

Socioeconomic factors differentiating maternal and child health-seeking behavior in rural Bangladesh

By

Ruhul Amin, Stan Becker, and Nirali M. Shah

Johns Hopkins University

Abstract

There has been an increasing availability and accessibility of modern health services in rural Bangladesh over the past decades. However, previous studies on the socio-economic differentials in the utilization of these services were based on a limited number of factors, focusing either on preventive or curative modern health services. These studies also failed to collect data from remote rural areas of the different regions to examine the socio-economic differentials in health seeking behavior in those areas. Using data from a household survey of 3, 498 currently married women conducted in 2006, this study examined both curative and preventive health-seeking behaviors in seven areas of maternal and child health care--antenatal care, postnatal care, child delivery care, mother=s receipt of Vitamin A postpartum, newborn baby care, care during recent child fever episodes, and maternal coverage by tetanus toxoid (TT). The survey was conducted in mid-2006. A principal finding was that a household=s poverty status, as reflected by a wealth index, was a major determinant in health seeking behavior. Mothers in the highest wealth quintile were significantly more likely to use modern trained providers for basic health services than those in the poorest quintile. This differential was less pronounced for TT and other Expanded Program of Immunization (EPI) items, such as BCG, DPT, and measles vaccines. The wider coverage of TT and other EPI items may have been due to their coverage of the rural people under a massive EPI campaign since early 1980s. On the other hand, because modern maternal and child health services in the curative area of fever treatment and preventive areas of prenatal-, delivery-, and postnatal-care were neither available as widely and as equitably as TT and other EPI items, their prevalence was lower and their use by lower socio-economic strata was lower compared to the higher socio-economic strata. Implications of these findings are discussed in the paper.

Introduction

In recent years, efforts to eliminate inequalities in the utilization of basic health care services have been emphasized for the overall improvement of health in developing countries [1-4]. As a part of ongoing efforts to provide basic preventive and curative health services to all, government and non-governmental organizations (NGOs) have been expanding their health services in rural Bangladesh. One of the purposes of this expansion was to make essential services available to all women and children [5-15]. Simultaneously, major efforts for improving the economic conditions of the poor have been going on through massive micro-credit programmes throughout

rural Bangladesh [14, 16, 17]. Improving the economic conditions of the poor has a potential of reducing the stress and strain of precarious living, which tends to impair a person's ability to recover from illness. Increased income may also promote health by enabling the poor to purchase better health services. While some progress has been made in providing basic health services to poor women and their children, this progress may have been uneven as those in the rural areas are less likely to have been reached [9, 15, 18, 19].

Previous studies in rural Bangladesh have shown substantial socio-economic inequalities in health status, access to health services, and their utilization, all disfavoured poor women and children [2, 20-22]. There has been an increasing availability and accessibility of practitioners of Western medicine in rural Bangladesh over the past decades [9, 15, 23]. While greater effectiveness of modern medicines in curing diseases may lead to their greater utilization compared to traditional medicines, the utilization of the former is likely to be higher among the higher socio-economic strata than among the lower socio-economic strata. Similarly, whatever development programmes, including micro-credit and health programmes, have been happening in Bangladesh, their benefits may accrue more to the urban areas and their nearby rural areas than to the more remote rural areas [2, 20, 21]. Also, while private health care services have been encouraged since the early 1980s, leading to the establishment of hundreds of private facilities in the country, they are located more in the urban areas and small towns and market places than in remote areas [14, 24]. Consequently, we expect that a higher proportion of the poor in rural areas have been relatively untouched by various economic, health, and development policies and programmes.

Nevertheless, a wide range of therapeutic choices is available in rural Bangladesh. These include primary health care organized around the Upazila (sub-district) Health Complex located at the Upazila headquarters with in-patient and basic laboratory facilities. Attached to the Upazila complex are two to three health sub-centres at the Union (sub-divisions of an Upazila) level [7]. Eight to ten qualified allopathic practitioners and their auxiliary personnel staff an Upazila Health Complex, while para-professionals (a paramedic, a medical assistant, and a midwife) staff

its satellite clinics at the union level. These facilities provide an essential services package (ESP) in health free of cost, which consists of maternal health, family planning, communicable disease control, child health, and basic curative care [10, 23, 25, 26]. Rural Bangladesh also has a wide range of local practitioners of indigenous medicines, and drug stores [21, 27, 28].

Many factors limit the utilization of maternal and child health services in the rural areas of developing countries, including their availability, accessibility, quality, and the characteristics of the users. Specifically, these may include distance to health service, cost of services, quality of services, technical qualifications of health practitioners, socio-economic status of the household, and women=s autonomy in household decision-making [29-34]. Studies from rural Bangladesh have found that various indicators of socio-economic status were positively associated with the utilization of health services [21, 22, 35, 36]. However, these studies were based on a limited number of factors and focused on either preventive or curative modern health care services. As a result, they neither examined the net effects of a wider set of individual, community, and provider-level factors on the utilization of services nor did they cover rural areas from different regions to see how the recent increases in the availability of maternal and child health services are reaching different socio-economic groups [21, 22, 35-38]. Given the recent expansion of basic facilities for preventive and curative health services, there is a need to examine how the different socio-economic groups in rural areas are affected [11, 12, 15, 23].

This study examines socio-economic differentials in maternal and child health-seeking behavior in selected rural areas from 3 of the 6 divisions of Bangladesh. The remainder of this paper is organized as follows: first a conceptual model of health-seeking behaviour is presented; then some hypotheses about socio-economic differentials in health-seeking behaviours are given [15, 19]. The third section explains the study setting, data, and variables; the fourth section describes some socio-economic characteristics of the study population; the fifth section presents bivariate relationships between health-seeking behaviours and socio-economic indicators; the sixth section provides the multivariate results; and the final section summarizes the study findings and their policy implications.

Conceptual Framework

Figure 1 shows the conceptual model used in this study. In specifying the various factors influencing health-seeking behavior, we rely on a behavioural model and its subsequent modification [39-43]. The modified version of the model has been successfully applied in the study of health services utilization in developing countries [44-46]. This model posits that health-seeking behaviour is a function of three sets of individual characteristics: predisposing, enabling, and need. The actual seeking of health services is assumed to be a sequential and conditional function of the individual's predisposition to use health services, their perceived need to use them and their ability to obtain the services. Some variables may belong in more than one of these categories. In such a case, we made an arbitrary classification for the analysis and presentation of our findings. The predisposing factors (age of the mother, educational level of the husband and wife, husband's occupation, exposure to mass media, and women's decision making power), and enabling factors (wealth index, pharmacy in the village, distance from a family welfare center, distance from Upazila headquarters, and micro-credit group membership) are considered as independent variables affecting health-seeking behaviour. The enabling factors are those by which individuals have the means that permit them to obtain health services. Finally, although predisposing and enabling factors are necessary for the use of health services, they are not sufficient for actual use; use of the health services is triggered by the need during pre-natal, childbirth, and post-natal stages, and during illness [39]. In the present study, we explore the extent to which the predisposing and enabling factors contributed to any differences in health seeking behaviour.

Hypotheses

We hypothesize that the seeking of basic curative and preventive health care services from modern trained providers by women in rural areas will be lower among mothers of lower socio-economic strata than among those of higher socio-economic strata. We posit that this is due to more physical, socio-economic, and biomedical (services) constraints faced by the former than by the latter. Physically, in rural areas, because of the lower accessibility of modern health care

services near their homes, lack of transportation, costs of transport, and difficulty of walking for hours to the health facilities, women and children from lower socio-economic strata are more likely to lag behind those from the higher socio-economic strata in the utilization of services. Similarly, those of lower socio-economic status have less exposure to the outside world, and consequently more traditional complacency about their health conditions, as well as lack of knowledge about illnesses. The poor are also more likely to encounter other constraints, such as apathy and lack of concern from health care providers and corrupt practitioners, inhibiting their access to, and utilization of services [34]. In contrast, those from the higher socio-economic strata have both more exposure to an outside world and more resources to access services.

The study setting, data, and variables

The data for this study come from a household survey carried out in 128 villages in 3 of the 6 Divisions of Bangladesh (Chittagong, Dhaka and Rajshahi). The survey included 3498 currently married women in 128 villages outside 16 catchment areas of health centres of Grameen Bank Health Programme. This sample survey was a "baseline survey" for an experimental project with a 4-cell design to assess the relative effects of separately and jointly introducing additional micro-credit and essential health services interventions on the use of health services, economic well-being, and women's empowerment.

Over the past decade the Grameen Health Programme has established health centres in selected small towns and village market places in rural Bangladesh. Our study villages are located outside the catchment areas of these centers (more than 4-6 km from the center) and thus can be considered remote from those centers. Of the 31 Grameen centres located in 31 Upazilas (sub-districts) from three regions of Bangladesh, 16 centres in Upazilas with the lowest reported coverage of microcredit were first selected. Then an enumeration was done of 24 villages in the vicinity directly outside the selected catchment areas to find villages estimated to have less than 40-50% of households participating in micro-credit and with only governmental health programmes. On the basis of the results of this enumeration, villages with the lowest microcredit participation were selected from enumerated villages around the 16 centers. For each of the 16,

two sets of four villages were selected in opposite directions from the health centre.

Prior to the household sample survey, a census was conducted in all 128 (16*8) villages. The purpose of this census was to categorize the households into three strata: 1) those not eligible for micro-credit, 2) those eligible and who had accessed micro-credit, and 3) those eligible but who had not accessed micro-credit. For the survey, a stratified random sample was taken with these three strata among all households that had ever-married women in each village. The sample sizes chosen were: 4, 12 and 15 from strata 1), 2), and 3), respectively. From the sample and census information, sampling weights were derived for each household and woman and used in the analyses.

The survey was conducted by a professional survey agency, using a structured and pretested questionnaire. Thirty interviewers and supervisors (social science graduates who were experienced in survey methods) were recruited. They received training on the content of the questionnaires and techniques to elicit valid information by establishing rapport with the respondents while maintaining neutrality essential to obtain the most accurate data possible. The training consisted of classroom lectures, role-playing, and practice sessions. Informed consent was obtained prior to conducting an interview. The Institutional Review Boards of the Johns Hopkins School of Public Health and the Bangladesh Medical Research Council approved the study.

Household and community information was collected from the heads of the households and community leaders, respectively. The woman=s questionnaire included a birth history, details about maternal and child health care, recent childhood illnesses, micro-credit participation, and relevant socio-economic data. The survey was undertaken in mid 2006, prior to the introduction of any intervention activities in the experimental areas of the project. The household response rate was 91.3% and the eligible woman response rate was 98.7%. More detailed information about the survey and its design is available elsewhere [14].

We examine the health seeking behavior of the mothers in terms of their reproductive health care as well as the health care for their children who were born between June 2003 and September 2006. Only information for last-born children was examined. This restricted the analysis to births that occurred relatively close to the time of interview, and thus enhanced the likelihood that mothers provided accurate information about the reported use of health services. In view of the difficulty of separate care given to twins, the study focused on the 1261 singleton births available for analysis. Information on recent illness of the child and information on mother=s reproductive health care was collected from the mothers. The health seeking behaviours analyzed here consisted of: (i) trained antenatal care (ANC) provider vs. untrained provider or no ANC, (ii) tetanus toxoid (TT) given vs. not given to the woman during the last live birth pregnancy, (iii) child delivery by trained providers vs. untrained providers, (iv) trained postnatal care (PNC) provider vs. untrained provider or no PNC , (v) newborn health checkup vs. no checkup, (vi) the mother was given vitamin A within two months postpartum vs. not given, and (vii) trained provider vs. untrained or no provider for illness of a child during 15-days= illness recall period.

The socio-economic predictors of health-seeking behaviours consisted of the following: mother=s educational level and her husband=s occupation and educational level, membership in micro-credit groups, and ownership of assets. The information on asset items was collected in the household questionnaire. The binary asset indicators were presence or absence of: electricity, a wardrobe, table, chair, clock, bed, radio, television, bicycle, at least one of a motorcycle, sewing machine or telephone, brick, cement or tin walls, and modern toilet or pit latrine. In addition, the ratio of the number of people in the household to the number of rooms in the house was used. Principal components= analysis was employed to combine the indicators into an asset index [47]. The analysis yielded a score for each individual. These scores were ordered and used to divide households into quintiles, representing their relative wealth with respect to other households in the study. This asset or wealth index reflects disparities that are primarily economic [48].

Other predictors of health seeking behaviors examined in our analyses were age of the mother, her exposure to TV and/or radio, presence of a pharmacy in the village, distance to a family

welfare centre (FWC), distance to Upazila headquarters, and women's decision-making power. The latter was calculated from responses about each of the 10 decision-making items. Specifically, each woman was asked: "In your family who do you think should have a say on decisions regarding: buying costly furniture such as cot, showcase? How about buying or selling cows/goats? How to spend family savings? Whether to take a loan? Treatment when children are sick? Whether to visit a doctor when you are sick? Whether you can work for money outside the home? Visiting your father's home? Whether to have another child or stop? Whether or not to use family planning?" Then for each decision she was also asked "Who takes part in the decision regarding the subject?" "Among them, whose opinion is the most important on the decision regarding the subject?" "Who has the final say on the decision regarding subject?" For each item we coded 0 if the woman reported that she did not participate in the decision, 1 if she reported that she contributes to the decision and 2 if she reported herself as the first or second most important person in actually deciding. These values were then summed to provide the decision-making score used in the analyses. Previous studies have used similar variables in differentiating health care utilization in rural Bangladesh [21, 22, 27, 35-37, 47, 50].

Analytical methods

We first compared characteristics of our survey population with those households and women in the Bangladesh Demographic and Health Survey (DHS) of 2004 for 34 rural clusters, which were located in the districts where our study villages are located. Then for each of the seven outcome variables listed above, we conducted bivariate and multivariate analyses. For the bivariate analyses, we utilized z-tests for binary covariates and ANOVA for covariates with three or more categories. For the multivariate analyses, we utilized binary logistic regression, in which the utilization (or not) of a health care service was treated as a dependent variable. For calculating the odds ratio for each category of the independent variables, the first group was always taken as the reference category. Variables having an association of $p < 0.1$ in at least one of the bivariate analyses were included in all multivariate analyses. Additionally, age group and wealth quintiles were included in all regression analyses. Analyses were done with STATA Version 9 with the SVY commands appropriate for sample surveys.

Descriptive Statistics on the Study Population

Table 1 compares socio-economic and other characteristics of the sample respondents and their households with those for women residing in the rural areas of the districts in which our study areas are located from the DHS of 2004. Though the data are not strictly comparable because of different sampling designs and different time periods, they still provide an indication of how our study areas differ from rural areas sampled in the DHS. Of course neither sample is representative at the district level. The areas of the current study were significantly higher in terms of utilization of trained personnel at delivery and PNC, micro-credit membership, and exposure to TV than those of the rural districts as a whole. On the other hand, they were significantly lower than the DHS sample in terms of TT immunization coverage and percentage of husbands in agricultural occupations. Some of these differences could be the reflection of more recent data for our study areas. Since exposure to TV, the safe-motherhood initiative with trained providers, and micro-credit outreach services have been steadily increasing in recent years, it is likely that they would be better in the more recent data of our study areas.

Bivariate results on socio-economic differentials of preventive and curative health seeking behaviors among the mothers are presented in Table 2. The percentage of mothers seeking antenatal care from trained providers was 57%, and 78% of mothers had TT vaccine. These were much higher than the values for the other five outcomes, which ranged between 19% and 32%. Mothers with education, mothers whose husbands were educated and were in a non-agricultural occupations, and mothers whose households were in the higher wealth quintiles were more likely to use modern providers for antenatal and postnatal care. The same pattern of higher use of vitamin A supplementation, newborn health checkup by health care professionals, and child delivery care by trained providers was also observed among those with some primary and higher education and higher wealth index compared to those with less or no education or a lower wealth index. Regarding the treatment of the children suffering from fever, only one fifth of the mothers used medically trained providers and none of the covariates had significant effects. Overall, in Table 2, the differentials in the use of services from trained providers tended to be similar for

both preventive and curative health-seeking behaviours, with those in the lower socio-economic strata less likely to seek modern health services than those in the higher strata. This inequality was greatest between the highest category and lowest category of the wealth index. However, the differentials in the use of TT and vitamin A supplementation were less pronounced than those for the other health outcomes. Interestingly, distance to FWC and to the Upazila Health complex (treated as continuous variables with a squared term to detect non-linear patterns) were not significant in any of the bivariate analyses so were dropped from further analyses (not shown).

Multivariate Analysis

Our bivariate analyses showed that the wealth index was positively associated with health-seeking behaviour, as were other indicators of socio-economic status. Since some of the bivariate relationships may be confounded by other variables, we next carried out multivariate analyses. The results of the multivariate analyses (Tables 3 and 4) are largely consistent with those of the bivariate analysis. With the exception of TT receipt, mothers in the highest wealth quintile were strongly and significantly more likely to have all the other health behaviors, with odds ranging from 4 to 33, compared to those in lowest wealth quintiles. Also, relative to women with no schooling, women with more than 5 years of schooling had odds of from 2 to 4 of having: ANC by a trained provider, TT receipt, trained birth attendant, and trained PNC provider. Other socio-economic variables (husband's occupation, media exposure, credit group membership) were significant in two or fewer of the seven regressions. Thus, among the predictor variables, the wealth index emerged as the strongest predictor of all the health-seeking behaviors except receipt of TT.

Discussion

In this study we have examined socio-economic differentials in maternal and child health seeking behavior among mothers in some rural areas of Bangladesh. The results highlighted the inequality in the utilization of maternal and child health services. Both predisposing and enabling factors were significantly associated with the use services. Inequality in the utilization by wealth index was high and statistically significant among these mothers. The evidence in this regard

from the present study is consistent with that of other studies [2, 22, 48, 49]. Socio-economic differentials in the utilization of curative health services for fever and preventive health services of ANC and PNC, and delivery care were more pronounced than those of the TT immunization of pregnant mothers and vitamin A supplementation. Since TT has been a part of a massive Expanded Programme of Immunization (EPI) campaign in rural Bangladesh beginning in the 1980s, its coverage is now high throughout the country, considerably reducing its socio-economic differentials. Socio-economic differentials in other EPI items, such as the coverage of BCG, DPT, and measles vaccines, were also less marked (not shown). This wider coverage of EPI may also be due to the fact that those below the poverty line have been reached by the special efforts of highly subsidized EPI services which are cost-effective and reach the doorsteps of households in the remote areas via mobile units [5, 6, 19, 50]. The relatively small differentials by socio-economic status in vitamin A supplementation may be due to its free distribution under the government's \$60 million nutritional programme [11-13, 49]. Because maternal and child health services in the curative area of fever treatment and preventive areas of prenatal-, delivery- and postnatal-care were neither available as widely or as equitably as TT, their prevalence was lower and their use by the lower socio-economic strata was lower compared to the higher socio-economic strata. All these suggest that there exists a stark inequality in the utilization of modern maternal and child health services in rural Bangladesh. This calls for community-based public policies in the following three critical areas:

i) Special efforts need to be made targeting poor women and children with basic maternal and child health services. Thus, it would be a prudent policy to examine the extent of inequity in the utilization of the existing services within the rural areas, using poverty maps, and facilitating universal access to services. In the same vein, since the access to basic maternal and child health services can be improved by augmenting their clinical and domiciliary delivery in under-served and unserved areas, it should be vigorously promoted in those areas.

(ii) Specific measures need to be undertaken to strengthen the demand-side of basic curative and preventive maternal and child health services in the remote areas of Bangladesh. An assessment is needed to find out why the poor do not adopt the basic preventive and curative health practices

in a timely and effective manner, what demand factors play a major role in achieving equity outcomes in health care utilization, and how appropriate promotional efforts in integrated management of childhood illness (IMCI) and other basic health services may be undertaken to increase the demand [14, 52-54].

(iii) New initiatives are needed to improve the quality of the available health services at the FWCs. The current FWCs are poorly staffed, offer a limited range of services, and lack critical supplies and medicines [15, 23]. A recent study in rural Bangladesh demonstrated an urgent need of improving the quality of care provided for sick children at the FWCs [26]. The enhancement of the quality of health services in FWCs may be important in promoting equity in health care utilization.

(iv) Our study shows that both schooling and the wealth index are positively associated with the utilization of maternal and child health services. Consequently, the improvement in both the economic and educational conditions of poor mothers is also needed. Continuation of the urban- and "not-so-distant-from-urban"-bias of current health, education, and economic development programmes together with the inequality in the socio-economic and health conditions of the people of the rural areas are important barriers to reaching the goal of health for all in Bangladesh. The challenge then for policy makers, programme administrators, and donor agencies is how to promote the delineation, extension, and implementation of effective and sustainable community-based efforts of both poverty alleviation and universal coverage of basic health services to all areas of Bangladesh so that the progress towards the attainment of Millennium Development Goals of health and socio-economic well-beings for all by the year 2015 can be speedily achieved [55].

In recommending the above, we recognize that providing health services to the poor in rural areas is more expensive than the average cost in any population. This is due to the inability of the poor to pay user fees and the high cost of reaching them with effective services [10, 34, 56].

Nevertheless, several pro-poor measures may be adopted for optimizing access. These include

mobilizing a fund from the community for covering costly treatment of morbidities through a micro-health insurance scheme, spreading the treatment costs among the insurance subscribers proportionate to their ability to pay, and improving preventive health outreach activities in local communities.

This study showed that micro-credit participation was not associated with most of our indicators of utilization of services. Even though poor mothers are likely to contribute to household resources through their micro-credit participation, and thus increase their ability to pay for health services, there could be other constraints, such as quality of services near their homes that prevent them from using such services. Nevertheless, given that a large proportion of poor mothers has already adopted and are increasingly adopting micro-credit in rural Bangladesh, this provides an important opportunity for identifying and serving them with an integrated programme of micro-credit and basic health services. In this, micro-credit institutions can be effectively used not only to reach poor mothers to change their predisposing and enabling conditions to use the health services, but also these institutions can mobilize the poor for a community-based micro-health insurance scheme, thereby ensuring programme coverage and sustainability [14].

Since other studies have found that participation in micro-credit activities by poor women was strongly associated with women's decision-making power with regard to health services utilization, strengthening the former may also strengthen the latter, thereby indirectly promoting utilization [57-62]. The present study, like many others, showed that years of schooling for mothers were positively associated with the utilization of health services. Hence, expanding female education in rural areas can enhance the utilization of health services [29-31]. These approaches, aimed at eliminating inequality in the use of basic maternal and child health services in rural areas, show that the inequality need not be accepted as inevitable and that many measures can be pursued to eliminate it.

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References

1. Wagstaff A: Poverty and Health. CMH Working Paper Series, Paper No. WG5. The Washington, D. C.:The World Bank; 2001.
2. Gwatkin DR, Rustein S, Johnson K, Rohin P, Wagstaff A: Socio-economic differences in health, nutrition, and population. Washington, D.C.: World Bank, HNP/Poverty Thematic Group; 2000.
3. Gwatkin, DR, Bhuiya A, Victora CG: Making health more equitable. *Lancet* 2004, 364 (9441): 1273-1280.
4. Victora CG, Wagstaff A, Schellenber JA, Gwatkin DR, Claeson M, Habicht J: Applying equity lens to child health and mortality: More of the same is not enough. *Lancet* 2002, 362 (9379): 233-241.
5. Kawnine N, Amin M, Guinness L, Killingsworth J, Hedrick-wong Y: A Public expenditure review of the health and population sector. Research Paper no 9. Health Economics Unit, Ministry of Health and Family Welfare, Government of Bangladesh. Dhaka, Bangladesh; 1998.
6. Kawnine N, Killingsworth J, Thomas S: A public expenditure review of the health and population sectors. Working Paper no. 1. Health Economics Unit, Ministry of Health and Family Welfare, Government of Bangladesh. Dhaka, Bangladesh; 1995.
7. Government of Bangladesh: Project implementation plan. Health and Population Sector Programme. Dhaka: Government of the People=s Republic of Bangladesh; 1998.
8. Government of Bangladesh: Health, nutrition & population strategic investment plan, July 2003-June 2006. Dhaka, Bangladesh: Ministry of Health and Family Welfare, Government of the People’s Republic of Bangladesh; 2004.
9. Perry HB: *Health for all in Bangladesh: Lessons in primary health care for the twenty-first century* Dhaka, Bangladesh: The University Press Limited; 2000.
10. Ensor T, Dave-Sen P, Ai L, Hossain A, Begum SA, Moral H. (2002). Do essential service packages benefit the poor? Preliminary evidences from Bangladesh. *Health Policy and planning* 2002, 17 (3): 247-256.
11. Hossain SM, Duffield AA, Taylor A: An evaluation of the impact of a S\$60 million nutrition programme in Bangladesh. *Health Policy and Planning* 2005, 20(1): 35-40.
12. Mercer A, Khan MH, Daulatuzzaman M, Reid J: Effectiveness of an NGO primary health care programme in rural Bangladesh: Evidence from the management information system. *Health Policy and Planning* 2004, 19(4): 187-198.
13. Mercer A, Haseen F, Huq NL, Uddin N, Khan M, Larson C: Risk factors for neonatal mortality in rural areas of Bangladesh served by a large NGO programme. *Health Policy and Planning* 2006, 21(6): 432-443.
14. Amin, R: *Grameen Micro-credit to Grameen Kalyan Health Programme for the poor: Reasons for optimism*. Dhaka, Bangladesh: Academic Press and Publishers; 2007.
15. Jahan R: (2007). Securing maternal health through comprehensive reproductive health

- services: Lessons from Bangladesh. *American Journal of Public Health* 2007, 97(7): 1186- 1190.
16. Palli Karma Sahayak Foundation: Maps of micro-credit coverage of Thanas of Bangladesh. Dhaka, Bangladesh: Palli Karma Sahayak Foundation; 2006.
 17. Yunus M: (2004). A national strategy for economic growth and poverty reduction: Sustainable development networking programme [http://www.sdnbd.org/sdi/issues/IT-computer/prsp-yu Ynus.htm](http://www.sdnbd.org/sdi/issues/IT-computer/prsp-yu%20Ynus.htm)]. Accessed in August 2004.
 18. Sen B, Acharya S: Health and poverty in Bangladesh. *World Health* 1997, 5(1): 28-29.
 19. NIPORT & ORC Macro: Bangladesh Demographic and Health Survey 2004. Dhaka, Bangladesh; 2005.
 20. Cockcroft A, Milne D, Anderson N: The third service delivery survey2003: Final report. Dhaka: CIETCanada and Ministry of Health and Family Welfare, Government of Bangladesh; 2004 [<http://www.ciet.org/www/image/country/bangladsehHtm1#1>]. Accessed June 2005.
 21. Ahmed SM, Petzold M, Kabir, ZN, Tomson G: Targeted intervention for the ultra poor in rural Bangladesh: Does it make any difference in their health-seeking behaviour? *Social Science & Medicine* 2006, 63 (11): 2899-2911.
 22. Anwar ATM, Killewo J, Chowdhury ME, Dasgupta SK: Bangladesh: inequalities in utilization of maternal health care services-evidence from Matlab. HNP discussion paper, reaching the poor program paper no. 2. Washington, D. C.: The World Bank; 2004.
 23. Streatfield PK, Mercer A, Siddique AB, Khan ZUA, Ashraf A: Health and population sector programme3 1998-2003: Status of performance indicators 2002. Dhaka, Bangladesh: ICDDR, B, Centre for Health and Population Research; 2003.
 24. Khan MM: Development of private of private health care facilities in Dhaka city: Impacts on costs, access, and quality. Seminar paper, Center for development Research, Dhaka, Bangladesh; 1996.
 25. Killingsworth J, Hossain N, Hedrick-Wong Y, Thomas SD, Rahman A, Begun T: Unofficial fees in Bangladesh: Price, equity, and institutional issues. *Health Policy and Planning* 1999, 14(2): 152-163.
 26. Arifeen SE, Bryce J, Gouws E, Baqu, AH et al : Quality of care for under-fives in

- first-level health facilities in one district of Bangladesh. *Bulletin of the World Health Organization* 2005, 83(4): 260-267.
27. Amin R, SA Chowdhury, Kamal GM, Chowdhury, J: Community health services and health care utilization in rural Bangladesh. *Social Science & Medicine* 1989, 29(12): 1343-1349.
 28. Amin R, St. Pierre M, Ahmed A, Huq R: Integration of an essential services package (ESP) in child and reproductive health and family planning with a micro-credit program for poor women: Experience from a pilot project in rural Bangladesh. *World development* 2001, 29(9): 1611-1621
 29. Cadwell, JC: Routes to low mortality in poor countries. *Population and Development Review* 1986, 12(2): 171-220.
 30. Cleland JG, van Ginneken JK: Maternal education and child survival in developing countries: The search for pathways of influence. *Social Science & Medicine* 1998, 27(12): 1357-1368.
 31. Das Gupta M: Death clustering, mother's education, and determinants of child mortality in rural Punjab. In J. C. Caldwell et al. (Eds.), *What we know about health transition: The cultural, social, and behavioural determinants of health*, series No. 2, vol. I (pp. 441-461). Australian National University, Health Transition. Canberra, Australia: Australian National University Printing Services; 1990.
 32. Timyan J, Brechin SJG, Measham DM, Ogunleye B: Access to care: More than a problem distance. In M. Koblinsky, K. Timyan, & J. Gay (Eds.), *The health of women: A global perspective* (pp. 217-234). Boulder, CO: Westview Press; 1993.
 33. Celik Y, Hotchkiss DR: The socio-economic determinants of maternal health care utilization in Turkey. *Social Science & Medicine* 2000, 50(12): 1797-1806.
 34. Andaleeb, SS: Service quality perceptions and patient satisfaction: A study of hospitals in a developing country. *Social Science & Medicine* 2001, 52(9): 1359-1370.
 35. Paul BK, Rumsey DJ: Utilization of health facilities and trained birth attendants for childbirth in Rural Bangladesh: An Empirical Study. *Social Science & Medicine* 2002, 54(12): 1755-1765.

36. Levin A, Rahman MA, Quayyum Z, Routh S, Khuda B: The demand for child curative care in two rural Thanas of Bangladesh: Effect of income and women=s employment. *International Journal of Health Planning and Management* 2001, 16(1): 170-194.
37. Ahmed SM, Adams AM, Chowdhury M, Bhuiya A: Gender, socioeconomic development and health-seeking behaviour in Bangladesh. *Social Science & Medicine* 2000, 51(3): 361-371.
38. Ahmed SM, Tomso, GM, Petzold M, Kabir, ZN: Socio-economic status overrides age and gender in determining health-seeking behaviour in rural Bangladesh. *Bulletin of the World Health Organization* 2005, 83(2): 109-117.
39. Andersen RMA: A behavioral model of families' use of health services. Chicago: Center for Health Administration Studies, University of Chicago; 1968.
40. Aday LA, Andersen RMA: A framework for the study of access to medical care. *Health Services Research* 1994; 9(2), 208-220.
41. Aday LA, Andersen RMA, Fleming G: *Health care in the U.S.: equitable for whom?* Beverly Hills: Sage; 1980.
42. Andersen RMA, Newman JF: Societal and individual determinants of medical care utilization in the United States. *Milbank Memorial Quarterly* 1973, 51(1): 95-124.
43. Andersen RMA: Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior* 1995, 36(1): 1-10
44. Fosu GB: Childhood morbidity and health services utilization: Cross-national comparisons of user-related factors from DHS Data. *Social Science & Medicine* 1994, 38(9): 1209-1220.
45. Subedi, J: Modern health services and health care behavior: A survey in Kathmandu, Nepal. *Journal of Health and Social Behavior* 1989, 30(4): 412-420.
46. Gleit DA, Goldman N, & Rodriguez G: Utilization of care during pregnancy in rural Guatemala: Does obstetrical need matter? *Social Science & Medicine* 2003, 57(12): 2447-2463.
47. Filmer D, Pritchett LH: Estimating wealth effects without expenditure

- data-or tears: An application to educational enrollments in states of India. *Demography* 2001, 38(1): 115-132.
48. Gwatkin DD, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A: Socio-economic differences in health, nutrition, and population: Bangladesh, 1996/97/1999/2000/, 2004. Working Paper no. 39465. Washington, D. C.: World Bank, HNP/Poverty Thematic Group; 2007.
 49. Routh S, Thwin AA, Barb N, Begum A: Cost efficiency in maternal and child health and family planning service delivery in Bangladesh: Implications for NGOs. *Health Policy and Planning* 2004, 19(1): 11-21.
 50. Huq M: *Near miracle in Bangladesh*. Dhaka, Bangladesh: University Press Limited; 1991.
 51. Ahmed SM., Adams AM, Chowdhury M, Bhuiya A: Changing health-seeking behaviour in Matlab, Bangladesh: Do development interventions matter? *Health Policy and Planning* 2003, 18(3): 306-315.
 52. WHODCHD (WHO Division of Child Health and Development): Integrated management of childhood illness: Conclusions. *Bulletin of the World Health Organization* 1997, 75(Supplement 1): 119-128.
 53. WHO & UNICEF: Child health in the community "community IMCI": Briefing package for facilitators. Geneva: World Health Organization; 1999.
 54. Kelly, L. M. & Black, R. E. (2001). Research to support household and community IMCI: Report of a meeting, 22-24 January 2001. Baltimore, Maryland, USA. *Health, Population and Nutrition* 2001, 19(Supplement 2), pp: S111-S154; 2001.
 55. United Nations: Road map towards the implementation of United Nations Millennium Declaration: Report of the Secretary-General, General Assembly, 5th Session. New York: United Nations; 2001.
 56. Ensor T, Cooper S: Overcoming barriers to health services access: Influencing the demand side. *Health Policy and Planning* 2004, 19(2): 69-79.
 57. Amin R, Li MAY: NGO-promoted women=s credit program, immunization coverage,

- and child mortality in rural Bangladesh. *Women & Health* 1997, 25(1): 71-87
58. Amin R, Becker S, Bayes A: NGO-promoted microcredit programs and women=s empowerment: Quantitative and qualitative evidence. *The Journal of Developing Areas* 1998, 32(2): 221-236.
59. Osmani, LNK: (1998). The Grameen Bank experiment : Empowerment of women through credit. *In women and empowerment : Illustrations for the Third World*, ed. Haleh Afshar. London: Macmillan; 1998.
60. Nanda P: Women=s participation in rural credit programmes in Bangladesh and demand for formal health care: Is there a positive impact? *Health Economics* 1999, 8(2), 415- 428.
61. Kabeer N: Conflicts over credit: Reevaluating the empowerment potentials of loans to women in rural Bangladesh. *World Development* 2000, 29(1): 63-84.
62. Bloom SS, Wypij D, Gupta MD: Dimensions of women=s autonomy and the influence on maternal health care utilization in a Northern Indian City. *Demography* 2001, 38(1): 67-78.

Figure 1: Conceptual Framework for health seeking behavior in rural Bangladesh

Predisposing factors II	Enabling factors II	Needs/Illness II	Health seeking behavior II
<p>Socio-Demographic</p> <ul style="list-style-type: none"> ◦ Age of mother ◦ Parity of Mother ◦ Education of mother ◦ Education of father ◦ Husband's occupation ◦ Access to mass media ◦ Women's decision making power 	<p><u>Family and Individual Resources</u></p> <ul style="list-style-type: none"> ◦ Wealth index ◦ Land ownership ◦ Contact with health worker ◦ Microcredit member <p><u>Community Resources</u></p> <ul style="list-style-type: none"> ◦ Proximity to FWC ◦ Proximity to Thana headquarter ◦ Pharmacy 	<p>Health Conditions</p> <ul style="list-style-type: none"> ◦ Pre-natal stage ◦ Post-natal stage ◦ Child fever 	<p><u>Curative/ Preventive Care</u></p> <ul style="list-style-type: none"> ◦ ANC by trained providers ◦ PNC by trained providers ◦ Trained child delivery care ◦ Newborn health checkup ◦ Mother given Vit A ◦ Treatment for cough and fever by trained providers

Table 1: Characteristics (percents with 95% CI) of study population of women and comparable population from DHS survey of 2004

Care-seeking behavior and household characteristic	Study Population (2006)		DHS rural sample in s districts (2004)	
<u>Care-seeking behaviors</u>				
Mothers provided with antenatal care from trained provider during last pregnancy	56.9	[48.7 - 65.1]	44.4	[34.5 -
Mothers covered by TT during last pregnancy	77.6	[70.1 - 85.1]	90.8	[85.8 -
Mothers received delivery assistance from medically trained providers during last child birth	32.2	[23.2 - 41.2]	8.1	[5.5 -
Sought trained PNC provider at last birth	23.1	[15.2 - 30.9]	5.9	[1.9 -
Mother received vitamin A within 2 months of delivery	23.7	[16.8 - 30.5]	13.8	[9.9 -
Sought newborn checkup	26.3	[18.3 - 34.2]	22.0	[13.6 -
Child treated by trained provider during recent illness	19.3	[12.8 - 25.9]	11.6	[7.9 -
<u>Household characteristic</u>				
Household membership in microcredit program	42.1	[38.1 - 46.2]	27.4	[20.8 -
Women with more than primary level education	30.5	[25.4 - 35.6]	27.6	[21.9 -
Husbands more than primary level education	34.3	[29.4 - 39.3]	32.5	[27.1 -
Husbands working in agriculture	26.6	[22.7 - 30.6]	41.5	[36.8 -
Exposed to TV at least once a week	56.7	[52.2 - 61.1]	41.7	[34.4 -
Exposed to radio at least once a week	28.4	[23.5 - 33.2]	33.5	[27.7 -

Table 2: Percent of women with given health seeking behaviors by selected socio-economic characteristics

Socio-economic variable and category	Mother Care-seeking					Child Care
	Antenatal and Delivery Care			Postnatal Care		
	ANC from trained provider	TT to mother during pregnancy	Attended by trained providers	PNC from trained provider	Mother given Vit A postpartum	
Whole sample	56.9	77.6	32.2	23.1	23.7	26.3
Wealth Quintile						
Low	31.5***	83.1	13.3***	5.1***	15.8	8.9***
2 nd	40.9	73.9	24.9	12.8	24.1	18.0
3 rd	49.4	87.0	27.2	13.4	22.1	17.1
4 th	59.1	88.2	25.0	19.9	20.5	23.9
High	87.1	64.3	57.1	49.3	31.4	50.0
Membership in microcredit agency						
Yes	48.7	81.4	23.4***	17.0**	23.9	20.1**
No	57.7	80.4	39.0	29.3	23.9	32.9
Woman's Education						
None	33.7***	81.1	15.9***	9.6***	15.2	16.0
Some Primary	45.7	71.0	27.0	14.7	28.4	26.2
> Primary	76.4	79.4	44.5	35.4	25.8	32.2
Husband's Education						
None	35.9***	79.5	19.6**	10.7**	16.0	17.1
Some Primary	54.7	90.9	36.2	26.8	39.2	27.0
> Primary	74.5	68.8	39.2	30.0	20.2	32.9
Husband's Occupation						
Agriculture	48.1	80.9	28.2	13.6	25.5	11.0***
Other	60.2	77.1	33.6	26.1	23.4	31.2
Number of observations	1261	1261	1261	1261	1261	1261

Indicators of significance from the test of homogeneity across categories are given next to first category of each variable
 ** significant at 5%; *** significant at 1%

Table 3: Estimated odds of antenatal and delivery care for selected socio-economic and other indicators

	Trained ANC provider vs untrained provider or no ANC		TT given vs. not given		Trained birth attendant vs untrained or no attendant	
(reference)	1.3	[0.7 – 2.1]	0.5**	[0.3 – 0.9]	2.5**	[1.1 – 5.9]
	1.6	[0.7 – 3.5]	0.8	[0.4 – 1.6]	2.0	[0.7 – 5.9]
	1.6	[0.7 – 3.8]	0.8	[0.3 – 2.5]	1.6	[0.4 – 5.9]
	7.1***	[2.0 – 24.8]	0.5	[0.2 – 1.2]	10.5**	[2.6 – 42.0]
	1.7**	[1.0 – 2.8]	1.0	[0.5 – 1.8]	1.0	[0.5 – 2.0]
(reference)	1.0	[0.6 – 1.9]	0.6*	[0.3 – 1.0]	1.3	[0.7 – 2.5]
	2.7***	[1.5 – 5.0]	3.7***	[1.5 – 9.3]	2.5***	[1.3 – 5.1]
(reference)	1.1	[0.6 – 2.0]	2.4**	[1.2 – 5.0]	1.0	[0.5 – 2.0]
	1.1	[0.4 – 2.8]	0.5	[0.2 – 1.2]	0.4*	[0.2 – 1.1]
agriculture (reference)	1.1	[0.6 – 1.9]	1.2	[0.6 – 2.7]	1.3	[0.8 – 2.3]
occupation (reference)	1.4	[0.8 – 2.4]	1.5	[0.8 – 2.7]	0.6	[0.3 – 1.3]
	1.1	[0.5 – 2.4]	1.2	[0.5 – 2.5]	1.3	[0.5 – 3.0]
	0.8	[0.4 – 1.7]	1.0	[0.4 – 2.6]	2.7*	[1.0 – 7.3]
	1.3	[0.3 – 6.0]	1.3	[0.3 – 5.0]	2.6	[0.5 – 14.2]
	1.0	[0.9 – 1.0]	1.1**	[1.0 – 1.2]	0.9***	[0.9 – 1.]
	1.2	[0.6 – 2.7]	0.6	[0.3 – 1.2]	1.5	[0.8 – 2.9]
Number of Observations			1212		1212	

*significant at 10%; **significant at 5%; *** significant at 1%

Table 4: Estimated odds of antenatal and delivery care for selected socio-economic and other indicators

Health –seeking behavior

Covariate and Category	Trained PNC provider vs. untrained provider or no PNC		Mother received Vit A postpartum vs. no Vit A		Newborn health checkup vs. no checkup	
<u>Socio-economic indicators</u>						
Relative Wealth: Poorest (reference)						
Quintile 2	3.4*	[1.1 - 10.1]	1.5	[0.6 – 4.0]	2.2*	[0.98 - 4.9]
Quintile 3	2.6	[0.7 - 10.0]	1.1	[0.4 – 3.3]	2.4*	[0.93 – 6.4]
Quintile 4	7.5*	[1.6 – 34.6]	0.8	[0.3– 2.8]	4.8***	[1.66 – 14.1]
Quintile 5	33.2**	[6.0 – 184.5]	3.6**	[1.0 – 12.6]	17.0***	[4.58 – 63.3]
Credit group member	1.5	[0.6 – 3.6]	1.5	[0.8– 3.0]	1.0	[0.52 – 1.9]
Woman’s Education: none (reference)						
1-5 years	0.6	[0.3 – 1.5]	1.7	[0.7 – 3.7]	0.9	[0.43 – 2.0]
More than 5 years	2.3	[1.0 – 5.2]	1.8	[0.6 – 5.0]	0.9	[0.37 – 2.3]
Husband’s Education: none (reference)						
1-5 years	0.9	[0.4 – 1.8]	2.7***	[1.3 – 5.4]	0.7	[0.37 – 1.2]
More than 5 years	0.3	[0.1 – 1.0]	0.5	[0.2– 1.5]	0.5	[0.19 – 1.2]
Husband’s occupation: Agriculture (reference)						
Non-agricultural Occupation	1.7	[0.7 – 4.1]	1.0	[0.5 – 2.1]	3.0*	[1.17 – 7.5]
Media Exposure: none (reference)						
TV or Radio	1.3	[0.4 – 4.8]	1.7	[0.8– 3.8]	0.9	[0.36 – 2.5]
TV and Radio	3.0	[0.8 – 10.9]	1.2	[0.4 – 3.2]	1.4	[0.53-3.9]
<u>Other Indicators</u>						
Age:<20 (reference)						
20-39	2.9	[.8 – 10.6]	1.4	[0.6 – 3.5]	1.4	[0.5 - 3.9]
40 +	1.2	[0.1 – 10.6]	0.4	[0.1 – 1.8]	0.6	[0.1- 3.6]
Total decision making score	1.0	[0.9 – 1.0]	1.0	[0.9 – 1.1]	1.0	[0.9-1.1]
Pharmacy in village	2.1	[0.8 – 5.4]	1.1	[0.5 – 2.3]	1.6	[[0.6 – 4.1]
Observations		1212		1212		
1212	788					

*significant at 10%; ** significant at 15%; *** significant at 1%