

DETERMINANTS OF MATERNAL HEALTH CARE SEEKING BEHAVIOR IN
BANGLADESH

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By
Md Mahabub-ul Anwar

Thesis Committee:
Dongmei Li, Chairperson
John Grove
Alan Katz

ABSTRACT

Although maternal mortality in Bangladesh declined almost one-fourth from 1329 in 1980 to 338 in 2008 per 100,000 live births, it is still one of the highest in the world. Most of these deaths can be avoided by providing maternal health care services. The Government of Bangladesh is providing free maternal health care service at the community level, yet the utilization is very low. This study tried to determine the causes of underutilization of services by using secondary data from three nationally representative Demographic Health Surveys. Results show that age, different time periods, place of residence, education, wealth, mass media exposure, age at marriage, and time wanted pregnancy are the determinants of underutilization of antenatal care, institutional delivery and postnatal care. In addition, field workers visit to pregnant women was found to be significant determinant for utilizing antenatal and postnatal care. The study suggests that the government needs to target poor and rural women who have lower education and lower age at first marriage. The government needs to make them aware of the necessity and availability of maternal health care services, which can be done through mass media and field workers.

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CHAPTER 1: INTRODUCTION

Background

The maternal mortality ratio (MMR) is not only an indicator of maternal health, but also a sign of the overall health status and well-being of a nation, particularly for developing countries.^{1,2} Over the last three decades, Bangladesh has made considerable achievements in several related health indicators; total fertility rate, infant mortality rate, and neonatal mortality rate have declined substantially. From the mid-eighties to 2007 the total fertility rate has declined from 5.1 to 2.7 live births, the infant mortality rate declined from 110 to 52 per 1,000 live births, and the neonatal mortality rate declined from 52 to 37 live births.³ Although MMR has declined almost one-fourth from 1329 in 1980 to 338 in 2008⁴ per 100,000 live births, it is still one of the highest in the world^{5, 6} compared to 251 globally and 17 per 100,000 live births in the USA.⁴ It is estimated that 90% of such deaths are avoidable if women are given appropriate maternal health care, especially obstetric care.^{7,8}

In Bangladesh, maternal deaths account for 20% of all deaths among women of reproductive age.⁹ Two-thirds of maternal deaths occur after delivery; one-tenth occurs during delivery, and the remaining one-fifth occurs before delivery.⁹ The leading causes of maternal deaths are haemorrhage (34%) and eclampsia (29%).^{9,10} Other direct major causes include: prolonged/obstructed labour, puerperal sepsis, and unsafe abortion.¹¹ Globally, also, the most common cause of maternal death is severe bleeding (25%) while another 12% of mothers die of eclampsia.¹² These complications can be managed and treated if mothers seek timely and appropriate care from facilities with skilled-care providers. A community based intervention

study¹³ in Matlab, Bangladesh found that skilled birth attendants during delivery and obstetric care can significantly reduce maternal deaths.

It is well established that proper utilization of maternal health care services not only reduces maternal mortality, but also improves the mother's survival and quality of life.¹³⁻²⁰ To achieve the Millennium Development Goal 5 of reducing maternal mortality to 143 per 100,000 live births by 2015,⁶ the Government of Bangladesh has taken safe motherhood initiatives and the recommendations from the International Conference on Population and Development (ICPD) as priorities.^{21,22} Providing free maternal health care services at the community level is on the prime agenda for government health policy.²² Nevertheless, the utilization of maternal health care services remains low in the country.^{3,23-25} About half of all pregnant women do not seek any antenatal care (ANC),³ which is critical for safe delivery.²⁶⁻
²⁸ The government recommends a minimum of three ANC visits, one visit every three months, during the pregnancy period. Yet, only one in three pregnant women make three or more ANC visits.³ Among those who do have access to ANC, 31% receive services during the first trimester while 24% delay seeking care until the third trimester. The frequency of ANC visits and early initiation of ANC is higher among women with their first pregnancy, women in urban areas, those who have completed secondary school, and those from the wealthiest households.³ Approximately half of all women receive ANC from trained providers. The main providers of ANC are doctors (24%) and paramedics (15%).³

To reduce health risks for mothers, it is important to increase deliveries made by skilled providers with adequate medical supervision.^{16,29,30} In Bangladesh, the majority of women use traditional birth attendants (TBAs) for delivery care. These TBAs frequently practice unsanitary and harmful rituals, such as using unsterilized razor blades or thread to cut

the umbilical cord and using cow dung for dressing materials, which lead to severe infection.^{31,32} Moreover, TBAs lack the knowledge to recognize, identify, and address delivery problems. Therefore, the government encourages women to receive free delivery care from health facilities that are available at the community level hospitals.^{21,22} Despite this encouragement, delivery at home remains almost universal; about 85% of babies are born at home in Bangladesh. Of the 15% of births that occur outside of the home 7% occur in public health facilities and the rest occur in private hospitals and clinics with trained providers (doctors, trained nurses, midwives, or paramedics).³ When women have complications during delivery only 29% of them receive treatment from trained providers, 33% visit unqualified providers, and the remaining one-third does not seek any care.^{3,9} The proportion of institutional deliveries is higher among women of higher socio-economic status, women in urban areas, and women with a secondary school or higher education.^{3,9}

Postnatal care (PNC) is another important maternal health care service for the reduction of maternal deaths, as most maternal deaths occur during delivery and the postpartum period due to complications.⁹ In Bangladesh, only 21% of mothers get any postnatal checkups from trained providers within the first 42 days of delivery. Most of them are checked up within the first two days after delivery.³ The percentage of postnatal checkups is lower among women in rural areas, those with lower socio-economic status, and those who have no education.³

Despite the government's commitment to make health services available at the doorsteps through a well-established health structure, the utilization of maternal health services is very low suggesting that that maternal health programs have failed to serve the country. Therefore, it is important to identify the factors associated with under utilization of

available health care services and to find ways to reach the groups who need maternal health services most.

Several reasons for the lower utilization of maternal health care have been documented.³³ The two main reasons are a lack of knowledge about maternal health care services^{3,29,34} and financial constraints^{3,8,35}. However, the effect of time (i.e., government policy and program intervention in different time point) is still unexplored. Since the Government of Bangladesh has been taking different initiatives to encourage women to receive services from trained service providers, this study focused on the effect of time with other variables to determine the care seeking behaviour. Therefore, the primary objective of this study is to examine factors associated with the utilization of maternal health care services in Bangladesh by using prospective data obtained from nationally representative surveys. The secondary objective is to identify the individual factors, which may facilitate or impede the effective use of services, which in turn may help identify vulnerable groups of women. The study will also provide information for policy makers to target services at the vulnerable populations.

Organization of the report

The thesis paper is divided into four sections. Section I delineates the background, rationale, and objectives of the study. Section I also highlights the health structure and maternal health programs and policies of Bangladesh. At the end of this section the conceptual framework is also discussed. The methodology of the study is presented in Section II. Section III describes the results of the study. The last section summarizes the

results and limitations of the study. This section also puts forward some recommendations, based on the findings, to improve the health care seeking behavior in Bangladesh.

Health structure and maternal health programs and policies of Bangladesh

Bangladesh is administratively divided into 6 divisions, 64 districts, and 496 sub-districts (*upazilas*).³⁶ On average each *upazila* has nine unions. Unions are the lowest administrative unit and cover approximately a 25,000 to 30,000 person population. Each union is further divided into nine geographic units known as wards. From national level to ward level, the government is providing free maternal health care services through a very well designed grassroots-based service delivery infrastructure. Maternal health care services are designed for a range of clients, from rural migrants and people in rapidly growing urban slums to people who choose to remain in the most remote hinterlands. Maternal health services are offered through clinics, doorstep services, and behavior change communication campaigns. These services include: pregnancy related care for women (i.e. ANC, PNC, tetanus toxoid immunization), assisted delivery care through the training of birth attendants, and the establishment of affordable maternity care at the community level.

At national level there is one Institute of Post Graduate Medicine and Research, one Maternal and Child Health Institute, one Institute of Child and Mother Health and 13 Government Medical College Hospitals in the country. The services available for mothers are ANC, delivery including comprehensive EOC (Emergency Obstetric Care) services, and PNC. At the district level, 57 district hospitals provide ANC, delivery care including comprehensive EOC services, PNC, EPI, and child care services.

There are 90 Mother and Child Welfare Centers (MCWCs) in the country situated at the District and *Upazila* level which provide ANC, normal deliveries, and PNC and 64 of these also provide comprehensive EOC services. There are 407 *Upazila* Health Complexes (UHCs) in the country. The major services provided are ANC, normal delivery, PNC EPI (Extended Program on Immunization), and health education. Out of these 407 UHCs only 132 provide comprehensive EOC services.

At the union level maternal health care services are provided through the Health and Family Welfare Center (HFWC). The services provided are: ANC (screening for “at risk” pregnancies and referral), safe deliveries through domiciliary follow up, PNC, and health education by one female Family Welfare Visitor and one male Sub-Assistant Community Medical Officer or Medical Assistant. In addition, five to six Family Welfare Assistants and three Health Assistants provide domiciliary services in each union.

In addition to the union level services, every month about 30,000 “satellite clinics” are organized at ward and community levels all over the country that aim to bring the service facility to people’s doorstep in order to deliver ANC, family planning, health education, and EPI services. About 23 thousand Family Welfare Assistants and 15 thousand Health Assistants are working at the grass-root level for maternal and general health care services delivery.

Aside from governmental help, non-governmental organizations (NGOs) and private sectors are also involved in providing maternal health services. Presently, many NGOs have special programs and facilities for providing ANC and safe delivery care. Moreover, there are private physicians and clinics, especially in urban areas.

With regard to maternal health programs and policies, up until 1985 maternal health was not a priority issue in the government health policy. The First Five Year Plan (1973-1978), the Population Policy (1976), and Second Five Year Plan (1980-1985) focused on decreasing population growth and providing basic health care by building health infrastructure, increasing family planning activities, and encouraging the private sector and NGOs to participate in the family planning program. The Third Five Year Plan (1985-1990) and the Fourth Five Year Plan (1990-1995) emphasized maternal health by focusing on comprehensive health and family planning service delivery. The Fifth Five Year Plan (1997-2002) along with Health and Population Sector Strategy (HPSS) prioritized maternal health and introduced the Essential Service Package (ESP) to make health services cost effective. Within this period the government introduced the Health and Population Sector Program (1998-2003) with the provision of one-stop services of ESP to address maternal health care at the grass-roots level. With the intention of achieving the Millennium Development Goal 5, Reducing Maternal Mortality, the Government of Bangladesh has introduced the Health, Nutrition and Population Sector Program (HNPSP) (2003-2010) largely focusing on maternal health care.²¹ In order to ensure quality of care in maternal health services, the government has emphasized the provision of safe motherhood services including: ANC, safe delivery care, emergency obstetric care, PNC, and emergency neonatal care.

Conceptual framework

In general, the utilization of maternal health care services is a complex behavioral phenomenon. Many factors limit the utilization of maternal health care services in rural areas of developing countries. These factors include the availability, accessibility, and quality of maternal health services, in addition to the characteristics of its users and communities in

which they live.³⁷ Specific barriers include: age, parental education, place of residence, culture, autonomy of women, perceived need of services, mass media exposure, wanted pregnancy, economic condition, field workers visit, number of children ever born, age at marriage, quality of services, and availability of services.³⁸⁻⁴¹ Studies from rural Bangladesh have found that some of these factors were positively associated with the utilization of health services.⁴²⁻⁴⁵

Most studies on the determinants of receiving maternal health care services consider age as an influential factor. Rahman, Tarafder, and Mostofa⁴⁶ found that more middle-aged women received delivery assistance from medically trained personnel than did adolescents and older women. Studies^{18,47-49} also found that women in their thirties attend ANC earlier and more frequently than teenagers and older women. In contrast, other studies have shown that women's age was not a significant predictor of the utilization of ANC⁵⁰⁻⁵³ and nor that age is predictive of receiving delivery care from trained providers.⁸ Non significance is due to high correlation with parity, and in some settings with educational level. It is also associated with marital status, desire for a pregnancy, socioeconomic status, and decision-making power.⁵⁴

It is well recognized that parental education has a positive impact on the utilization of maternal healthcare services.^{8,55,56} A systematic review of 28 studies⁵⁷ revealed that mother's education was the best predictor of ANC visits. Mothers with higher education were more likely to receive the recommended amount of ANC care^{58,59} and were more likely to start ANC visits early than less educated mothers.^{48,49} There are multiple pathways that could explain why "maternal education is consistently and strongly associated with all types of health behavior".⁶⁰ One study on delivery assistance in Bangladesh⁴⁶ found that receiving

delivery assistance from governmental health facilities was strongly and positively associated with parental education. When compared to mothers with no education, mothers with higher, secondary, and primary education were 2.5, 1.2, and 1.7 times more likely respectively to receive delivery care from government trained medical personnel.⁴⁶ Another study⁶¹ also revealed that more educated mothers are more likely to receive services from trained providers. Similar trends in the utilization of PNC were found in a study from Bangladesh.⁶² There might be multiple potential reasons for the disparity between the utilization of health services by educated and uneducated parents. Explanations for these differences may be that educated mothers may have: (a) increased knowledge of preventive health care benefits and increased awareness of health services, (b) increased receptivity to new health-related information, (c) more experience in interacting and socializing with formal services outside of the home environment, (d) more familiarization with modern medical culture, (e) better access to financial resources and health insurance, (f) more control over resources within the household and wiser spending habits, (g) more egalitarian relationships and better communication with husbands, (h) more decision-making power, (i) increased self-worth and self-confidence, (j) better coping abilities and negotiating skills, and (k) reduced power differential towards health care providers and thus better communication and ability to demand adequate services.⁶³⁻⁶⁷

In addition to the mother's educational level studies have indicated that the use of ANC increased with the father's educational level.^{48,53,58,68} In a literature review, Gabrysch and Campbell⁶⁹ found that nearly all studies that consider fathers' educations find that higher education is associated with more skilled attendance at delivery. A study⁴⁶ on Bangladesh found that mothers whose husbands had higher, secondary, and primary education were

respectively 1.9, 1.6, and 1.4 times more likely to receive delivery assistance from medically trained personnel than those who had no formal education.⁴⁶ However, this effect is often less for the father's education than when considering the mother's own education. Furthermore, educated fathers may be more open toward modern medicine,⁷⁰ aware of the benefits of skilled attendance, and be more able to communicate with health workers and demand appropriate care. Educated fathers may also put fewer constraints on their wives' mobility and decision-making, thus facilitating care-seeking behavior in women.⁶⁹

Geographic place of residence may also influence the utilization of maternal health care services. In general, research has shown that differentials in the advantages between regions within a country are usually moderate to large in size.⁶³ The majority of studies on delivery service examine the effects of region or urban/rural residency among their variables. Research has shown that there is a large advantage for women in urban areas compared to women in rural areas, and there is an even larger advantage for those living in large cities or in the capital. For example, in urban areas of Bangladesh there is a higher proportion of births occurring in health facilities compared to rural areas.^{3,46} This difference is explainable by variations in the literacy rate, occupations, and accessibility to health care resources between urban and rural areas.⁸

In Bangladesh, pregnancy and childbirth are permeated with strong cultural meaning.⁷¹ The vast majority of people in rural areas believe that childbirth is an act of God and is a 'natural event.' For this reason, they do not expect delivery complications or problems and therefore, they use TBAs for childbirth.⁸ Villagers also select TBAs because of tradition, convenience, and the special attention they receive. TBAs are well known and trusted members of the community and are also highly accessible and affordable.⁸ Moreover,

rural women, particularly the Muslims, do not usually converse with unknown persons, particularly males. This behavior is particularly pertinent because most deliveries at rural health centers are attended by male physicians creating an important social and religious barrier to the use of these centers for delivery purposes. Additionally, many rural women have negative perceptions about the quality of services offered by rural health facilities and medically trained personnel. Some reasons suggested for this negative perception include: a lack of qualified/skilled staff, cooperation, and privacy, and inattentive or discourteous staff behavior. These negative perceptions are considered important in explaining the underutilization of rural public health facilities in developing countries. Results from a qualitative study in India highlighted that the perception of pregnancy was a natural process that only warranted ANC when problems arose.⁷² One reason that Indian women did not attend ANC during the first trimester was the fear associated with the local belief that the early period of pregnancy was the most vulnerable to witchcraft.⁷² There was a fear that blood could be used for bewitching women if it came into the wrong hands, or that it would be tested for HIV and the result recorded on their ANC card in Zimbabwe.⁷³

The various dimensions of autonomy, such as household position, financial independence, mobility, and decision-making power regarding one's own healthcare, may all impact on health facility use.⁶⁹ In many countries women have to seek permission from husband or mother-in-law in order to seek personal health care. Furthermore, women may lack control over material resources that are needed to pay for expenses, their mobility may be restricted, or they may lack access to transportation including vehicles, bicycles, and even donkeys.^{63,65} In Bangladesh, barriers to the utilization of obstetric services, especially by women in rural areas, include discouragement of traveling unaccompanied and their lack

decision making power.⁷⁴ Another study in Pakistan⁷⁵ found that travelling in the company of another adult (accompanied mobility) was positively associated with ANC use. Autonomy and status effects are likely to vary by age, marital status, wealth, and parity. One study found that women's autonomy was positively related to the use of ANC in rural north India,⁶⁸ whereas, in Nigeria, the husband's refusal of his wife's health care was one of the major reasons for non-utilization of ANC.⁷⁶ Several studies examine the effect of autonomy dimensions on use of skilled attendance at delivery.^{23,63,79-87} Most find significant associations for at least some dimensions including: freedom of movement, aspects of decision making, control over earnings, communication and sharing of housework with the husband, sex of household head, and presence of the mother-in-law in the household.⁶⁸ However, the associated significance of specific dimensions with ANC varies from study to study.

One of the most important reasons for the under utilization of maternal health care services in Bangladesh is the perceived need for services.³ Most of the women who do not receive any maternal health care services believe that receiving services from trained providers is unnecessary.³ In the case of receiving ANC, older women, especially mothers-in-law, did not consider ANC essential during pregnancy and often discouraged their daughters-in-law from attending ANC in rural Bangladesh.⁷⁷ Women who felt that friends and family were unsupportive were twice as unlikely to attend ANC as other women.^{47,77} Qualitative studies in South Africa found that most women saw little direct benefit from ANC and that they would not seek ANC care unless they had problems in previous pregnancies.⁷⁸ In Zimbabwe, neither urban nor rural women were sure about the benefits of ANC for their health or their unborn child.⁷³ Like in South Africa, ANC was not seen as essential unless

there was physical discomfort during pregnancy and complications in a previous pregnancy or childbirth in Bangladesh.⁷⁷

Mass media exposure has been found to have a positive effect on receiving maternal health care services in Bangladesh.^{3,37,46,88} A systematic review⁵⁷ revealed that exposure to mass media (especially television and radio) significantly predicted utilization of ANC. One study⁸⁹ found that women with high levels of media exposure were more likely to have receive ANC. Moreover, studies by Pallikadavath⁶⁸ and Sharma⁹⁰ found that watching television weekly substantially increased the chances of women seeking ANC. Gabrysch and Campbell⁶⁹ argued that having access to information through modern media could influence women's knowledge about delivery risks and availability of services.

Another influential factor is whether the women want the pregnancy. Women with wanted pregnancies are significantly more likely to receive health care services from professional health workers than women with unwanted pregnancies.^{56,91} Rahman⁸⁸ found that women with wanted pregnancies in Bangladesh were 2.2 times more likely to receive services from trained professionals than women with unwanted pregnancies. However, Chakraborty et al.⁶² found an inverse relationship between a desired birth and the use of modern health services for treatment of any of the life-threatening and high-risk postnatal complications. Wantedness may be associated with age, parity and social support or marital status.

The prime reason for not using professional health care includes its cost and lack of resources.^{8,35} These costs may include: transportation, education and supplies, official and unofficial provider fees as well as the opportunity costs of travel time and the waiting time lost from more productive activities.⁶³ Studies^{52,78} found that the costs of services, including transportation and the necessary laboratory tests, were major factors prohibiting service

utilization. Qualitative studies also support this finding.^{72-74,77} Households on a tight budget will have great difficulties paying these costs and therefore be less likely to use a health facility for delivery.⁶⁹ Rob et al.⁹² also found that cost was one of the most important barriers for not seeking ANC and PNC services in Bangladesh. Furthermore, women with high economic status were more likely to receive adequate and early ANC than those with low economic status.^{56,93,94} Bhatia et al.⁹⁵ showed that providing financial assistance could be a viable option for increasing the utilization of reproductive and child health services in India.

The Government of Bangladesh is providing doorstep maternal health care services by requiring field workers to visit each house every two months. They are equipped to provide ANC and counseling and education for professional delivery care and delivery follow up. A study⁸⁹ found that women who had been visited by field workers within six months are 1.5 times more likely to receive professional care for delivery than the women who have not been visited. Darmstadt et al.⁹⁶ suggested that field workers may play a promising role in providing pregnancy and childbirth care, mobilizing communities, and improving prenatal outcomes in low-income settings.

In some studies parity (total children ever born) is also considered a determinant factor for maternal health care services utilization. Studies^{50,52,59,90,93} found that higher parity was generally a barrier to adequate use of ANC. Similar findings were observed for assisted delivery care in Bangladesh.⁹⁷ Wong et al.⁹⁸ argued that because of the perceived risk associated with a first pregnancy, a woman is more likely to seek maternal healthcare services for first-order than higher-order births. Having more children may also cause resource constraints, which will have a negative effect on healthcare utilization. However, one study⁶² on PNC determinants found a positive relationship between previous pregnancy experiences

and the use of professional care for PNC. Researchers⁶² argued that for all the high-risk and life-threatening complications considered in the present study, the percentage of women who sought some care increased with the total number of previous pregnancies.

The mother's age at the time of marriage sometimes serves as a proxy for her educational attainment and social class, which may have a positive impact on the utilization of maternal health care services.⁶⁸ Chakraborty et al⁶² demonstrated that the use of modern/medical health services (for all life-threatening and high-risk conditions during the postnatal period considered in this study) was higher among women who were married at 16 years of age or older. Similarly, Islam and Choudhury⁶¹ found that women who reported their age as 15 year or older at their first marriage received delivery assistance from trained professionals 1.5 times more often compared to those who got married at an earlier age. Chakraborty et al.⁹⁹ found the same result for receiving maternal health care services, irrespective of ANC, delivery care or PNC.

Several studies found that the distance of the health facility,^{62,93,100-102} perceived quality of care⁹⁸, parental occupation, and family composition are determinants of maternal health care utilization. Considering all the variables discussed in the literatures and avoiding multicollinearity problem in model fitting, the following factors were selected to predict ANC, delivery in health facilities and PNC:

- Age of the of the respondent (pregnant women)
- Residence
- Education of the respondent
- Education of partner
- Mass media exposure

- Wealth of the respondent
- Field worker's visit to the respondent
- Age at first marriage
- Time wanted pregnancy
- Parity (number of children ever born) , and
- Time, which is still unexplored

CHAPTER 2: METHODOLOGY

Data source and participants

To fulfill the objective of the study, data were extracted from three Bangladesh demographic and health surveys (BDHS) - BDHS 1999-2000, BDHS 2004, and BDHS2007. BDHS is a nationally representative periodic survey conducted in Bangladesh to serve as a source of population and health data for policymakers, program managers, and the research community. The survey is conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare and implemented by Mitra and Associates of Dhaka. Macro International, USA provides financial and technical assistance for the survey through USAID/Bangladesh.

Using multistage sampling 10,544 women age 15-49 from 10,268 households, 11,440 women from 10,500 households, and 10,996 women from 10,400 households were selected in BDHS 1999-2000, BDHS 2004, and BDHS2007 respectively. Since this study is trying to determine the factors of utilization of maternal health care services, women with at least one childbirth were considered for analysis. Thus the number of selected women are 6939, 7002, and 6058 for BDHS 1999-2000, BDHS 2004 & BDHS2007 respectively.

Outcome variables

The outcome variables are receiving ANC, delivery at home or health facility and PNC.

ANC

Information on ANC includes whether pregnant woman was visited by a professional at least once during her pregnancy. And the responses were binary in nature giving ‘Yes’ or ‘No’, representing whether pregnant women have received any ANC.

Place of delivery

Since unhygienic practices^{31,32} are available in the Bangladesh, the government is encouraging women to have their childbirth in the health facilities. Therefore, place of delivery was used instead of professional assisted delivery. To determine the place of delivery, women were asked “where was your last child born” and were categorized as health facility delivery and home delivery. Health facility delivery included the deliveries that occurred in public or private hospital or clinics where a trained professional was available.

PNC

Information on PNC includes whether pregnant woman was visited by a professional at least once within 42 days of her delivery. And the responses were binary in nature giving ‘Yes’ or ‘No’, representing whether pregnant women have received any PNC.

Exposure variables

The factors considered in this study to determine the utilization of maternal health care services were time, age of the respondent, place of residence, education of the respondent, education of partner, mass media exposure, wealth of the respondent, field worker’s visit, age at first marriage, time wanted pregnancy, and total children ever born. Due to unavailability of information of cultural constrains, cultural was not considered in the analysis.

Time

Time was determined by the year the respondent was interviewed.

Age of the respondent

Respondents were asked a simple question on their age, and if necessary probing technique was also used to determine the exact age. Age was then grouped into eight categories such as 10-14, 15-19, 20-24,....45-49. Although it was determined earlier to select women of age 15-49, some women found at age 10-14 when probed, and the reviewers of BDHS decided to use those respondents in the analysis.

Place of residence

Respondents were divided into two categories, whether they live in urban areas or rural.

Education of the respondent

Respondents were asked whether they had any formal education, if yes, how many years they studied. They were also asked if they had passed different levels of schooling to crosscheck the educational level. For this study, level of study was used to determine the education of the respondents. The response had four categories – no education, primary, secondary, and higher.

Education of partner

It is expected that apart from the mother's education, father's education has also a great effect on the maternal health care utilization. Father's educational status was also grouped into same four categories.

Mass media exposure

Four questions were used to determine the mass media exposure of the respondents – whether they watch TV, if yes how frequently, whether they listen to radio, if yes how frequently. According to their responses watching TV and listening to radio were categorized in four groups – not at all, less than once a week, at least once a week, almost every day. Average was taken of watching TV and listening to radio to create the variable.

Wealth of the respondent

A wealth index¹⁰³ was constructed to represent the wealth of the respondents. Information on access to electricity at home; possession of cot/bed, wardrobe, quilt, radio, TV, bicycle, motorcycle, mobile phone, sewing machine and wall clock; ownership of land; type of household construction materials; were used to construct the wealth index. Each asset was assigned a weight (factor score) generated through principal components analysis and the resulting scores were standardized in relation to normal distribution with a mean of zero and standard deviation one. Each household was then assigned a score for each asset, and the scores were summed for each household. Finally the households were ranked according to the total score. The households were divided into five groups from one (Poorest) to five (Richest). A single asset index was developed for all the households.

Field worker's visit

Information was also collected if any of the health workers visited the respondent's house within last six months. And the responses were binary in nature giving 'Yes' or 'No', representing whether the respondents were visited by any field workers or not.

Age at first marriage

The age at first marriage was asked to respondents and categorized in three groups – below 15, 15-19, and 20 and above.

Time wanted pregnancy

Regarding the last pregnancy, respondent answered, whether they wanted that pregnancy or not. If they wanted the pregnancy then categorizes as “then”, if wanted but not the time it happened, then categorized as “later”, and if they did not want the pregnancy then categorized as “no more”.

Total children ever born

Data collected from women on how many children they had given birth. Responses were categorized in four groups – 1 child, 2-3 children, 4-5 children, 6 and more children.

Data analysis

Bivariate analysis was performed to determine the relationships between outcome and exposure variables. Pearson’s Chi-square test of independence was performed to test the existence of significant association between outcome and exposure variables. Besides presenting data in the form of tables to see the distributions and the relationships, multivariate logistic regression was carried out to measure the effect of different exposure variables on outcome variables. Here logistic regression has been considered separately for each dependent variable. In this study, all the dependent variables are binary. An estimated odds ratio of 1 indicates that the nature of dependent variable is not different from the reference category. If the estimated odds ratio is > 1 , the nature of dependent variable is higher relative to the reference category, and if it is < 1 , it is opposite to > 1 category. SAS 9.2 software was used to analyze the data.

CHAPTER 3: RESULTS

Background characteristics of respondents

Table 3.1 shows the background characteristics of the respondents for the study. Almost three-fourth of the respondents are under age 30 among which 20-24 years age group being the highest (33%). About 14% of women were found among 30-34 years group. The majority of the respondents resided in rural areas (81%) and the rest in urban settings (19%).

Education is critical for maternal health care utilization. It has been observed that 38% of women had no education, while 30% women completed primary schooling. About one-fourth of the respondents completed secondary education. On the other hand, partner's educational attainment is also important for health seeking behavior of a woman. About 40% husbands had no education, while one-fourth had completed primary education. Secondary education completed was found only 23%. About nine percent of husbands completed higher education.

There were no substantial differences among the wealth index. Around 20% of women were found in poorest and poorer households. The richest and richer households were 18% each, while 20% of the respondents belonged to the middle wealth index.

In addition to education, media plays critical role in acquiring knowledge and information. Respondents were assessed on their exposure to television and radio as mass media exposure. Findings suggest that more than half of the respondents did not watch television or listen to radio at all. One-fifth watched television or listen to radio every day, while 18% watched or listened once a week. At the same time, fieldworkers are vital source of information regarding maternal health issues in rural Bangladesh. It has been found that almost three-fourth of the respondents were not visited by any fieldworkers.

Table 3.1 Percent distribution of women of reproductive age by selected background characteristics

Characteristics	Frequency	%
Age		
10-14	27	.1
15-19	3211	16.1
20-24	6653	33.3
25-29	5153	25.8
30-34	2964	14.8
35-39	1392	7.0
40-44	468	2.3
45-49	129	.6
Type of place of residence		
Urban	3783	18.9
Rural	16215	81.1
Highest educational level		
No education	7633	38.2
Primary	6081	30.4
Secondary	5335	26.7
Higher	948	4.7
Missing	1	.0
Partner's education level		
No education	8031	40.2
Primary	5322	26.6
Secondary	4638	23.2
Higher	1879	9.4
Don't know	102	.5
Missing	26	.1
Wealth index		
Poorest	4416	22.1
Poorer	4273	21.4
Middle	3981	19.9
Richer	3689	18.4
Richest	3640	18.2
Mass media exposure		
Not at all	10748	53.7
Less than once a week	1473	7.4
At least once a week	3578	17.9
Almost every day	4195	21.0
Missing	5	.0
Total	19998	100.0

Table 3.1 (continued)

Characteristics	Frequency	%
Field worker's visit		
No	14718	73.7
Yes	5254	26.3
Missing	26	.1
Age at first marriage		
Below 15	10015	50.1
15-19	8689	43.4
20 and above	1295	6.5
Time wanted pregnancy		
Then	14062	70.3
Later	3195	16.0
No more	2720	13.6
Missing	21	.1
Total children ever born		
1	4494	22.5
2-3	9382	46.9
4-5	3910	19.6
6 and more	2212	11.1
Total	19998	100.0

Age at marriage is an important determinant for fertility regulation as well as maternal health. In Bangladesh, age at first marriage for women is traditionally very low. Findings suggest that half of the respondents were married before age 15. A large percentage of women (43%) got married within age 15-19 years. Only seven percent of women got married at age 20 or above.

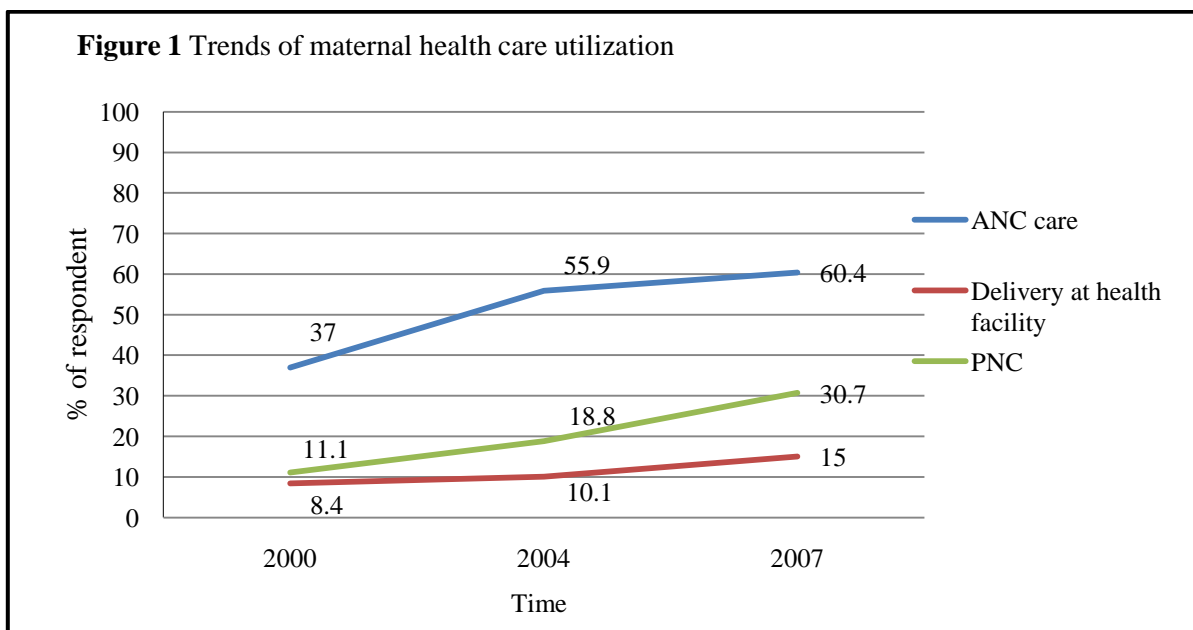
In Bangladesh, getting pregnant right after marriage is very common and expected. It has been found that 70% of women wanted to be pregnant during their last birth, while 16% wanted to delay the pregnancy. Encouragingly, about 14% reported not to have more children.

For the last three decades the Government of Bangladesh has been campaigning to motivate couples to limit family within two children. It has been found that almost one-third

of the women had more than three children. A large percentage of women had 2-3 children ever born to them (47%). About one-fifth of the respondents had one child (Table 3.1).

Trends of maternal health care utilization

Over the years, substantial increase in each component of maternal health care utilization has been observed in Bangladesh. During the 2000-2004 period, ANC increased drastically then lost its pace afterward. Figure 1 shows that sought for ANC by the women reached to 60% in 2007, which was 37% in 2000. On the other hand, delivery care at health facility increased to 15% in 2007 compared to 8% in 2000. The trends reveal that institutional delivery did not increase to a satisfactory extent, which is still a challenge for the government to ensure safe motherhood. Like other component of maternal health, PNC also increased over the period; exhibiting moderate pace initially but sharp increase at the end. Only 11% women utilized PNC in 2000, which increased to almost 19% in 2004. This momentum continued for the following years to reach at almost 31% in 2007.



Differential pattern of ANC utilization

In specifying the determinants of ANC, bivariate effects of background characteristics of respondents were examined. Table 3.2 shows the bivariate analysis of exposure variables on the use of ANC. Findings show that about half of the women of 15-30 years had their antenatal care at least once during their pregnancy followed by the 30-34 years age group (47%). Less than half of the women of 10-14 years age group had ANC visit (41%). This was similar to the 35-39 years age group. On the other hand, utilization of ANC by the 40-44 and 45-49 years age groups were 31% and 24% respectively. A significant relationship is found between age of the respondent and ANC utilization.

Significant urban-rural differences are existed regarding utilization of ANC during pregnancy. More urban women receive ANC than their rural counterpart. About 71% of urban women received ANC visit, compared to 46% of rural women.

Regarding educational attainment, 95% of the women with higher education sought any ANC followed by 70% with secondary education. Among the women with no schooling 31% of them utilized ANC, while it was 48% primary education completed. The relationship between education and ANC utilization is significant.

Partner's education is an important determinant that influences the utilization of ANC by the women. Women who had partner with higher education, 83% of them reported having any ANC followed by 64% with secondary education. On the other hand, women who had husband with no schooling 36% of them received any ANC, while it was 48% for primary completion.

Table 3.2 Utilization of ANC by selected characteristics

Characteristics	ANC (%)	N
Age***		
10-14	40.7	27
15-19	53.6	2655
20-24	55.6	4979
25-29	51.8	3927
30-34	46.9	2337
35-39	39.8	1141
40-44	30.9	404
45-49	23.7	114
Type of place of residence***		
Urban	71.5	3075
Rural	45.9	12510
Highest educational level***		
No education	31.4	5669
Primary	48.4	4691
Secondary	70.5	4393
Higher	95.2	829
Partner's education level***		
No education	36.2	6027
Primary	48.1	4105
Secondary	64.6	3753
Higher	83.1	1601
Don't know	24.4	78
Wealth index***		
Poorest	33.4	3267
Poorer	39.4	3271
Middle	49.5	3083
Richer	61.9	2954
Richest	73.2	3008
Mass media exposure***		
Not at all	37.0	8017
Less than once a week	50.4	1180
At least once a week	57.0	2880
Almost every day	78.0	3504
Field workers visit**		
No	51.6	1195
Yes	49.1	4069
Total	50.9	15564

Table 3.2 (continued)

Characteristics	Frequency	%
Age at first marriage***		
Bellow 15	43.1	7677
15-19	56.2	6837
20 and above	73.8	1071
Time wanted pregnancy***		
Then	53.0	10497
Later	51.9	2658
No more	40.9	2425
Number of ever children born***		
1	63.9	4494
2-3	52.7	6804
4-5	39.5	2754
6 and more	25.9	1532
Total	50.9	15584

** significant at 0.01, ***significant at 0.001

Utilization of maternal health care is significantly correlated with the economic condition of the women. About 73% of women among the richest households were found availing ANC followed by 62% among the richer households. Half of the respondents of middle households sought ANC visit. Eventually, poorer and poorest households had lower utilization of ANC being 39% and 33% respectively.

Encouragingly, women who had more exposure to mass media found higher utilization of ANC. Women who watched television or listen radio almost every day about 78% of them received any ANC followed by 57% who do the same at least once a week. Women who had no exposure to mass media 37% of them were found to utilize ANC, while it was about half for the women who watched less than once a week.

Among the women who received ANC half of them were not visited by any fieldworkers.

Respondents who got married at age 20 or above were found higher utilization ANC; about 74% of women of age 20 or above received ANC, while 56% of the 15-19 age group did the same. The lowest utilization was found among the group who aged below 15 (43%).

Respondents were asked whether they intended to be pregnant during their last birth. Among the women who intended to be pregnant during their last birth 53% received ANC. About 52% sought ANC who wanted to delay. Among those who did not want more children 41% of them utilized ANC.

Among the women with one child, 64% of them received ANC. This trend decreased towards women with more children born to them. Of the women with 6 and more children about one-fourth mentioned receiving ANC, while it was 53% of the women with 2-3 children and 39% of the women with 4-5 children (Table 3.2).

Differential pattern of utilization of health facilities for delivery care

There is no alternate to increase the institutional delivery to improve the maternal health care. But women in Bangladesh are less likely to go to health facility for delivery. Bivariate analysis of exposure variables on the use of health facility delivery is presented in Table 3.3. Only 11% of births take place in the health facility and the percentage decreases as the age of the respondents' increases. It has been observed that highest number of delivery took place at health facility among the lowest age groups; around 15% among the 10-14 age group. The significant relationship between age and delivery at health facility shows that the younger women are more likely to go to health facility for delivery care, yet it is very low.

Also, there is significant difference between urban and rural residence regarding delivery care. Only 7% of rural women give birth at health facility compared to 27 of urban women.

Educated women are more likely to use health facility for delivery care. Data shows that 3% of deliveries occur at health facility of women who have no education. The trend increases according to the educational attainment. Among women with primary education completed 7% deliveries take place at health facility, while it is 19% for women with secondary education. The highest percentage has been found among the women with higher education (57%).

Similar result was found among the partners of the women. Husbands who have no education, 4% of their wives utilize health facility for delivery care followed by 7% with primary education. On the other hand, husbands who have higher education 41% of their wives deliver their baby at health facility.

Richest households are more likely to deliver at health facility than poorest households. Among the richest households 30% have institutional delivery, while it decreased to 3% for the poorest households.

Exposure to mass media influences the place of delivery. Women who have exposure to mass media almost every day, 29% of them experienced institutional delivery, while it is almost 10% for the women who has mass media exposure at least once a week. Women who had no exposure, only 5% of them gave birth at health facility.

Bivariate analysis shows no significant relationship between field worker's visit and utilization of health facility. Women who had delivery at health facility had very lower fieldworker's visitation.

Age at first marriage is significantly associated with the institutional delivery. It has been found that women who got married below age 15 were less exposed to give birth at facility (6%), compared to women who got married 20 years and above (37%).

Table 3.3 Utilization of institutional delivery care by selected characteristics

Characteristics	Delivery at health facility (%)	N
Age***		
10-14	14.8	27
15-19	10.2	3212
20-24	11.6	6652
25-29	11.8	5153
30-34	11.1	2965
35-39	9.2	1392
40-44	4.5	468
45-49	3.1	129
Type of place of residence***		
Urban	26.7	3783
Rural	7.3	16215
Highest educational level**		
No education	3.1	7632
Primary	6.8	6082
Secondary	18.9	5335
Higher	56.9	948
Partner's education level***		
No education	4.0	8031
Primary	6.9	5321
Secondary	15.9	4637
Higher	41.0	1880
Don't know	1.0	101
Wealth index***		
Poorest	3.3	4414
Poorer	3.7	4273
Middle	7.0	3982
Richer	14.0	3689
Richest	30.2	3640
Mass media exposure***		
Not at all	4.6	10748
Less than once a week	7.9	1473
At least once a week	10.2	3579
Almost every day	29.0	4194
Field workers visit		
No	11.5	14717
Yes	9.5	5254
Total	89.0	19998

Table 3.3 (continued)

Characteristics	Delivery at health facility (%)	N
Age at first marriage***		
Below 15	5.8	10015
15-19	13.1	8688
20 and above	36.5	1294
Time wanted pregnancy***		
Then	11.7	14062
Later	11.5	3195
No more	6.3	2721
Number of ever children born***		
1	20.3	4494
2-3	11.1	9382
4-5	4.9	3911
6 and more	2.5	2212
Total	89.0	19998

* significant at 0.01, ***significant at 0.001

A significant relationship was found between intention of having child and utilization of health facility for delivery care. Data suggests that 12% of the women who gave birth at health facility wanted to be pregnant then. Almost same percentage of women wanted to delay the pregnancy. On the other hand, about 6% wanted no more children.

In Bangladesh, number of children born to a woman is significantly correlated to the place of delivery. Most of the cases, women with less children tend to deliver at health facility. Data show that almost 20% of women who had institutional delivery had one child. Delivery at health facility decreased with the number of children ever born to a woman (Table 3.3).

Differential pattern of PNC utilization

PNC is a major component for the management and treatment of delivery related complications to ensure safe motherhood. Table 3.4 shows the utilization of PNC by selected

characteristics. The highest PNC was observed among the 20-24 age group (21%) followed by 15-19, 25-29, 30-34, and 35-39 groups with almost 20% each. Younger and older age groups were found less percentage of PNC utilization; 14% for 10-14 years age group, 13% for 40-44 years age groups, and 15% for 45-49 years age group.

Urban women are more vigilant regarding the PNC. Data suggest that about 29% of urban women had PNC, while it was only 18% for the rural women.

Respondent's educational attainment has significant impact on seeking PNC. More than half of the higher educated women received PNC, while it is 31% for women with secondary education. Women who had no education, only 11% of them sought PNC. About 17% of the women with primary education received any PNC.

Partner's education also significantly related with the utilization of PNC. It has been seen that women who had partner with no education, only 13% of them received any PNC. It increased to 18% for primary completion, 26% for secondary, and 45% for higher education.

Finding shows that economic condition has considerable impact on PNC. Women from poorest household are less likely to utilize PNC among the wealth group. Only 12% of poorest households had utilized any PNC, while it is 15% for poorer households. Eventually, it increased to 17% for middle, 26% for richer and 35% for richest households.

Exposure to mass media significantly influences the utilization of PNC. Among the women who had exposure almost every day, 35% of them utilized any PNC followed by 20% for who had exposure at least once a week and 22% who had exposure less than once a week. On the other hand, only 15% of women who have no exposure to mass media utilized PNC.

Only one-fifth of the women who sought PNC were visited by any fieldworkers. No significant relationship was observed between field worker's visit and utilization of PNC.

Table 3.4 Utilization of PNC by selected characteristics

Characteristics	PNC (%)	N
Age**		
10-14	13.6	22
15-19	20.0	2494
20-24	21.5	4629
25-29	20.3	3633
30-34	19.8	2162
35-39	19.9	1087
40-44	13.1	396
45-49	15.3	111
Type of place of residence***		
Urban	28.7	2541
Rural	18.5	11990
Highest educational level***		
No education	11.0	5531
Primary	17.2	4483
Secondary	31.4	3964
Higher	57.9	551
Partner's education level***		
No education	13.3	5859
Primary	18.4	3952
Secondary	26.1	3423
Higher	44.9	1199
Don't know	2.6	78
Wealth index***		
Poorest	12.4	3214
Poorer	14.7	3200
Middle	17.1	2957
Richer	26.2	2699
Richest	35.0	2460
Mass media exposure***		
Not at all	14.6	7798
Less than once a week	21.8	1119
At least once a week	20.3	2701
Almost every day	34.8	2910
Field workers visit		
No	20.2	10680
Yes	20.4	3830
Total	20.3	14510

Table 3.4 (continued)

Characteristics	PNC (%)	N
Age at first marriage***		
Below 15	15.4	7390
15-19	23.5	6289
20 and above	38.6	852
Time wanted pregnancy***		
Then	21.6	9727
Later	19.2	2471
No more	16.0	2333
Number of ever children born***		
1	27.8	4011
2-3	19.4	6356
4-5	15.0	2663
6 and more	13.0	1501
Total	20.3	14531

** significant at 0.01, ***significant at 0.001

Age at first marriage significantly influences the utilization of PNC. Younger women are less likely to utilize PNC. Data show that only 15% of the women who got married below 15 utilized any PNC, while it was 39% for the women who got married at age 20 and above. On the other hand, near about one-fourth of the women who got married at the age of 15-19 years sought PNC.

Women who wanted to be pregnant during their last birth 22% received any PNC, while it was 19% for the women who wanted to delay. About 16% of women who wanted no more children received any PNC after their last birth.

Usually women with more than one child are less likely to receive PNC for their following births in Bangladesh. Data show that 28% of the women with one child received any PNC and it decreased according to the higher number of children ever born. About 19% of the women with 2-3 children received PNC, while it was 15% for the women with 4-5

children. The lowest utilization was observed among the women with 6 and more children which were 13% only.

Multivariate analysis

Multivariate analysis was conducted to explore the effect of different exposure variables on the outcome variables corrected for other exposure variables. Multivariate logistic regression was employed to determine which factors best explain and predict the outcome variables. To conduct the multiple regression analysis, eight steps of Hosmer & Lemeshow's¹⁰⁴ recommended strategies were followed. All the significant variables in the bivariate analysis were included in the model. Because of the importance of explaining the differentials in utilization of maternal health care services, field worker's visit was also included in the model, although the variable was not found to be significant with institutional delivery and PNC in the bivariate analysis. Age of the respondent were dropped from the model, even though it was found to be significant in the bivariate analysis, because of a probable high correlation with age at first marriage. The models for three different outcome variables appear to be significant ($P < 0.001$) for the selected characteristics. The odds ratios (ORs) and 95% confidence intervals (CI) are presented in Table 3.5, Table 3.6, and Table 3.7 for not receiving ANC, Delivery at health facility, and not receiving PNC respectively.

The results from the multiple logistic regression model indicate that women at present time are less likely (OR=0.45 for year 2007 compared to year 2000, adjusted for all other variables) not to receive ANC. Rural women are 1.8 times more likely not to receive ANC compared with urban areas. Both respondent's and partner's education has significant

relationship with not receiving ANC – more educated are less likely not to receive ANC. Results also show that richer women are less likely not to receive ANC (Table 3.5).

Table 3.5 Estimated odds ratio from logistic regression of not receiving ANC

Indicator	OR	95%CI	
Year			
1999-2000 (reference)			
2004	0.437***	0.396	0.483
2007	0.448***	0.403	0.497
Type of place of residence			
Urban (reference)			
Rural	1.808***	1.640	1.992
Respondent's education			
	0.896***	0.882	0.910
Partner's education			
	0.960***	0.948	0.972
Wealth index			
Poorest (reference)			
Poorer	0.918	0.808	1.043
Middle	0.763***	0.670	0.869
Richer	0.703***	0.610	0.810
Richest	0.630***	0.538	0.736
Mass media exposure			
Not at all (reference)			
Less than once a week	0.820*	0.702	0.958
At least once a week	0.740***	0.662	0.827
Almost every day	0.496***	0.438	0.563
Field worker's visit			
No (reference)			
Yes	0.864**	0.786	0.949
Age at first marriage			
	0.971***	0.955	0.988
Time wanted pregnancy			
Then (reference)			
Later	1.118*	1.003	1.246
No more	0.878	0.770	1.001
Total children ever born			
	1.148***	1.117	1.179

* significant at .05, ** significant at 0.01, ***significant at 0.001

Mass media exposure is found to be an important of utilizing ANC, holding other exposure variables constant. The odds ratio of not receiving ANC is 0.5 for the women who have exposure to mass media almost every day in compare with the women who have no exposure. Field workers also play a significant role in utilizing ANC. Results revealed that women who were visited by a field worker is 0.86 times less likely nor to receive ANC than their counterpart who had not been visited by. Age at marriage is also found to be a significant determinant to predict ANC - women who married early were less likely not to utilize ANC. A wanted pregnancy revealed a significant relationship with ANC utilization. It is observed that those who wanted pregnancy later were slightly (OR=1.12) more likely not to receive ANC. Findings also revealed that women with more children are more likely not to receive ANC (Table 3.5).

Table 3.6 presents the result of multivariate analysis for predicting institutional deliveries. Results show that women in 2007 are 1.5 times more likely to receive delivery services for health facilities. Rural women are less likely to receive the same services (OR=0.43). Both respondent's and partner's education has significant relationship with institutional deliveries - more educated are more likely to receive institutional delivery care. Similar to ANC, richer women are 1.8 times more likely to utilize the services.

Mass media exposure is found to be an important of utilizing Institutional delivery, holding other exposure variables constant. The odds ratio of receiving institutional delivery is 1.8 for the women who have exposure to mass media almost every day in compare with the women who have no exposure. No significant relationship was found between field workers visit and institutional delivery. Age at marriage is also found to be a significant determinant to utilize the service - women who married later were more likely to utilize institutional delivery

care. Findings also revealed that women with more children are less likely to receive delivery care (Table 3.6).

Table 3.6 Estimated odds ratio from logistic regression of receiving institutional delivery

Indicator	OR	95%CI	
Year			
1999-2000 (reference)			
2004	1.154*	1.002	1.329
2007	1.452***	1.264	1.667
Type of place of residence			
Urban (reference)			
Rural	0.431***	0.385	0.482
Respondent's education	1.104***	1.083	1.126
Partner's education	1.068***	1.051	1.085
Wealth index			
Poorest (reference)			
Poorer	0.802	0.610	1.054
Middle	1.067	0.832	1.367
Richer	1.325*	1.041	1.686
Richest	1.835***	1.441	2.337
Mass media exposure			
Not at all (reference)			
Less than once a week	1.207	0.941	1.549
At least once a week	1.238*	1.039	1.473
Almost every day	1.844***	1.583	2.147
Field worker's visit			
No (reference)			
Yes	1.009	0.885	1.151
Age at first marriage	1.087***	1.066	1.109
Time wanted pregnancy			
Then (reference)			
Later	0.880	0.757	1.022
No more	1.272*	1.028	1.573
Total children ever born	0.785***	0.746	0.826

* significant at .0.05, ** significant at 0.01, ***significant at 0.001

Table 3.7 Estimated odds ratio from logistic regression of not receiving PNC

Indicator	OR	95%CI	
Year			
1999-2000 (reference)			
2004	0.519***	0.453	0.595
2007	0.347***	0.305	0.396
Type of place of residence			
Urban (reference)			
Rural	1.138*	1.020	1.271
Respondent's education			
	0.911***	0.895	0.927
Partner's education			
	0.976***	0.962	0.990
Wealth index			
Poorest (reference)			
Poorer	0.940	0.792	1.116
Middle	0.908	0.763	1.080
Richer	0.695***	0.582	0.830
Richest	0.569***	0.469	0.690
Mass media exposure			
Not at all (reference)			
Less than once a week	0.790*	0.657	0.952
At least once a week	0.991	0.861	1.140
Almost every day	0.831**	0.725	0.953
Field worker's visit			
No (reference)			
Yes	0.824***	0.737	0.921
Age at first marriage			
	0.958***	0.940	0.975
Time wanted pregnancy			
Then (reference)			
Later	1.188**	1.043	1.355
No more	1.013	0.863	1.191
Total children ever born			
	1.025	0.990	1.062

* significant at .05, ** significant at 0.01, ***significant at 0.001

Table 3.7 revealed that women in 2007 are 0.35 times less likely not to receive PNC and women in 2004 are 0.52 times less likely not to receive the same services compared with year 2000. Rural women are slightly (OR=1.1) more likely not to receive PNC compared with

urban areas. Both respondent's and partner's education has significant relationship with not receiving PNC – more educated are less likely not to receive PNC. Results also show that richer women are less likely not to receive PNC.

Mass media exposure is found to be an important of utilizing PNC. The women who had more exposure are less likely not to receive PNC. Field workers also play a significant role in utilizing PNC. Results revealed that women who were visited by a field worker is 0.82 times less likely nor to receive PNC than their counterpart who had not been visited by. Age at marriage is also found to be a significant determinant to predict PNC - women who married early were less likely not to utilize PNC. Number of total children ever is found to be non significant for PNC.

CHAPTER 4: DISCUSSIONS AND RECOMMENDATIONS

The Government of Bangladesh has been providing free maternal health care services at the community level, to achieve the Millennium Development Goal 5, to reduce maternal mortality to 143 per 100,000 live births. Yet the utilization of services is very low. This study tried to find out the determinants of underutilization of these services. Services include: ANC, delivery at health facility, and PNC. To satisfy the objective of the study secondary data from three nationally representative surveys (BDHS 1999-2000, BDHS 2004, and BDHS 2007) were analyzed using SAS 9.2 software. Findings are similar to available studies on maternal health care seeking behavior of Bangladesh.^{3,8,9,13,37,44,46,61,82,88,91,97,99}

Results show that there is an increasing trend of maternal health care utilization in Bangladesh, which is still low. Bivariate analysis shows the relationship between different exposure variables with ANC, delivery at health facility, and PNC. Age is observed highly correlated with all of the outcome variables, showing decreased utilization with the increase of age. The probable explanation may be lack of proper knowledge of the older women regarding the necessity and availability of services. Age is not considered in the multivariate analysis due to high correlation with age at first marriage.

Different time points found to be a significant determinant of the utilization of maternal health care services. It is observed that with the increase of time service utilization also increase. This is probably due to the different initiatives of the government to increase utilization, which is targeted to achieve the Millennium Development Goal 5.

Findings reveal that the utilization of services by rural women is very low. This might be due to availability of health care providers at the rural level, at the same time availability of field workers to provide the services at their home at low cost. Recently, the government

announced it will post a medical graduate at the union level. Government is also emphasizing the presence of the providers at the health facility. Lack of proper knowledge among rural women about safe delivery could also be a cause.

Both respondents and partner's education show strong positive association with receiving ANC, PNC and institutional delivery care. In general, educated people are more aware of available health care services. Special programs are necessary to target the low educated people. Results also revealed that poor are more vulnerable to under utilize services.

Findings show that mass media exposure has positive effect on utilizing services. In recent years, the government has enriched their maternal and child health related programmes on television, radio and newspapers which are likely to have increased the mother's knowledge on safe motherhood.

Results reveal that field workers visit is an important determinant for utilizing ANC and PNC, but not for institutional delivery. Interestingly, only 26% of the respondents were visited by field workers, which mean that they are not working properly. They also might not be providing complete information on safe delivery.

It is also observed that mothers with more children are less likely to receive ANC and institutional delivery. The lower utilization could be because of time management, limited resources in the family and negative perceptions resulting from previous pregnancies. Interestingly PNC is not significant with total number of children born in the multivariate analysis.

Results show that higher the age at marriage, higher the utilization of maternal health care services. This might be due to the education and autonomy of women. In general, age at marriage among educated women is high. Interestingly, the Government of Bangladesh set

the minimum age at marriage at 18, whereas, this study found that more than half of the women married before 15 years of age. The women with lower age at marriage should need more attention.

This study has some limitations. First, data used for this study is cross sectional, which limits conclusions on the directionality on the results, whereas some variables may have relationships that this study does not capture. Second, knowledge and perception regarding the utilization of services is found to be an important variable in several studies, which is not considered due to lack of information. However, education of the respondents might cover this issue in some extent. Third, cost, mainly transportation, is cited for the main causes of not receiving services in some studies, which is not also directly reflected in the study. This study revealed “Wealth Index” as an important determinant of maternal health care utilization, which might indirectly cover the cost issue. Fourth, patient’s satisfaction or quality of care issue is not considered due to lack of information. Lastly, delivery assistance from trained professional could be a better indicator than institutional delivery. Since the government is encouraging women to delivery at health facility, institutional delivery was selected as one of the indicator of maternal health seeking behavior.

On the basis of the results, the study suggests that the government needs specific efforts to target the rural women who have only primary education or below, particularly the poor. The women with more than two births and lower age at marriage also need more attention. Though the maternal health care services are free, the poor people are not able to pay the cost of transportation, medicine and c-section, which is very small amount of money. The government can provide the small amount to cover the cost. Different programs on the necessity and availability of maternal health care services on mass media can play an

important role to improve the situation to the satisfaction level. Besides different behavioral communication change activities can be conducted to motivate women to utilize the services, which can be done by field workers. Field workers also need to be monitored regarding visiting the households regularly. Finally, the government can train the field workers or TBAs on safe delivery to provide quality delivery assistance.

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