Socioeconomic factors differentiating maternal and child health-seeking behavior in rural Bangladesh: A cross-sectional analysis

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Abstract

Background

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 on curative modern health services. These studies 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.

Methods

Data from 3,498 randomly selected currently married women from three strata of households within 128 purposively chosen rural villages in three divisions of Bangladesh were collected in 2006. This study used bivariate and multivariate logistic analyses to examine 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).

Results

A principal finding was that a household's relative 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 antenatal care, post natal care, birth attendant and newborn child care than those in the poorest quintile (χ^2, $p<0.01$). This differential was less pronounced for other factors examined, such as education, age and relative decision making ability of the woman, in both bivariate and multivariate analyses.

Conclusion

Within rural areas of Bangladesh, where overall poverty is greater and access to health care more difficult, wealth differentials remain pronounced. Those programs with high international visibility and dedicated funding (Immunization, Vitamin A delivery) have higher overall prevalence and a more equitable distribution of beneficiaries than the use of modern trained providers for basic essential health care services. Implications of these findings and recommendations are provided.

Background

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 programs throughout rural Bangladesh [5,16,17]. 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 [10,15,18,19].

Previous studies in rural Bangladesh have shown substantial socio-economic inequalities in health status, access to health services, and their utilization, all disfavoring poor women and children [1, 20-24]. There has been an increasing availability and accessibility of practitioners of Western medicine in rural Bangladesh over the past decades [10,15,23-25]. 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 programs, including micro-credit and health programs, have been happening in

Bangladesh, their benefits may accrue more to the urban areas and peri-urban areas than to the more remote rural areas [1,20,22]. 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 [5,26]. 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 programs.

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-centers at the Union (sub-divisions of an Upazila) level [7]. In Bangladesh there are 475 Upazilas within 64 districts within 6 Divisions. 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 the union level sub-centers. 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 [6,23,27,28]. Rural Bangladesh also has a wide range of simple drug stores and local practitioners of indigenous medicines [20,29,30].

Many factors limit the utilization of maternal and child health services in the rural areas of developing countries, including its' availability, accessibility, and 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 [23,24, 31-36]. Studies from rural Bangladesh have found that various indicators of socio-economic status were positively associated with the utilization of health services [20-24,37,38]. 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 [20-24, 37-40]. 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 [9,10,13,25].

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 behavior is presented and some hypotheses about socio-economic differentials in health-seeking behaviors are given [10,18]. Then the study setting, data, and variables are described. Socio-economic characteristics of the sample are then compared with a sample from the same districts in a recent Demographic and Health Survey. Next bivariate relationships between health-seeking behaviors and socio-economic indicators are documented and then the multivariate results are presented. In the discussion section, the study findings are summarized and their policy implications elaborated.

METHODS

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 behavioral model and its subsequent modification [41-45]. The modified version of the model has been successfully applied in the study of health services utilization in developing countries [46-48]. This model posits that health-seeking behavior 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 and parity 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 (i.e. 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 behavior. 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 [43]. In the present study, we explore the extent to which the predisposing and enabling factors contributed to any differences in health seeking behavior.

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 [31]. 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 centers of Grameen Bank Health Program. 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 Program has established health centers 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 centers located in 31 Upazilas (sub-districts) from three regions of Bangladesh, 16 centers 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 programs. 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 pre-tested 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 [5].

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 behaviors 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's receipt of vitamin A within two months postpartum vs. no receipt, 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 behaviors consisted of the following: mother's level of schooling and her husband's occupation and level of schooling, 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 asset indicators and household

density figure into an asset index [49]. 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 [50].

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? 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 [20-24, 29,37-39, 49,51].

Analytical methods

We first compared characteristics of our survey population with those of 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 [50].

RESULTS

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 (32.2% vs. 8.1%), PNC (23.1% vs. 5.9%), 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 (77.6% vs. 90.8%) and percentage of husbands in agricultural occupations (26.6% vs. 41.5%). 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 expected that they might be better in the more recent data of our study areas.

Bivariate analyses

Bivariate results on socio-economic differentials of preventive and curative health-seeking behaviors among the mothers are presented in Table 2. Greater use of antenatal care (ANC) was significantly associated with years of schooling of either the mother or father, with 76.4% of mothers with more than primary school vs. 33.7% of mothers with no schooling seeking ANC, ($p<0.01$) and 74.5% of mothers whose husbands were had been to school compared with 35.9% of husbands without schooling seeking ANC ($p<0.01$). Seeking post-natal care, while overall less prevalent, also had significant differences by level of schooling of either parent. Similarly, husbands who 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. Higher use of 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 or greater wealth compared to those with less or no schooling or who were poorer. Regarding the treatment of the children suffering from fever, only 19.3% 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 behaviors, 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 and lowest quintile. The use of TT (prevalence=77.6%) and Vitamin A (prevalence=23.7%) did not show any differences by wealth status, or by education level of either parent. 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 relative wealth of a household (as seen by their wealth quintile) was positively associated with health- seeking behavior, 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 - 5) are largely consistent with those of the bivariate analysis. Independent variables in all analyses were wealth quintile of household, microcredit membership of mother, years of schooling of mother and husband, husband's occupation as agricultural or non-agricultural, media exposure of mother, age group of mother, total decision making score of mother, whether

the community contained a pharmacy, the distance to the Thana Headquarters where the Upazila Health Center is located, and the distance to the nearest family welfare center (FWC).

Table 3 shows the odds of seeking ANC from a trained provider, receiving TT injection during pregnancy, and having a trained provider present at child-birth, as compared to no trained provider or no injection. For each of these outcomes, the mother's years of schooling is significantly and positively associated with the desired behavior, ranging from 2.9 to 3.9 times greater for mothers with more than 5 years of schooling, compared to mothers with no formal education. As compared to the poorest households, women from the wealthiest households in the study area are more likely to seek ANC from a trained provider (OR=7.1, 95% CI: 2.4-20.7, $p<0.01$) and nearly 12 times more likely to have a trained provider present at child delivery (95% CI: 2.6-54.4, $p<0.01$). Husband's schooling, occupation and mother's media exposure do not demonstrate consistent significant associations with the three outcomes.

Post-partum care outcomes are shown in Table 4. Wealth is again associated with seeking trained post-natal care (PNC) and receiving vitamin A within 2 months of delivery, with the strongest associations found when comparing the richest vs. poorest households (ranging from 3.5 to 44 times the odds of seeking health care). A mother with more than primary education has a significantly greater chance of seeking PNC from a trained provider (OR=2.9, 95% CI: 1.3-6.7, $p<0.05$), however when her husband has greater than primary education, she is 79% less likely to seek PNC ($p<0.05$). Women who live more than 3 miles from the Thana headquarters (and Upazila health complex) are 3 times more likely (95% CI: 1.4-6.5, $p<0.01$) to seek PNC from a

trained provider than women who are closer.

Child related outcomes (Table 5) show a very striking association between wealth and care-seeking, with all wealth groups significantly more likely to seek newborn care or sick child care from a trained provider than those in the poorest quintile. Educated mothers show a positive trend towards seeking sick child care from trained providers while babies whose fathers' have a non-agricultural occupation are more likely to receive a newborn check-up (OR=2.8, 95% CI: 1.2-6.7, $p<0.05$). Mothers with any media exposure had 90% lower odds of seeking a trained provider for their sick child (OR=0.10, 95% CI: 0.05, 0.37), however mothers with greater decision making power within the household are significantly more likely to seek trained care ($p<0.01$).

Among all the predictor variables, the relative wealth of the household emerged as the strongest predictor of health-seeking behaviors, and many associated socio-economic characteristics provided mixed results.

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 of services. Inequality in the utilization by relative wealth was high and statistically significant among these mothers. The evidence in this

regard from the present study is consistent with that of other studies [1,21-24,50,53]. 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 Program 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 [11,12,18,51]. 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 program [9,13,14,53]. 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 nor 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. More curious results, such as the negative association between media exposure and seeking trained providers for child illness, certainly require further investigation.

Nevertheless, results show that a stark inequality in the utilization of modern maternal and child health services persists 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. 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 [5,54-56].

(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 [10,25]. A recent study in rural Bangladesh demonstrated an urgent need of improving the quality of care provided for sick children at the FWCs [27]. The enhancement of the quality of health services in FWCs may be important in promoting equity in health care utilization.

Our study shows that both formal education and relative wealth 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 programs 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, program 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-being for all by the year 2015 can be achieved [57].

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 [6,31,58]. 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. 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 [23, 59-64]. 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 program 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 program coverage and sustainability [5].

List of abbreviations used:

ANC Antenatal Care

DHS Demographic and Health Survey

EPI Expanded Program of Immunization

FWC Family Welfare Center

IMCI Integrated Management of Childhood Illness

PNC Post-natal Care

TT Tetanus Toxoid

Competing Interests:

The authors declare that they have no competing interests.

Authors' Contributions:

RA conceived of the study, and participated in its design and coordination and helped to draft the manuscript. NS performed the statistical analyses and participated in the drafting and revision of the manuscript. SB is PI of the larger study, led design and coordination of data collection, advised on statistical analyses and assisted in revision of the manuscript. All authors read and approved the final manuscript.

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Figure Legends:
Figure 1: Conceptual framework for determinants of health seeking behaviors in rural Bangladesh

Tables:

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

Health care behaviors	Study Population (2006)		DHS rural sample in same districts (2004)	
Mothers provided with antenatal care from trained provider during last pregnancy	56.9	[48.7 - 65.1]	44.4	[34.5 - 54.2]
Mothers covered by TT during last pregnancy	77.6	[70.1 - 85.1]	90.8	[85.8 - 95.8]
Mothers received delivery assistance from medically trained providers during last child birth	32.2	[23.2 - 41.2]	8.1	[5.5 - 10.7]
Sought trained PNC provider at last birth	23.1	[15.2 - 30.9]	5.9	[1.9 - 9.9]
Mother received vitamin A within 2 months of delivery	23.7	[16.8 - 30.5]	13.8	[9.9 - 17.7]
Sought newborn checkup	26.3	[18.3 - 34.2]	22.0	[13.6 - 30.4]
Child treated by trained provider during recent illness	19.3	[12.8 - 25.9]	11.6	[7.9 - 15.3]
Characteristics of the population				
Household membership in microcredit program	42.1	[38.1 - 46.2]	27.4	[20.8 - 33.9]
Women with more than primary level education	30.5	[25.4 - 35.6]	27.6	[21.9 - 33.4]
Husbands more than primary level education	34.3	[29.4 - 39.3]	32.5	[27.1 - 38.0]
Husbands working in agriculture	26.6	[22.7 - 30.6]	41.5	[36.8 - 46.2]
Exposed to TV at least once a week	56.7	[52.2 - 61.1]	41.7	[34.4 - 49.1]

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

		Mother care-seeking					Child care-seeking	
		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	Sought newborn checkup	Received treatment by trained providers for fever/cough
Whole sample		56.9	77.6	32.2	23.1	23.7	26.3	19.3
Wealth quintile								
	Low	31.5***	83.1	13.3***	5.1***	15.8	8.9***	9.5
	2nd	40.9	73.9	24.9	12.8	24.1	18.0	23.4
	3rd	49.4	87.0	27.2	13.4	22.1	17.1	12.3
	4th	59.1	88.2	25.0	19.9	20.5	23.9	21.0
	High	87.1	64.3	57.1	49.3	31.4	50.0	24.8
Membership in microcredit agency								
	Yes	48.7	81.4	23.4***	17.0**	23.9	20.1**	19.0
	No	57.7	80.4	39.0	29.3	23.9	32.9	21.5
Woman's schooling								
	None	33.7***	81.1	15.9***	9.6***	15.2	16.0	11.1
	Some primary	45.7	71.0	27.0	14.7	28.4	26.2	29.9
	> Primary	76.4	79.4	44.5	35.4	25.8	32.2	18.1
Husband's schooling								
	None	35.9***	79.5	19.6**	10.7**	16.0	17.1	15.9
	Some primary	54.7	90.9	36.2	26.8	39.2	27.0	22.2
	> Primary	74.5	68.8	39.2	30.0	20.2	32.9	19.9
Husband's occupation								
	Agriculture	48.1	80.9	28.2	13.6	25.5	11.0***	15.3
	Other	60.2	77.1	33.6	26.1	23.4	31.2	20.5
Number of observations		1261	1261	1261	1261	1261	1261	822

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

Table 3: Estimated odds (95% CI) of antenatal and delivery care for selected socio-economic and other indicators

Variables and categories	Trained ANC provider vs untrained provider or no ANC		TT given vs not given		Trained birth attendant vs untrained or no attendant	
Socio-economic indicators						
Relative wealth: Poorest (reference)						
Quintile 2	1.26	[0.73 - 2.17]	0.48**	[0.26 - 0.91]	2.52**	[1.09 - 5.86]
Quintile 3	1.60	[0.73 - 3.49]	0.82	[0.43 - 1.56]	2.02	[0.69 - 5.91]
Quintile 4	1.63	[0.70 - 3.81]	0.87	[0.31 - 2.46]	1.63	[0.44 - 5.94]
Quintile 5	7.10***	[2.04 - 24.78]	0.47	[0.19 - 1.20]	10.48***	[2.61 - 42.04]
Credit group member	1.71**	[1.03 - 2.83]	0.96	[0.50 - 1.84]	1.02	[0.51 - 2.03]
Woman's schooling: None (reference)						
1-5 years	1.03	[0.57 - 1.86]	0.59*	[0.34 - 1.04]	1.34	[0.72 - 2.49]
more than 5 years	2.70***	[1.45 - 5.03]	3.74***	[1.52 - 9.25]	2.52***	[1.25 - 5.07]
Husband's schooling: None (reference)						
1-5 years	1.10	[0.60 - 2.03]	2.43**	[1.19 - 4.98]	0.95	[0.45 - 1.98]
more than 5 years	1.11	[0.44 - 2.84]	0.48	[0.20 - 1.16]	0.43*	[0.18 - 1.06]
Husband's occupation: Agriculture (reference)						
Non-agricultural occupation	1.09	[0.62 - 1.89]	1.23	[0.56 - 2.68]	1.33	[0.77 - 2.29]
Media exposure: None (reference)						
TV or radio	1.35	[0.75 - 2.43]	1.45	[0.78 - 2.69]	0.61	[0.28 - 1.30]
TV and radio	1.10	[0.49 - 2.43]	1.16	[0.54 - 2.52]	1.28	[0.53 - 3.10]
Other indicators						
Age: <20 (reference)						
20-39	0.79	[0.38 - 1.65]	1.00	[0.39 - 2.60]	2.66*	[0.97 - 7.34]
40 +	1.31	[0.29 - 5.96]	1.29	[0.33 - 4.96]	2.64	[0.49 - 14.19]
Total decision making score	0.97	[0.90 - 1.04]	1.10**	[1.02 - 1.19]	0.91***	[0.86 - 0.97]
Pharmacy in village	1.22	[0.56 - 2.68]	0.60	[0.31 - 1.16]	1.52	[0.79 - 2.93]
Observations	1212		1212		1212	

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

Table 4: Estimated odds (95% CI) of post partum care for selected socio-economic and other indicators

Variables and categories	Trained PNC provider vs untrained provider or no PNC		Mother received Vit A postpartum vs no Vit A	
Socio-economic indicators				
Relative wealth: Poorest (reference)				
Quintile 2	3.37**	[1.13 - 10.08]	1.51	[0.57 - 4.02]
Quintile 3	2.62	[0.69 - 9.97]	1.13	[0.38 - 3.34]
Quintile 4	7.47**	[1.61 - 34.62]	0.83	[0.25 - 2.77]
Quintile 5	33.21***	[5.98 - 184.53]	3.63**	[1.04 - 12.60]
Credit group member	1.46	[0.60 - 3.55]	1.52	[0.76 - 3.04]
Woman's schooling: None (reference)				
1-5 years	0.62	[0.25 - 1.49]	1.66	[0.73 - 3.74]
more than 5 years	2.25*	[0.98 - 5.17]	1.77	[0.63 - 4.97]
Husband's schooling: None (reference)				
1-5 years	0.86	[0.41 - 1.84]	2.65***	[1.30 - 5.38]
more than 5 years	0.29*	[0.08 - 1.01]	0.54	[0.19 - 1.54]
Husband's occupation: Agriculture (reference)				
Non-agricultural occupation	1.66	[0.67 - 4.11]	0.99	[0.46 - 2.11]
Media exposure: None (reference)				
TV or radio	1.29	[0.35 - 4.77]	1.71	[0.77 - 3.78]
TV and radio	2.99*	[0.82 - 10.93]	1.18	[0.44 - 3.17]
Other indicators				
Age: <20 (reference)				
20-39	2.89	[0.79 - 10.58]	1.40	[0.56 - 3.50]
40 +	1.15	[0.13 - 10.60]	0.37	[0.08 - 1.81]
Total decision making score	0.96	[0.89 - 1.04]	0.97	[0.89 - 1.06]
Pharmacy in village	2.07	[0.79 - 5.38]	1.07	[0.49 - 2.30]
Observations	1212		1212	

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

Table 5: Estimated odds (95% CI) of child care for selected socio-economic and other indicators

Variables and categories	Newborn health checkup vs no checkup		Child treated by trained provider vs treated by untrained provider or not treated during recent fever/cough illness	
Socio-economic indicators				
Relative wealth: Poorest (reference)				
Quintile 2	2.18*	[0.98 - 4.85]	4.53***	[1.72 - 11.96]
Quintile 3	2.44*	[0.93 - 6.41]	3.14**	[1.12 - 8.81]
Quintile 4	4.84***	[1.66 - 14.11]	6.66***	[1.73 - 25.57]
Quintile 5	17.03***	[4.58 - 63.28]	20.60***	[4.27 - 99.46]
Credit group member	1.00	[0.52 - 1.92]	1.34	[0.66 - 2.70]
Woman's schooling: None (reference)				
1-5 years	0.92	[0.43 - 2.00]	3.28***	[1.34 - 8.03]
more than 5 years	0.91	[0.37 - 2.26]	2.42	[0.80 - 7.33]
Husband's schooling: None (reference)				
1-5 years	0.67	[0.37 - 1.23]	1.30	[0.50 - 3.36]
more than 5 years	0.48	[0.19 - 1.21]	0.74	[0.23 - 2.40]
Husband's occupation: Agriculture (reference)				
Non-agricultural occupation	2.96**	[1.17 - 7.50]	1.96	[0.84 - 4.57]
Media exposure: None (reference)				
TV or radio	0.94	[0.36 - 2.47]	0.13***	[0.05 - 0.37]
TV and radio	1.43	[0.53 - 3.85]	0.10***	[0.03 - 0.32]
Other indicators				
Age: <20 (reference)				
20-39	1.41	[0.51 - 3.90]	1.29	[0.42 - 3.92]
40 +	0.56	[0.09 - 3.55]	0.14*	[0.02 - 1.02]
Total decision making score	0.98	[0.91 - 1.06]	1.17***	[1.06 - 1.29]
Pharmacy in village	1.61	[0.64 - 4.05]	0.55	[0.26 - 1.18]
Observations	1212		788	

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