

Socioeconomic and Regional Disparity in the Utilization of Reproductive Health Services in Bangladesh

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Abstract

Although the health care system has significantly expanded in Bangladesh during the last two decades, the health status of the population has remained very poor because of the uneven distribution of health services. Inequality in health exists in many forms and multiple dimensions such as age, gender, economic, ethnicity, class, etc. Using data from a nationally representative sample, this study attempts to improve our understanding about the socioeconomic and regional disparity in the utilization of reproductive health services in Bangladesh.

Data for this study came from the demographic and health surveillance system of BRAC which provided the updated information of the ownership of household asset. Socioeconomic disparity was measured by constructing a wealth index using compound assets and possessions of a set of household assets based on which the households were classified into wealth quintiles. The surveillance areas were categorized into four regions as urban, rural under-served, other rural and the hill tracts. The utilization of reproductive health services was measured by the access to ante and postnatal care, maternal immunization, and safe delivery. A total of 1,182 women were interviewed who gave birth in 2001 were selected at random.

Findings revealed significant household and regional differentials in the use of reproductive health services. The use of health services was much lower among the extreme poor than the non-poor and among the ethnic minorities in the hill and under-served than the other regions. While socioeconomic differentials in the utilization of health services by age, education, land ownership were noticeable, the use of services among women involved in NGO program was found significantly higher than those not similarly involved.

Multivariate analysis identifies that older and illiterate women from the extreme poor households who lived in the traditionally under-served region and not involved in NGO-led development program were the most deprived and vulnerable groups in receiving reproductive health services. The probability to receive services, however, is likely to significantly increase after involving in NGO-led program. The study argues that targeted development intervention has the potential to significantly reduce both the socioeconomic and regional inequality in the utilization of reproductive health services in Bangladesh.

Introduction

Equal opportunities for health are a desirable goal in all societies. It is expected that everyone should have a fair chance to attain their full health potential and that none should be excluded from achieving this. Although the health status in most countries of the world has significantly improved over the past few decades, substantial inequalities in health outcomes between nations, socioeconomic groups and individuals have remained (Leon and Walt 2001). Improving the health of the poor and reducing health inequalities have become the central goals of many development programs (Wagstaff 2002). Four dimensions in health such as equal access to available care for equal need, equal utilization for equal need, equal quality of care for equal need, and equity in outcome are emphasized to promote health equity (Krasnik 1996).

Can conventional economic development process ultimately be able to achieve health equity? The general process of economic growth which involves the increase in national income per capita may not necessarily promote health unless choices to be made on the priorities to be chosen (Sen 1999). Studies revealed that poverty and ill-health are intertwined (Wagstaff 2002) and that poverty and marginalization are the underlying causes of inequities in health (Evans et al. 2001). The health status of the poor requires to be understood by their social conditions including access to the basic needs and amenities like food, drinking water, housing, education, employment, transport and communication (Prasad 2000). The socioeconomic well-being of the poorer section of the community has deteriorated in many developing countries in relative terms because the rural poor are generally denied access to resources needed to them by which they could improve their own incomes and living conditions (World Bank 1993).

The need of the expansion of reproductive health services in developing countries has now been recognized than ever. More than 500,000 maternal deaths that occur every year of which more than 99 per cent are in developing countries (Populi 2002). A quarter to a third of all deaths is the result of complications of pregnancy (Populi 2002).

The poorest are expected to suffer a greater burden of ill health although they use limited health services than do the rest of the population (Kutzin 2001). The poverty and social deprivation are strongly associated with poor health status, more illnesses and death at earlier ages (Leon and Walt 2001). A woman living in Africa has a lifetime risk of dying from complications related to pregnancy 200 times greater than a woman living in an industrialized country (Populi 2002).

Although the poor faces the worse reproductive health outcome than others, poverty is not an insurmountable barrier to health if appropriate investment in health is made (Populi 2002).

There are many discriminatory policies in place in most developing countries. One major problem in reaching the poor has been that most cost-effective interventions are not targeted to the poor

but targeted at the very diseases from which the poor suffer disproportionately (Feachem 2000). Another frequent form of discrimination against the poor is that the rich receive more of government subsidies than the poor in the health sector (Wagstaff 2002). However, the cost of health care deterred poorer persons from seeking care to a greater extent than the richer persons (Gertler and van der Gaag 1990).

Bangladesh is a poor country with nearly half (48%) of the population lived on the wrong side of the poverty line. Although the health care network has expanded in the rural areas of Bangladesh during the last two decades, the health status has remained very poor. Infant mortality remained 92 per 1,000 live births with an average life expectancy of 56 years (Government of Bangladesh 2001). Since reproductive illnesses constitute a significant proportion – a special attention needs to be given to reproductive health.

The existing health care system in Bangladesh does not serve the poor. The problems of health care system are deeply rooted in the society and their transformation requires major structural changes. Several attempts have been made by both the government and non-government organizations (NGOs) to increase access to reproductive health services among the poor.

Although the country experienced significant social and health development over the past two decades, the overall livelihood situation of the extreme poor has changed very little. The basic question in the equity issue, however, has remained unanswered. [Add Bhuiya and AMR here] While there are several competing explanations for health inequalities, there is evidence that ‘some things can only be done by the government’ to get desired results (Roberts 1997). An investigation of the experience of the targeted interventions in health services for the poor is considered worthwhile to identify some clues.

While social exclusion is a major human crisis of modern times, it has been found that equity approach in health care system can not only guide health promotion but also help reducing the regional and socioeconomic gaps in health care delivery (Leon and Walt 2001). This can only be done by assessing the health equity status to determine whether differences in health outcomes are unavoidable, acceptable and fair (Peter 1998).

The poor communities are vulnerable to illnesses by a combination of low levels of education and poor access to health services. Thus, regardless of the increase of access to primary health care in recent years, the poor continue to suffer from lack of access to services. The community-based non-formal education has been promoted in some countries to raise health information and reduce morbidity and mortality with marked improvement in health knowledge in many countries (Power 1996). Assuming that better health should lead to better economic performance, targeting health as part of development efforts is, therefore, regarded an effective way to improve well-being in the developing communities (World Bank 1993).

Considerable amount of resources has already been spent to promote reproductive health services in Bangladesh by the government and other agencies. Unfortunately, many of such approaches were inappropriately designed to reach the poor living in remote areas of the country. While the conventional approaches in reaching the poor were largely ineffective in producing desired outcome, micro-credit based development programs introduced primarily by the non-government organisations (NGOs), were regarded as successful because of their emphasis on the planned intervention at the grassroots level (Uphoff 1993; BRAC 1999).

The NGOs in Bangladesh have introduced not only the collateral-free credit for the poor women, but a package of support services such as group formation, skill training, adult literacy, basic health services, and legal awareness. Many NGOs, although not directly providing reproductive health services, have been promoting the messages that women should have control on their own body, and that they have the right to decide when and how many children they should have. The awareness about women's rights has been an important goal to be achieved by the micro credit-based development organisations in Bangladesh.

When a woman gets credit and invests her money into a successful enterprise, she needs to attend weekly meetings and participate in skill training sessions. As an active participant of the programme, she has culturally legitimate reasons to go outside her home and opportunities to interact with others. The access to credit without any collateral raises her position within the family members. After involving in income generating activities, she finds herself as productively employed, an earning member, increasingly self reliant and confident. Her relationship with husband modifies as a result of her financial contribution to her households (Hadi, Nath and Chowdhury 2001).

It is not known, however, whether women's involvement in NGO-led development programmes has also improved their access and utilization of reproductive health services. This study attempts to improve our understanding about the socioeconomic and regional disparity in the utilization of reproductive health services in Bangladesh. Four domains of reproductive health service use viz. antenatal and postnatal care, maternal immunization and safe delivery were considered in this study. The study then assesses the role of targeted health interventions in reducing inequality in the utilization of reproductive health services in Bangladesh.

Materials and Methods

Data source

Data for this study came from *Watch Project*, the demographic and health surveillance system of BRAC where a number of non-governmental organizations (NGOs) had credit-based income generating activities for the poor. The surveillance system provided updated sampling frame from where the households were selected following systematic random sampling technique. All women who had given birth in 2001 were considered to be included in the sample. Systematic random sampling technique was followed to select sample from the database. A total of 1,182 women were interviewed. The structured questionnaire was used to collect detailed information of the demographic characteristics, household wealth, involvement in credit-based income generating activities and the use of reproductive health services. Data were collected in April 2002.

Measuring household wealth index

Watch Project had updated information about ownership of various assets, such as whether the household owned table, cot, quilt, watch, radio, television and cycle. In addition, information about housing characteristics, use of electricity, source of drinking water, type of toilet facilities and the type of materials used in the construction of the dwelling were included in the survey format.

The approach in developing the asset index for this study has been developed by Filmer and Pritchett (2001) who have shown that the asset index performs as well as a more traditional measure such as household-size-adjusted consumption expenditures. Following this approach, a set of household level variables was identified to include in the construction of wealth index. These were table, cot, quilt, watch, radio, television, cycle and electricity. Each of the variables was recoded into categorical dichotomous (yes-no) variable. A total of 8 dichotomous variables was created and standardized. The principal component analysis was run with all constructed variables with certain criteria. The component score coefficient matrix were multiplied by the standardized variables to produce factor scores which were termed as household wealth score variable. Each of the households was then automatically assigned to each of these groups on the basis of their value of the asset index. The wealth score variable was classified into quintile variable for this research.

Definitions of the variables

The study focuses on the *utilization of reproductive health care*⁵ as the outcome variable. Four aspects of reproductive health viz. the use of ante and postnatal care, maternal immunization, and safe delivery were examined in this study. All married women who had given birth in 2001 were asked to report about the

services they received. If a woman had routine health check-up in the third trimester and took (iron and vitamin) supplementation, she was considered to have antenatal care during pregnancy. On the other hand, a woman was considered received post-natal care if she was monitored by a health professional within 4 weeks after delivery. Similarly, a woman was considered immunized if she had both doses of tetanus toxoid vaccines. If she delivered in the health clinic or hospital under the supervision of a physician or midwife, the delivery was considered safe.

*Region of residence*³ was created from the widely dispersed and varied DSS sites. A total of four distinct regions such as hill, urban, traditionally under-served rural and other rural were identified based on certain criteria. The residents of the *hill region* in the south-east were primarily ethnic minorities who were very different than the mainstream population in terms of language, culture, religion, food habit and economic activities. The *urban* clusters consisted of urban poor and lower middle class in the city of Dhaka. *Traditionally under-served areas* included remote and inaccessible, and traditionally conservative villages where the public services were always found poor. The *other rural* sites were largely representative rural communities in Bangladesh.

Model specification

The contribution of both socioeconomic and regional disparity on the utilization of reproductive health services was assessed by logistic regression model. The main independent variables were wealth index and region of residence. There were other variables in the analytical framework such as age and education of women, their participation in development program and land ownership that were assumed to modify the effects of household wealth and region of residence. The relationships of these confounding variables with maternal knowledge were analyzed. Based on the preliminary analysis, *participation in development program* was coded as non-participant and participant, *age* of women was dichotomized as <30 and 30± years. *Education* of women was coded as some or no education. *Land ownership* was considered as continuous variable as decimals.

Results

Profile of sample women

The differences in socio-demographic characteristics of sample women by the region of residence are shown in Table 1. More than a third (35.7%) of the women had age ≤ 30 years. The mean age was nearly 28 years. The proportion of younger women were much larger in the hill and traditionally underserved regions compared to the urban and other rural regions. Illiteracy among women was widespread in the study areas as only 44.8% sample women could read and write. Literacy rate was significantly lower among the ethnic minorities in the hill tracts compared to the other regions. Only 36% of the households had some kind of agricultural land. The mean ownership of land was only 63 decimals. As expected, the urban households had no farm land while the land ownership was highest in the hill regions. The proportion of NGO participants was only 27.5%. The rate of participation was lowest in the urban followed by traditionally underserved regions. The participation was highest in the other urban regions. In summary, the socio-economic characteristics of sample women differ significantly by the region of residence.

Table 1 here

Socioeconomic and regional disparity in the use of services

The utilization of all four components of reproductive health services was compared among wealth index and regions in Table 2. The socioeconomic and regional disparity in the use of reproductive health was very wide. The use of services in all four components significantly ($p < .01$) increased with the household wealth index. About 36.5% pregnant women had received antenatal care while only half (18.2%) of them had accessed postnatal care. The immunization coverage, compared to the use of prenatal care, appeared to be very high (76.3%) while only 4.1% went to any health facility for the delivery.

The differences in the utilization of reproductive health care by wealth index indicate that the extreme poor were significantly ($p < .01$) less likely to use antenatal health services than the moderate and other less poor. The picture was nearly similar for the case of postnatal care. The delivery in the hospital was nearly 8 times higher among the rich than the extreme poor. This finding was consistent with (Gwatkin et al. 2000) where the women attended by medically trained persons where the safe delivery rate was about 16.5 times higher among the rich than the poor. About 82% of the least poor women were immunized during pregnancy compared with only 59% of the extreme poor women. The rich-poor inequality was less pronounced in TT coverage compared to the use of other reproductive health services.

The disparity in the utilization of reproductive health care by the region of residence was also very wide. Overall, the coverage of services was lowest in the ethnic communities in the hill region than

other three regions except for the use of postnatal care. The women in the rural underserved region had limited access because of the unavailability of the services and, thus, the utilization was poorer than other rural and urban region. The women living in other rural regions had better access than others in receiving antenatal care and maternal immunization. The delivery in the hospital was, however, much higher in the urban (8.3%) than ant other regions because of the availability of the hospital facilities.

Table 2 here

Other correlates of the utilization of health services

Table 3 shows the role of socioeconomic factors on the use of reproductive health services. Age of women appeared to have negative association with reproductive health service use although the relationships were not significant for the hospital delivery and postnatal care. Education was more likely to positively influence the use of health care as found in other studies (Kutzin 2001). Education of women, not only greatly strengthens their ability to seek care when in need, it also increased their ability to make good use of health services (World Bank 1993). Land ownership had insignificant association with the utilization of reproductive health services. The participation in NGO-led health program also played a positive role in raising the use of reproductive health care except in the delivery in the hospital.

Table 3 here

Factors predicting utilization of reproductive health services: Multivariate analysis

The net effects of household wealth and regional variation on the use of reproductive health services were estimated controlling for the effects of region, participation in NGO program, age, education and land ownership (Table 4). As have seen, the use of antenatal and postnatal care was 3-4 times higher among women of least poor than the extreme poor households adjusting for the influence of confounding factors. Similarly, the least poor were nearly 3.8 times more likely to use hospital than the extreme poor. Immunization during pregnancy was totally supported program and, thus, the poor-rich difference in coverage, although significant, was narrower. The effects of regional disparity, as found in the bi-variate analysis, were also significant in all components of reproductive health use. The participation in NGO program helped raise the use of health services in most of the components except postnatal care. The utilization of health care was higher among the younger women although the influence of age was significant for the antenatal care only. Among the other socio-economic predictor variables, education of women was found to raise the utilization of health care. The influence of other variables such as land ownership was not statistically significant.

Table 4 here

Estimated probabilities of the utilization of health services

The probabilities of the use of antenatal and prenatal health care as outcomes of the effect of various combinations of factors are shown in Table 5. The use of antenatal care was estimated to be minimum (0.099) among women if they were from the extreme poor households, lived in the underserved and traditional rural areas, never participated in NGO program, were older, illiterate and owned marginal amount of land. The probability increased slightly to 0.103 among women in the hill region while other conditions remain same. It appears from various combinations that the probability of the use of prenatal care consistently increased with the increase of household wealth. On the other hand, change in the region of residence and participation in NGO program significantly influenced on the use of antenatal care. Other variables such as age, literacy and land ownership also modified the role of household wealth and region of residence. The probability of the utilization of antenatal care was maximum (0.711) when women belonged to the least poor households, lived in other rural areas, participated in NGO program, were younger, literate and large land owners.

Table 5 here

Nearly similar pattern is found in the probabilities of the use of postnatal care. Data clearly suggest that the household wealth, region of residence and the participation of women in NGO program were the main predictors of the utilization of postnatal care in the study areas.

Table 6 here

The estimated probabilities of tetanus coverage during pregnancy and delivery in the hospital by various combinations of predictors are shown in Table 6. The chance to be immunized during pregnancy was estimated minimum (0.519) among women if they were from the extreme poor households, lived in the underserved and traditional rural areas, never participated in NGO program, were older, illiterate and owned marginal amount of land. The probability increased slightly to 0.362 among women in the hill region while other conditions remain same. It appears from various combinations that the probability of the use of prenatal care consistently increased with the increase of household wealth. On the other hand, change in the region of residence and participation in NGO program significantly influenced on the use of antenatal care. Other variables such as age, literacy and land ownership also modified the role of household wealth and region of residence. The probability of the utilization of antenatal care was

maximum (0.715) when women belonged to the least poor households, lived in other rural areas, participated in NGO program, were younger, literate and large land owners.

Discussion

Overall, the reproductive health services were largely inadequate in the rural communities in Bangladesh. The findings of this study clearly show that the disparities in the utilization of reproductive health are very wide and the poor women are more likely to be deprived than others. Although the use of health services were expanded in the last two decades, it had produced very little in improving health equity in the rural communities because the programs were targeted to the general public and not specifically designed for the poor (Hadi 2001). The poverty-focused credit-based development interventions on the other hand, paid more attention to the need of the poor to promote equity in access and the use of health care. The presence of pro-poor and gender-focussed development program might have reduced the use of health services in the study villages. Education of women has significantly strengthened their ability to benefit from health services.

The social, economic and cultural factors have played important role in getting the needed services although the mechanisms through which such factors operate are not clearly known. Among these, improvement of education among women has broadened their ability to understand the options available to them, re-think traditional cultural values and modify their individual attitudes (Cook and Fathalla 1996).

Although the social and cultural contexts largely determine women's accessibility to participate in the labor force outside home, micro-credit based income-generating programs have created an opportunity for many poor women to be productively employed in Bangladesh. As found in other studies, women's involvement in economically productive activities has reduced their dependency on husbands (Husain 1998). It has also modified the traditional gender relations within the household, created opportunities for women to exercise some degree of autonomy, and enhances their participation in decision-making including limiting or spacing birth (Hadi, Nath and Chowdhury 2001). Income and control over family resources have created their self-respect and perception of self-worth that subsequently have enhanced a sense of identity.

Inequality in the utilization of reproductive health services is pervasive across the globe regardless of whether a country is rich or poor (Evans et al. 2001). However, significant improvements are achieved in the last two decades in the developing world. While there have been important gains in the health of the poor in recent times, there exists significant inequalities between the health outcomes for the poor and the non-poor. Among the problems identified were the use of services among the poor. The extreme poor have remained the out-of-reach of the health care system. The micro-credit based health interventions, however, found to have raised the well-being of the poor and reduced inequality in access to health care (Hadi 1996).

Unavailability of health services not only reduced utilization of reproductive health services but also forced people to bypass medical personnel when in need of services (Whitehead et al. 2001). Since the main focus of the reproductive health program should be the pursuit of broad-based and equitable health development, it is proposed that the existing health system should include pro poor health components in it which are specifically targeted to the poor. Re-allocation of health resources to reduce regional gaps and the promotion of health services for the ethnic minorities and the outreach may be a viable option.

The development strategy must incorporate the reproductive health services for the poor and disadvantaged women. The risk factors during pregnancy are not only higher among the poor, reproductive illness is also a major factor among the poor. Unless the reproductive health needs of the poor are addressed and maternal illnesses among the poor are significantly reduced, the development interventions to reduce poverty would be redundant (Hadi 1996).

Bangladesh continue to face a formidable challenge in the improvement of health of the population. As have seen, the very rich, the rich and the middle class are the principal users of the existing health care system. Several socioeconomic reasons are identified why the poor and very poor households are less likely to receive health care. What is needed here is to recognize the health need of the poor, tailor both the health and social development interventions to match the specific livelihood strategies of different households. The reduction of the health inequality can be achieved by expanding the existing system adopting new health delivery strategy to ensure that the very poor get access to reproductive health services.

One major feature of this approach has been the integration of health promotion with other development programs. Eligibility to receive credit from BRAC requires that the woman should know basic health practices. Compared to the other women, the credit recipients pay more attention to health promotion activities in order to keep their eligibility to receive credit, free education for their children and subsidized health care for their family members. In the group meetings, they were largely homogeneous in terms of age and socio-economic status where they freely interact with a woman health promoter in community settings. The discussion and diffusion created an enable environment to modify health behavior of the participants through their interactions among themselves and with the credit program staff. The process of change, however, would depend on the social and cultural context where the women live and interact.

One feature of the micro-credit program was mandatory health check-up for each credit recipient at the time of receiving services. In a way, the participants were given additional opportunities to discuss their health problems with a paramedic and recollect what they learned earlier. Such re-enforcement had

significant positive effects in understanding the messages. This has been reflected earlier where women involved in credit program for longer years knew more than others.

Policy

In equalities exist by region and households. Thus, the immediate policy should be targeted region-focused and household-level development intervention. The region specific inequality should be reduced by the expansion of outreach health programs to bring services closer to the disadvantaged such as the poor and women is a requirement to achieve the goal. This can be achieved by promoting more equitable distribution of health resources focussing not only on the size of the population but also on the burden of diseases (Whitehead et al. 2001).

Thus, the proposed expansion can contribute in many ways. For example, reproductive health care for the poor will reduce the incidence of maternal morbidity. This is also likely to reduce workday losses among the poor. The proposed health care system, thus, needs to move beyond the one-size-fits-all model of health care. The policy options should include testing new initiatives, systemic interventions and routine monitoring that will help designing the most effective health intervention models.

The participation of rural women in micro-credit programs along with their financial contribution increases women's position in the families and mobility in the community that may help getting reproductive health care in need. NGO-led development program experience suggests that the positive association between the participation of micro credit program and the utilization of reproductive health services may be sustained if specific components such as social awareness and human rights are added to it.

Given the financial constraints, a gradual phasing approach may be a viable option that addresses priority reproductive health components in Bangladesh. In other words, the reproductive health program should follow a step-by-step approach by removing structural barriers (e.g., cost of services), building partnership between public and private sectors, and adding appropriate and replacing unnecessary services.

Health development can only be ensured by enhancing the lives of women and by providing them freedom (Sen 1999). The poor women in Bangladesh should be given the freedom to avoid ill-health and escapable mortality.

The study concludes that the targeted health interventions for the poor women will improve the access and use of reproductive health among the poor and significantly reduce the inequity in Bangladesh. This chapter shows how the distribution of wealth determines disparities in the use of health care. Thus, the expansion of health care alone cannot resolve health problems in a population. The study concludes that social determinants must be targeted to achieve the

Notes

1. NGO-led targeted program is designed primarily for the poor women. The program includes a package of support services such as collateral-free credit for the income generating activity, skill training, basic literacy and health care for the participating women.
2. *Watch Project* is the demographic and health surveillance system of BRAC covering more than 90,000 people living in 85 villages in ten rural areas, four urban clusters in the metropolitan city and five ethnic clusters in the hill regions of Bangladesh. The regions are selected to be representative of the Bangladesh. In each region, BRAC operates a field research station to cover approximately 1,200 households in neighboring 6 to 8 villages or clusters. Field investigators routinely visit all households of the study clusters and record relevant information on the registers. Information is then entered onto computers in the central office of BRAC in Dhaka.
3. Steps to produce the wealth index: A set of household level variables were identified to include in the construction of wealth index. These were table, cot, quilt, watch, radio, television, cycle and electricity. Each of the variables was recoded into categorical dichotomous (yes-no) variable. Thus, we created eight dichotomous variables. All variables were then standardized. The principal component analysis (factor analysis) was run with all constructed variables with the criteria as follows: only one factor to be produced, no rotation, principal components extraction, factor score to be calculated with regression method and print only component score coefficient matrix. The component score coefficient matrix were multiplied by the standardized (sampling weight) variables to produce factor scores which were termed as household wealth score variable. The wealth score variable was classified into quintile variable for this research.
4. Socioeconomic disparity was measured by constructing a wealth index using compound assets and possessions of a set of household assets based on which the households were classified into wealth quintiles.
5. Watch Project coverage was expanded last year to include ethnic minorities in the southeastern hill district of Bandarban, and urban poor and lower middle class in the city of Dhaka. The ethnic communities in the hill region were very different than the mainstream population in terms of language, culture, religion, food habit and economic activities. The urban clusters consisted of the lower classes and, therefore, not representative of urban women in general. Among the 10 rural sites covered by the Watch Project, two sites were located in the remote haor (riverine low land) and inaccessible to public facilities. Two sites were located in traditionally conservative districts where the health services for women were

always found neglected. These four sites consisted the traditionally under-served regions in this study. The remaining six rural sites were considered average and largely represented the rural communities in Bangladesh. Watch Project sites were, therefore, categorized into four regions: hill, urban, rural under-served and other rural areas.

6. Utilization of reproductive health services was measured by four indicators such as a) the use of antenatal and b) post-natal care, c) immunization during pregnancy and d) delivery in the hospital. **Antenatal care** included participation of pregnant women in health education sessions, routine health check-up by a medically trained professional, monitoring weight gain, identification of danger signs, iron, vitamin and nutrition supplementation if needed and use of emergency services for the complicated cases. If a woman had routine health check-up in the third trimester and took (iron and vitamin) supplementation, she was considered to have antenatal care during pregnancy. **Post-natal care** covered the follow-up by a medically trained professional, education on breastfeeding, food supplementation, counseling and post-partum period, growth monitoring and immunization for the newborn. If a woman was monitored by a health professional within 4 weeks after delivery, she was considered to have postnatal care. The study women were expected to receive two doses of tetanus toxoid (TT) during pregnancy. A woman was considered **immunized** if she had both doses of tetanus toxoid vaccines. When the newborn was delivered in a health clinic or **hospital**, the delivery was considered safe.

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References

- Bhuiya, A. A In: Evans T., Whitehead M., Diderichsen F., Bhuiya A. and Wirth M. (eds.), *Challenging Inequities in Health. From Ethics to Action*. New York: Oxford University Press.
- BRAC 1999. *Annual Report 1998*. Dhaka: BRAC
- Chowdhury, A.M.R. and Bhuiya, A. 1999. Do poverty alleviation programmes reduce inequalities in health? The Bangladesh experience. In: Leon D. and Walt G. (eds.) *Poverty, Inequality and Health*. Oxford: Oxford University Press.
- Cook, R.J. and M.F. Fathalla 1996. Advancing reproductive rights beyond Cairo and Beijing *International Family Planning Perspectives* 22(3):115-121.
- Evans T., Whitehead M., Diderichsen F., Bhuiya A. and Wirth M. (eds.), 2001. *Challenging Inequities in Health. From Ethics to Action*. New York: Oxford University Press.
- Feachem, G.A. 2000. Poverty and inequity: a proper focus for the new century. *Bulletin of the WHO* 78(1):1-2.
- Filmer, D. and Pritchett 2001. The Structure of Social Disparities in Education: Gender and Wealth.
- Gertler, P. and van der Gaag, J. 1990. *The Willingness to Pay for Medical Care*. Baltimore: Johns Hopkins University Press.
- Government of Bangladesh, 2001. Action Programme for the Development of Bangladesh. Country Presentation. Paper presented in the *Third United Nations Conference on the Least Developed Countries*, Brussels, 14-20 May 2001.
- Gwatkin, D., Rustein, S. John, K., Pande, R. and Wagstaff, A. 2000. *Socio-economic Differences in Health, Nutrition and Population in Bangladesh*. HNP/Poverty Thematic Group of the World Bank. Washington: The World Bank.
- Hadi, A. 1996. Does health development improve socioeconomic well-being in less development communities? Paper presented at the *Canadian Conference on International Health*, Ottawa, Canada, 10-13 November 1996.
- Hadi, A. 2001. Promoting health knowledge through micro-credit programme: Experience of BRAC, Bangladesh. *Health Promotion International* 16(3): 219-227.
- Hadi, A., S.R. Nath and A.M.R. Chowdhury (2001). "The effects of micro-credit programmes on the reproductive behaviour of women in rural areas of Bangladesh", in: Z. Sathar and J.F. Philips (eds.) *Fertility Transition in South Asia* (New York: Oxford University Press).
- Husain, A.M.M. (1998). *Poverty Alleviation and Empowerment: The Second Impact Assessment Study of BRAC's Rural Development Programme* (Dhaka: BRAC).
- Krasnik, A. 1996. The concept of equity in health services research. *Scandinavian Journal of Social Medicine* 24(1): 2-7.

Kutzin, J. 2001. Obstacles to women's access: Issues and opinions for more effective interventions to improve women's health. Background paper for the *World Bank Best Practices Paper on Women's Health and Nutrition*. Population, Health, and Nutrition Department, Washington, DC. Draft of March 17.

Leon, D. and Walt, G. 2001. Poverty, inequality, and health in international perspective: a divided world? In: Leon D. and Walt G. (eds.) *Poverty, Inequality and Health*. Oxford: Oxford University Press.

Peter, F. 1998. The Ethical Foundations of Health Equity: Some Notes in Reactions to the GHEI Meeting. Paper discussed at the *Global Health Equity Initiative Meeting* in China, October 4-10, 1997.

Populi

Power, J.G. 1996. Evaluating health knowledge: an alternative approach. *Journal of Health Communication* 1: 285-298.

Prasad, P. 2000. Health care access and marginalized social spaces. Leptospirosis in South Gujarat. *Economic and Political Weekly* October 7, 2000.

Robert, H. 1997. Socioeconomic determinants of health. Children, inequalities, and health. *BMJ* 314: 1122-1125.

Sen, A 1999. Health in development. *Bulletin of the World Health Organization* 77(8): 619-23.

Uphoff, N. 1993. Grassroots organizations and NGOs in rural development: opportunities with diminishing states and expanding markets. *World Development*, 21, 515-530.

Wagstaff, A. 2002. Poverty and health sector inequalities. *Bulletin of the WHO* 80(2): 97-105, 2002.

Whitehead, M., Dahlgren, G. and Gilson, L. 2001. Developing the policy response to inequities in health: A global perspective. In: Evans T., Whitehead M., Diderichsen F., Bhuiya A. and Wirth M. (eds.), *Challenging Inequities in Health. From Ethics to Action*. New York: Oxford University Press.

World Bank (1993). *World Development Report 1993. Investing in Health*. Washington DC: Oxford University Press.

Table 1. Profile of sample women by region of residence

| Study Variable | Region | | | | All |
|-----------------------|-------------------|--------------------|----------------------|----------------------|------|
| | Hill ^a | Urban ^b | Rural-1 ^c | Rural-2 ^d | |
| Age ≤30 years | 41.7 | 27.4 | 43.6 | 27.4 | 35.7 |
| Mean age (years) | 30 | 28 | 30 | 27 | 28 |
| Literacy rate | 21.7 | 48.8 | 45.7 | 48.7 | 44.8 |
| Land ownership | 53.9 | --- | 33.5 | 40.4 | 35.9 |
| Mean amount of land | 199 | --- | 50 | 55 | 63 |
| Participation in NGOs | 28.7 | 17.9 | 21.0 | 35.8 | 27.5 |
| N | 115 | 84 | 505 | 478 | 1182 |

^a The residents of the hill region in the south east are primarily ethnic minorities.

^b Urban samples include only the lower middle class and slum dwellers.

^c Rural-1 represents the traditionally underserved and remote rural areas.

^d Rural-2 represents other rural areas.

Table 2. Utilization of reproductive health services by wealth index and region of residence

| Wealth index and region | Reproductive health services | | | |
|-------------------------|------------------------------|-------------|----------------------|--------------|
| | Received ANC | TT coverage | Delivery in hospital | Received PNC |
| All | 36.5 | 76.3 | 4.1 | 18.2 |
| Wealth index | | | | |
| Extreme poor | 15.7 | 59.0 | 1.2 | 7.2 |
| 2 | 33.2 | 76.4 | 3.1 | 15.3 |
| 3 | 29.5 | 78.4 | 2.1 | 15.8 |
| 4 | 49.4 | 86.1 | 4.2 | 25.5 |
| Least poor | 52.2 | 81.6 | 9.0 | 25.9 |
| <i>P</i> | <.01 | <.01 | <.01 | <.01 |
| Region | | | | |
| Hill tracts | 22.6 | 51.3 | 2.6 | 22.6 |
| Urban | 39.3 | 61.9 | 8.3 | 14.3 |
| Rural underserved | 27.3 | 68.7 | 2.6 | 17.0 |
| Other rural | 49.2 | 92.9 | 5.2 | 19.0 |
| <i>P</i> | <.01 | <.01 | <.05 | <i>ns</i> |

ns=not significant.

Table 3. Utilization of reproductive health services by socioeconomic factors

| Socioeconomic factors | Reproductive health services | | | |
|--------------------------|------------------------------|-------------|----------------------|--------------|
| | Received ANC | TT coverage | Delivery in hospital | Received PNC |
| NGO program | | | | |
| Non-participant | 35.2 | 74.2 | 4.1 | 19.4 |
| Participant | 40.0 | 81.8 | 4.1 | 15.1 |
| <i>P</i> | <.10 | <.05 | <i>ns</i> | <.10 |
| Age of women (in years) | | | | |
| ≤ 30 | 40.8 | 79.1 | 4.5 | 19.1 |
| 30 + | 28.9 | 71.3 | 3.3 | 16.6 |
| <i>P</i> | <.01 | <.05 | <i>ns</i> | <i>ns</i> |
| Education of women | | | | |
| No education | 26.5 | 71.0 | 2.3 | 13.2 |
| Educated | 48.9 | 82.8 | 6.2 | 24.3 |
| <i>P</i> | <.01 | <.05 | <.01 | <.01 |
| Land ownership (decimal) | | | | |
| Landless | 35.1 | 73.9 | 3.6 | 17.0 |
| Land owner | 39.2 | 80.7 | 5.0 | 20.3 |
| <i>P</i> | <.10 | <.01 | <i>ns</i> | <.10 |

ns=not significant.

Table 4. Odds ratios for selected predictors of the utilization of reproductive health services

| Explanatory variables | Reproductive health services | | | |
|---------------------------------|------------------------------|-------------|----------------------|--------------|
| | Received ANC | TT coverage | Delivery in hospital | Received PNC |
| Wealth index | | | | |
| Extreme poor | 1.00 | 1.00 | 1.00 | 1.00 |
| 2 | 2.01*** | 1.72** | 1.87 | 2.48*** |
| 3 | 1.44 | 1.35 | 1.20 | 2.60*** |
| 4 | 3.43*** | 2.57*** | 2.25 | 4.41*** |
| Least poor | 3.18*** | 1.60* | 3.77** | 4.29*** |
| Region | | | | |
| Hill tracts | 1.00 | 1.00 | 1.00 | 1.00 |
| Urban | 1.28 | 1.24 | 2.19 | 0.32*** |
| Rural underserved | 0.94 | 1.86*** | 0.78 | 0.48** |
| Other rural | 2.05*** | 9.69*** | 1.38 | 0.47** |
| NGO program | | | | |
| Non-participant | 1.00 | 1.00 | 1.00 | 1.00 |
| Participant | 1.20** | 1.31** | 1.14* | 0.78 |
| Age of women (in years) | | | | |
| 30 + | 1.00 | 1.00 | 1.00 | 1.00 |
| ≤ 30 | 1.55*** | 1.22 | 1.04 | 1.11 |
| Education of women | | | | |
| No education | 1.00 | 1.00 | 1.00 | 1.00 |
| Educated | 1.37** | 1.43** | 1.90* | 1.49** |
| Land ownership (decimal) | | | | |
| | 1.01 | 1.01 | 1.00 | 1.01 |
| <hr/> | | | | |
| --2 Log likelihood | 1551.9 | 1107.5 | 370.0 | 1050.9 |
| Pseudo R squared | 0.11 | 0.22 | 0.09 | 0.09 |

* p<0.10

** p<0.05

***p<0.01

Table 5. Estimated probabilities of the utilization of antenatal and postnatal services by the combination of predictors

| Combination of factors | Estimated probabilities | |
|---|-------------------------|----------------|
| | Antenatal care | Postnatal care |
| 1. Wealth index 1, lived in underserved region, not NGO participant, older, illiterate and small (132 d) landowners | .099 | .057 |
| 2. Index 1, lived in hill region, not NGO participant, older, illiterate and owned small (85 d) landholding | .103 | .109 |
| 3. Index 2, underserved region, not NGO participant, older, illiterate and owned small (72 d) landholding | .178 | .127 |
| 4. Index 2, underserved region, NGO participant, older, illiterate and owned medium (253 d) landholding | .216 | .113 |
| 5. Index 3, lived in other rural region, not NGO participant, older, illiterate and owned small (132 d) landholding | .258 | .133 |
| 6. Index 3, other rural region, NGO participant, younger, illiterate and owned small (145 d) landholding | .364 | .119 |
| 7. Index 4, underserved region, NGO participant, older, illiterate and owned small (29 d) landholding | .487 | .159 |
| 8. Index 4, other rural region, NGO participant, younger, illiterate and owned small (101 d) landholding | .572 | .182 |
| 9. Index 5, other rural region, NGO participant, younger, literate and owned small (143 d) landholding | .695 | .249 |
| 10. Index 5, other rural region, NGO participant, younger, literate and owned high (348 d) landholding | .711 | .278 |

Note: Above probabilities are calculated from the estimated coefficients of Table 4 by using the following equation:

$$p = \exp(a + \sum b_i x_i) / [1 + \exp(a + \sum b_i x_i)]$$

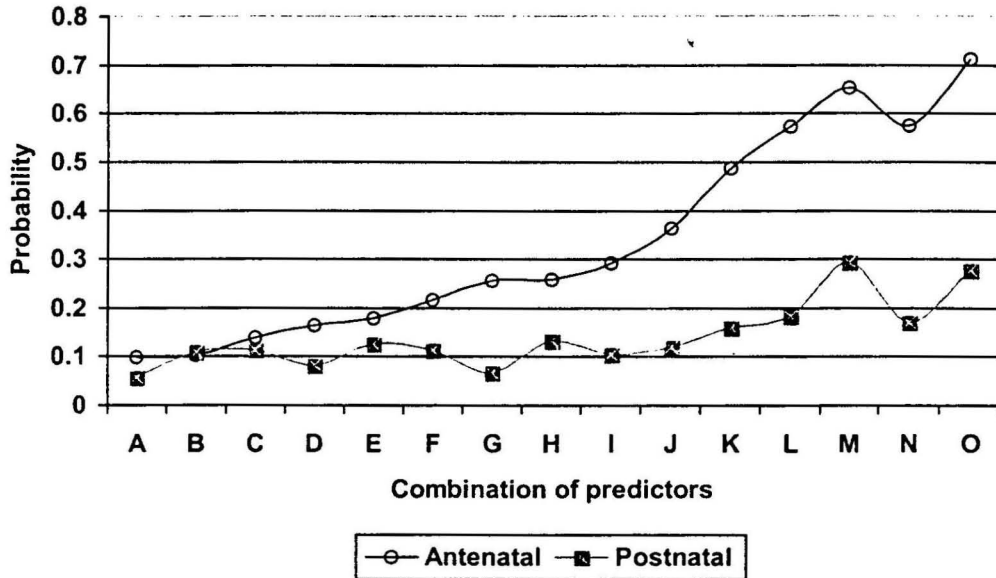
Table 6. Estimated probabilities of tetanus coverage during pregnancy and delivery in the hospital by the combination of predictors

| Combination of factors | Estimated probabilities | |
|---|-------------------------|----------------------|
| | TT Coverage | Delivery in hospital |
| 1. Wealth index 1, lived in underserved region, not NGO participant, older, illiterate and small (132 d) landowners | .519 | .009 |
| 2. Index 1, lived in hill region, not NGO participant, older, illiterate and owned small (85 d) landholding | .362 | .011 |
| 3. Index 2, underserved region, not NGO participant, older, illiterate and owned small (72 d) landholding | .644 | .015 |
| 4. Index 2, underserved region, NGO participant, older, illiterate and owned medium (253 d) landholding | .718 | .021 |
| 5. Index 3, lived in other rural region, not NGO participant, older, illiterate and owned small (132 d) landholding | .884 | .018 |
| 6. Index 3, other rural region, NGO participant, younger, illiterate and owned small (145 d) landholding | .925 | .022 |
| 7. Index 4, underserved region, NGO participant, older, illiterate and owned small (29 d) landholding | .948 | .034 |
| 8. Index 4, other rural region, NGO participant, younger, illiterate and owned small (101 d) landholding | .958 | .039 |
| 9. Index 5, other rural region, NGO participant, younger, literate and owned small (143 d) landholding | .954 | .119 |
| 10. Index 5, other rural region, NGO participant, younger, literate and owned high (348 d) landholding | .715 | .155 |

Note: Above probabilities are calculated from the estimated coefficients of Table 4 by using the following equation:

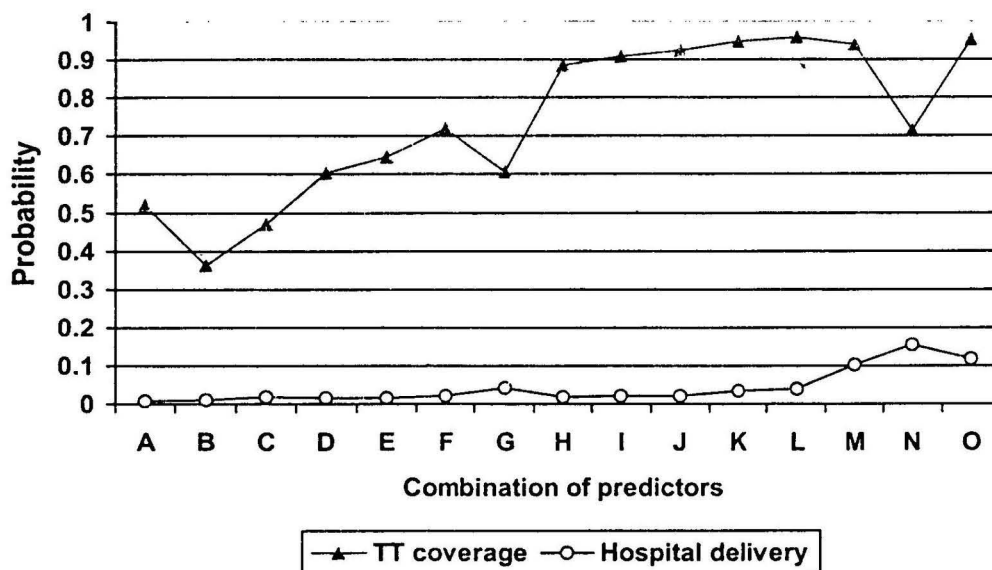
$$p = \exp(a + \sum b_i x_i) / [1 + \exp(a + \sum b_i x_i)]$$

Figure 1. Probabilities of the use of antenatal and postnatal care by the combination of predictors



- A= Index 1, older, illiterate, not NGO participant, underserved and 132 d land
- B= Index 1, older, illiterate, not NGO participant, hill region and 85 d land
- C= Index 1, older, illiterate, NGO participant, hill and 504 decimal land
- D= Index 1, older, literate, not NGO participant, underserved and 82 d land
- E= Index 2, older, illiterate, not NGO participant, underserved and 72 d land
- F= Index 2, older, illiterate, not NGO participant, underserved and 235 d land
- G= Index 2, older, illiterate, NGO participant, urban and landless
- H= Index 3, older, illiterate, not NGO participant, other rural and 132 d land
- I= Index 3, older, illiterate, NGO participant, underserved and 91 d land
- J= Index 3, younger, illiterate, NGO participant, other rural and 145 d land
- K= Index 4, older, illiterate, NGO participant, other rural and 29 d land
- L= Index 4, younger, illiterate, NGO participant, other rural and 101 d land
- M= Index 5, younger, literate, not NGO participant, other rural and 118 d land
- N= Index 5, younger, literate, NGO participant, urban area and 4 d land
- O= Index 5, younger, literate, NGO participant, other rural and 143 d land

Figure 2. Probabilities of TT coverage and delivery in the hospital by the combination of predictors



- A= Index 1, older, illiterate, not NGO participant, underserved and 132 d land
- B= Index 1, older, illiterate, not NGO participant, hill region and 85 d land
- C= Index 1, older, illiterate, NGO participant, hill and 504 d land
- D= Index 1, older, literate, not NGO participant, underserved and 82 d land
- E= Index 2, older, illiterate, not NGO participant, underserved and 72 d land
- F= Index 2, older, illiterate, not NGO participant, underserved and 235 d land
- G= Index 2, older, illiterate, NGO participant, urban and landless
- H= Index 3, older, illiterate, not NGO participant, other rural and 132 d land
- I= Index 3, older, illiterate, NGO participant, underserved and 91 d land
- J= Index 3, younger, illiterate, NGO participant, other rural and 145 d land
- K= Index 4, older, illiterate, NGO participant, other rural and 29 d land
- L= Index 4, younger, illiterate, NGO participant, other rural and 101 d land
- M= Index 5, younger, literate, not NGO participant, other rural and 118 d land
- N= Index 5, younger, literate, NGO participant, urban and 4 d land
- O= Index 5, younger, literate, NGO participant, other rural and 143 d land