lower infant and child mortality However, Table 6 also shows that for each immunization status, the non-members within the comparison area have a higher under five-year death rate than that of the non-members within the NGO program area Part of the reason of the higher infant and child mortality rate of the non-members within the NGO program area might have been the result of the fact that once the motivated clients of immunization have been recruited by the NGO credit program, those who remained were, perhaps, hard-core resisters of immunization or other modern medicines, increasing the mortality of their infants and children

Causes of Children's Death

The pattern of disease symptoms at the time of the deaths of infants and children, based on verbal reports by the respondents, are presented in Table 7 Although accuracy may be flawed in verbal reports, the rural women can identify some common childhood diseases either by local names or by specification of symptoms (Amin, 1988) As evident in Table 7, the most common disease symptoms that have been present at the time of the deaths of infants and children were diarrhea, tetanus, high fever, weakness and extreme deterioration of the ability of body movement, and

TABLE 6 Under Five-Year Deaths per 1000 Live Births by Different Doses of Immunization Against Childhood Disease, by the NGO Program Area and NGO Membership, Rural Bangladesh 1995

NGO program area and NGO credit membership	Total number of children	Total	Tetanus Toxoid			DPT			Polio			TB		Measles vaccine		Health card of vaccination	
			0 dose	1 dose	2 dose	3 dose	0 dose	1 dose	2 dose	3 dose	0 dose	1 dose	0 dose	1 dose	yes	no	
Whole sample	2826	800	1268	688	2717	463	165	2892	390	170	2610	203	1863	152	123	1455	
Program area	1695	802	1318	803	3390	528	182	3435	465	191	3260	233	2175	195	121	1588	
Credit member	684	643	1428	694	4526	435	127	3437	438	126	3367	188	2059	127	54	1329	
Non member	1011	910	1255	876	3350	585	225	3434	481	240	3213	266	2235	246	167	1762	
Non program area (comparison area)	1131	804	1223	478	2149	380	129	2390	304	128	2072	148	1568	71	126	1296	

TABLE 7 Percent Distribution of Disease Symptoms at the Time of Death of a Child by NGO Program Area and NGO Membership, Rural Bangladesh, 1995

Disease symptoms at the time of death	Whole Sample	Program Area			Non program Area (Comparison Area)
		Both	Member	Non Member	Non member
Weakness and extreme deterioration of body movement	14 5	12 9	14 3	12 2	16 8
High fever	14 5	14 0	14 3	13 9	15 1
Measles	11 0	11 7	16 1	9 6	10 1
Pneumonia	4 1	2 9	5 4	1 7	5 9
Respiratory track infection	2 8	2 9	0	4 3	2 5
Whooping cough	6 2	7 6	10 7	6 1	4 2
Diarrhea	14 5	14 6	14 3	14 8	14 3
Tetanus	14 5	14 6	8 9	17 4	14 3
Dysentery	4 1	4 7	1 8	6 1	3 4
Polio	1 4	1 8	1 8	1 7	0 8
Other symptoms	12 4	12 3	12 5	12 2	12 6
Total	100 0	100 0	100 0	100 0	100 0
N	290	171	56	115	119

Based on the information of the last infant or child of a respondent that died between 1990 and 1994

measles in that order. While high fever as a symptom can be caused by respiratory infection, typhoid, and many other common illnesses, endemicity of the first two diseases with fever as a symptom is well-known in Bangladesh.

SUMMARY AND DISCUSSION

Although in the early 1980s, Bangladesh embraced the goal of the Universal Child Immunization (UCI) by the year 2000, only two percent immunization coverage was achieved by the mid-1980s. The present study together with the 1993-94 Demographic and Health Survey (Population

Council and Macro International, Inc. 1995) show that, by the mid-1990s, this coverage has reached as high as about 85 percent of children. Massive financial and technical assistance from UNICEF and other foreign donor agencies as well as a vigorous social mobilization, in which the NGOs, governmental agencies, and public co-operated in the EPI, seem to have contributed to this success (Huq, 1991). The present study shows that the NGO credit-members are higher adopters of child immunization than those of non-members and their infant and child mortality rate is lower than those of non-members due to this higher adoption of immunization. However, the higher immunization and the lower infant and child mortality among the credit members may have been partly due to complementary efforts of NGOs in child immunization, especially in the areas where the government services are lacking because of resource constraints and partly due to the tendency of some clients to simultaneously adopt the immunization and the NGO credit membership. Similarly, the lower infant and child mortality among NGO credit members may be a consequence of their higher nutritional status.

Indeed, one of the flaws of our study is the potential for selection bias. This study utilized a cross-sectional design without random assignment of subjects. Thus, if credit programs tend to recruit women who have adopted immunization or who have lower infant and child mortality, then any relationship between credit membership and the latter two variables could be spurious. Selection bias may operate at the level of the village as well, if allocation of programs occurs in a nonrandom manner, such as villages with better nutritional status or with more modern attitudes and beliefs.

We took several steps to minimize such bias. First, data from credit-program members and nonmembers were combined and compared with data from women in nonprogram areas. Each of the nonprogram areas was in the same general vicinity as a randomly selected program area, which provides some assurance against systematic area-level differences between the two. Moreover, nongovernmental organization program areas from which the sample was drawn were those densely covered by their programs, ensuring broad representation of women across the program area. Finally, logistic regression models were used to control for differences in the socioeconomic and age differences of women in each of the groups.

The present study shows that even among their poorest credit-members of rural Bangladesh, the NGO programs have been able to attain an immunization level comparable to that of the national average. This advantage of the NGOs may stem from the target-oriented approach and small-scale size of their organizations, which enable them to maintain quality of ser-

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ices and coverage of the under-served clients. It seems that, even among the disadvantaged groups of rural Bangladesh, the NGOs have been able to create some extra demand for child immunization, leading to its higher utilization compared to their counterparts in the general population.

Further analysis of infant and child mortality by immunization coverage has revealed that deaths of children under five years of age per thousand live births progressively decline with the increase in doses of various vaccines and that infant mortality rates tend to be lower among the NGO-credit members than among the NGO non members in the program area and in the comparison area. While the massive nationwide inputs in the EPI may have led to a current high immunization coverage and the resultant recent decline in infant and child mortality, the NGO complementary efforts in the former seem to have accelerated the latter decline in the NGO program area. This decline in infant and child mortality seems to have taken place despite the fact that the NGOs themselves do not provide the health services, and, instead, rely on the government supply sources. Consequently, any favorable effect that an NGO credit program has either on immunization coverage or on infant and child mortality reduction could be due more to its influence on the demand side rather than the supply-side. One implication of this finding is that the strengthening of both the demand and the supply side through the NGO credit programs would further improve the effectiveness of the EPI and reduce the current infant and child mortality rate to irreducible minimum.

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