

Some Determinants to Reduce Maternal and Child Mortality in Bangladesh

Nilima Ahmed

Senior Research Associate, PhD student

Mitra and Associates, Jahangirnagar University, Dhaka, Bangladesh

Abstract: *This paper is like to look out whether antenatal visit and place of delivery is influenced or not by several issues like wealth, education of women and husbands, occupation of women and husbands, working status of women in last 12 months. Insight into factors affecting prenatal care usage and place of delivery will help policy-makers redirect health-related strategies and policies in more equitable directions. We use the secondary data from Bangladesh Demographic and Health Survey 2011 on 18000 ever married women (12-49 age) following women questionnaire. Using the multiple regression analysis we find that wealth index, women's and their husbands education has significant effect on ante natal visit and place of delivery, but husbands occupation and women's working status in last 12 months has no significance rather some of it negatively affected. Besides, women occupation put marginal effect on place of delivery which is not come out in number of ante natal visits.*

Keywords: *MDG, Maternal mortality, Antenatal visit, Place of delivery, Wealth index, Education level, Occupation.*

I. Introduction

Millions of women in developing countries experience life threatening and other serious health problems related to pregnancy or child-birth. Complications of pregnancy and childbirth cause more deaths and disabilities than any other reproductive health problems (EC/UNFPA, 2000). According to Akanda (2010), lack of prenatal care has been identified as a risk factor for maternal morbidity and other adverse pregnancy outcomes in many developing countries. Yucesoy (2005) identified that in such countries, adequate primary health services of maternal and child health such as prenatal care, delivery and post-natal care are considered generally unavailable to an entire population and 95% of births take place at home. [11]

There were an estimated 358,000 maternal deaths worldwide in 2008, of which 99% occurred in resource-poor countries. Taken together, Sub-Saharan Africa and South Asia account for 87% of maternal deaths. In addition to the significant burden of maternal mortality, for every maternal death, more than 20 women suffer from short or long-term illness as a result of pregnancy or childbirth. [7] This situation is worse in developing countries like Bangladesh due to inadequate access to modern health services and poor utilization. Despite the government serious commitment to deliver health facilities to the doorsteps of people through innovative approaches, such as Essential Service Package (ESP), the utilization of health service is still far below any acceptable standard. Over the past decades, impressive studies have been made in reducing levels of infant and childhood mortality in developing countries but progress in reducing levels of maternal mortality and in making pregnancy and child bearing safer for women, despite being a central element of the millennium development goals, progress is much slower. [14]

Adequate antenatal care use and place of delivery has association with improved pregnancy outcome. The article is identifying the factors that can influence the ante natal visits and place of delivery to make faster its target to Millennium Development Goal. It is expected that the findings would help policy makers, population scientists and planners to reach out the MDG-5 target by 2015.

The study is divided into five sections; in first section there is introduction and background, and previous studies on antenatal visit and place of delivery, in 2nd section there is methodology, 3rd section is covered by findings, 4th section is about discussion on findings and lastly the 5th section is for conclusion.

1.1 Background

Began in 1992, the reduction in levels of maternal mortality and improvement of maternal health have been central policy and program goals since the fourth Population and Health Programme. Efforts to address these issues have recently gained considerable momentum with the formulation of the National Strategy for Maternal Health. [12] This strategy emphasizes the provision of emergency obstetric care, and is predicated on the "three delays" framework of factors that affect safe motherhood service utilization and outcomes: delays in making the decision to seek care, in reaching a medical facility and in receiving adequate treatment or management at the facility. [13]

Systematic antenatal care was first introduced early in the 20th century in Europe and North America and is now almost universal in the developed world. Antenatal care can be defined in various ways; WHO recommendations, every pregnant woman should receive at least four ANC visits during pregnancy. It includes routine follow up provided to all pregnant women at primary care level from screening to intensive life support during pregnancy and up to delivery. In Bangladesh, antenatal care (ANC) usually refers to pregnancy related care provided by a health provider either in a medical facility or at home. The use of ANC in developing countries is low compared to developed countries (97%). Still in rural Bangladesh, more than 75% of all births occur at home in the absence of skilled birth attendants. [8]

The Bangladesh Demographic and Health Survey (BDHS) 2011 showed that 55% of women with a birth in the three years preceding the survey received ANC at least once from any provider. More than half (55%) of the women received care from a medically-trained provider, such as doctor, nurse, midwife, family welfare visitor, community skilled birth attendant, medical assistant or sub-assistant community medical officer.[6] The necessities of ANC services by explaining the numerous advantages of them which may include monitoring health of the mother and baby during pregnancy, anticipating difficulties at pregnancy and labor with early treatment to reduce the risks for mother and child, facilitating the better use of emergency obstetric care services, disseminating health education and information, and so on. Please look the table below to follow the deadline of MDG-5.

Table 1

Goal, targets and indicators (as revised)	Base year 1990/91	Current status (source)	Target by 2015
Goal 5: Improve maternal health			
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.			
5.1: Maternal mortality ratio (per 100,000 live births)	574	194 (BMMS 2010) 209 (SVRS 2011) 218 (Sample census, 2011 BBS)	143
5.2: Proportion of births attended by skilled health personnel (%)	5.0	31.7 (BDHS 2011)	50
Target 5.B: Achieve by 2015, universal access to reproductive health			
5.5: Antenatal care coverage (at least one visit and at least four visits) (%)			
5.5a: Antenatal care coverage (at least one visit), (%)	27.5 (1993-94)	67.7 (BDHS 2011)	100
5.5b: Antenatal care coverage (at least four visits), (%)	5.5 (1993-94)	25.5 (BDHS 2011)	50

1.2 Previous studies on Antenatal visits and place of delivery

Both the number of antenatal care visit and the timing of the check up are considered important in detecting and preventing an adverse pregnancy outcome. Care is most effective if the visits are started early during pregnancy and continued at regular intervals throughout the pregnancy. The frequency and timing of the initial ante natal visit for live births and still births that occurred in the three years preceding the Bangladesh Maternal Mortality Survey 2010; for a minority of the birth outcomes (29%) no ante natal care was sought but the 71% of women who made an ANC visit, the median number of ante natal visits sought per live birth was 2.7. Almost 2 in 5 live births were characterized by three or more ante natal visits. Early initiation of ante natal care was more common among women who resided in urban areas. The median number of ante natal visits were highest among women with first births, women in urban or metropolitan areas who completed secondary school or higher and women in households in the highest wealth quintile, with substantial percentage of each sub group reporting four or more antenatal care visits.

Data on the place of delivery for all live births and still births that occurred during the 3 years preceding the survey. Delivery at home occurred 76% of the time, which represents a dramatic decline;10% of deliveries occurred in a public sector clinical facility (hospital, upazilla health complex, maternal and child welfare centre or upazilla health and family welfare centre), almost double that in 2001 and 11% occurred in a private hospital or clinic, up from 3% in 2001. Besides 38% of urban deliveries took place in a facility (almost double the 2001 level) compared with only 19% of rural deliveries (more than double the 7% in 2001). Delivery in a facility was more common for women having their first child (34%), women with higher education (61% of secondary or higher), for women in the wealthiest households (53%). There was an association between the frequency of antenatal care visits and place of delivery. [1] Our study supports the findings of this study like wealthiest households, mothers higher education supports ante natal visit and delivery in facility. Besides we

add some extra independent variable like women's occupation, husbands/partners education & occupation, women worked in last 12 months to get its effect on antenatal visit and place of delivery.

The Bangladesh Maternal Mortality Survey (BMMS) 2001 data show that, the number of antenatal visits to any provider was low only 12% of recent pregnancy outcomes had women made the recommended four antenatal visits. The median time of first visit was at 5.4 months of pregnancy, and in only one in seven cases did women initiate ante-natal care during the first trimester. Although 84% of women reported having received advice on diet, only 54% were told where to go in the event of maternal complications and just 45% were informed about the danger signs of complications. Most deliveries still occur at home and are attended by medically unskilled birth attendants. Among all live births and stillbirths in the three years preceding the survey, 91% took place outside of a health facility, 6% of facility-based deliveries occurred at a government hospital, upazila (administrative unit) health complex, or maternal and child welfare center, and 3% at a private hospital or clinic. Only 12% of deliveries were attended by a medically trained provider. Comparison of BMMS 2001 data with 1993–1994 DHS data reveals little change in the proportion of births assisted by a medically trained provider, in either urban or rural areas. [2] The study reveals still the worse condition of antenatal visit and delivery in facility; on the light of this study it is essential to sort out which factors are affecting the antenatal visit and delivery place? Following these need our study has begun.

Another research on married women of Ghana shows that an environment where men wield so much authority can have negative implications for women's reproductive health outcomes. The study explores the relationship between some selected socio-economic variables, women's status and choice of place of delivery and indicate that a woman's status does not act independently to affect her choice of place of delivery but these effects are channeled through some socio-economic variables; wealth and educational status of the women and their partners which emerged predictors of choice of place of delivery. [3] Our study is supported the study on Ghana because we are also showing the dependent variables antenatal visit and place of delivery is positively or negatively affected by several factors like wealth, women and husbands education, women and husbands occupation and women worked in last 12 months.

A study in Nanded district of Maharashtra, India shows delivery in a medical institution promotes child survival and reduces the risk of maternal mortality. The proportion of institutional deliveries increased from 42% in 2004 to 69% in 2009 where the deliveries in government institutions and in private institutions also showed a significant rise. Less than 10% of the deliveries in the home (range 2-9%) were assisted by health personnel throughout the study period. [4] This study shows the rise in institutional delivery in Nanded district but our study will show which factors are associated with this regarding place of delivery and antenatal visit.

In another study on northern rural women showed in the three years preceding the survey who received antenatal care from a provider and had 48% of all live births and stillbirths. More than 85% of these cases, care was obtained from medically trained providers. Comparison with the two previous Bangladesh Demographic and Health Surveys indicates a steady increase in the proportion of women who sought antenatal care from a qualified provider—from 30% in the 1996–1997 DHS to 35% in the 1999–2000 DHS and 41% in the 2001 BMMS. Considering the knowledge on safe motherhood and safe delivery, majority of the respondents (98.6%) mentioned that every pregnant mother should receive antenatal care. Regarding safety, 96.2% mentioned hospital delivery as safe, while 80.6% mentioned home delivery as a risk. Among the respondents, 85.3% showed a positive attitude towards hospital delivery while 14.7% had a negative attitude. Majority of the respondents (66.8%) had delivered at home, and only one-fourth of the respondents delivered their index child in a hospital. 70.1% said that ANC is important, 29.9% was found to be informed of child birth complications, 16.1% knew the duration of pregnancy, 8.1% knew the danger signs of pregnancy, 4.7% about emergency obstetric care (EOC), 4.3% about expected date of delivery (EDD), 2.4% about safe motherhood and 28.4% about the access of health facilities in the village. [5] This study shows the rise in percentage of antenatal visit than the previous nationwide survey and though a large part of women 96.2% know hospital delivery is safe but 66.8% respondents delivered at home. Our study could elaborate this study that which factors are associated with place of delivery and antenatal visit.

An another study mothers who had one living child had the highest percentage of adequate ANC use compared to those who had two or more living children. Access to mass media (newspapers and TV) had a positive significant ($p < 0.001$) effect on the use of ANC services. The results of logistic regression analysis showed that, after adjusting other factors, respondents who had secondary level education were 4.5 times more likely to use ANC adequately compared to those who had no education. [6] Our study is supports this study that along with other variables women's education has stronger effect on ante natal visit and on place of delivery.

In Bangladesh, 62.2% of women received any antenatal care, 23.1% of women received at least four antenatal care visits, and 27.2% of women received the first antenatal care visit during the first trimester. A greater number of community level factors were associated with the outcome of receiving the first antenatal care visit within the first trimester. Women in communities with a higher mean HIV knowledge index score and women in communities with a higher reproductive health knowledge index score were more likely to have

received the first visit during the first trimester (Bangladesh mean community HIV knowledge index score: OR=1.24, 95% CI 1.02, 1.50). Evidence suggests a positive association between receiving antenatal care and improved maternal and child health outcomes. Additionally, antenatal care presents an opportunity to link women to clinics for delivery care. Women who receive antenatal care are more likely to deliver in a health institution and childbirth in a health institution has been consistently associated with a reduced risk of maternal and neonatal mortality, as complications can be addressed in a timely fashion. [8] This study is also partly associate with our study which shows women reproductive health knowledge have effect on first ante natal visit. Though it don't clearly mention about education. And our study has shown effect on ante natal visit and place of delivery because of several factors.

The utilization of antenatal care has been associated with a number of factors. In order to assess the contribution of these factors to overall variance, multiple logistic regression analysis was conducted. Income and knowledge were found to be significant factors affecting the utilization of antenatal care. After adjusting for the effect of other variables in the model, women of higher income were two times more likely to use antenatal care services as compared to the lower income group. When the age, educational status of women, husbands education and income of households were compared between the two groups, the only characteristic demonstrating a statistically significant association with utilization of antenatal care was income. The odds of reporting high income were 1.75 times among the antenatal care group as compared to women not receiving antenatal care. [9] Our study also supports this study as income and knowledge is effective for antenatal care services and in our study wealth, education is effective for antenatal visit and place of delivery. Though women and husbands occupation is not significant in our study which is dissimilar with this study.

II. Methodology

This papaer use the secondary data from Bangladesh Demographic and health Survey (BDHS 6th) 2011. For that need to some brief on sampling frame of BDHS 2011. The Enumeration area (EA)/cluster of BDHS is taken from population and housing census provided by the Bangladesh Bureau of Statistics (BBS). Based on two stage stratified sample of households; first stage, 600 EAs were selected with probability proportional to the EA size and in second stage sample of 30 households on average was selected per EA. Total 3 types of questionnaires were conducted; household, women and men. With this design women questionnaires was conducted on 18000 ever married women (12-49 age). It covers background characteristics, reproductive history, use and source of family planning methods, antenatal, delivery, postnatal and new born care, breast feeding and infant feeding practices, child immunization and childhood illness, marriage, fertility preferences, husbands' background and respondents work, awareness of AIDS and other sexually transmitted infections, food security.

2.1 Data collection and analysis

Here we use the secondary data of BDHS women questionnaire 2011 which is stored to Mitra and Associates (research and consultancy firm) who implemented the data collection and data processing activities. From the database of women questionnaire we have taken out data on antenatal visit and place of delivery on the last child of the women who were born on 2006 or later. From the data base we chose the two dependent and six independent variables to testify the influence on dependent variables. The variables details are described below. I do multiple regression analysis using SPSS software 17.0 version to look out the influence and also computed the descriptive summery statistics for all dependent and independent variables for a general view. The results are described in section 3.

Definition of independent and dependent variables

Variable	Description
Dependent Variable	
Number of antenatal visits during pregnancy	Number of antenatal visits were counted from 1-20, also include no antenatal visit & don't know
Place of delivery	Continuous variable indicate place of delivery like respondents home, government hospital and whatever
Independent Variable	
Respondents means women's occupation	Nominal variable like farmer, agricultural worker, fisherman; it covers all type of occupation
Husband/partners occupation	Like the above
Wealth index	Ordinal variable like poorest, poorer, middle, richer, richest
Husband/partners education level	Ordinal variable like no education, primary, secondary, higher
Women's highest educational level	Ordinal variable like no education, primary, secondary, higher
Respondent worked in last 12 months	Nominal variable like no, in the past year, currently working, have a job but on leave last 7 days

III. Results

In the table 2 we just depict the summery statistics of dependent and independent variables. Here Number of antenatal visits during pregnancy valid N is 7319, and 10523 are missing which means they had no children or was not available to interview and here mean is 2.40, for place of delivery valid N is 7324 and 10518 are missing the missing cause could be like the above, for highest educational level & wealth index 17842 is valid N with no missing. Husband/partner's education level 17833 is valid N with 9 missing, Husband/partner's occupation 17830 is valid N with 12 missing, respondents occupation 2683 is valid N with 15159 is missing, respondent worked in last 12 months 17842 is valid with no missing. And means are 16.23, 2.40, 3.15, 1.29, 30.88, 27.83.29 respectively.

Table 2: Summery statistics for dependent and explanatory variables

		Number of antenatal visits during pregnancy	Place of delivery	Highest educational level	Wealth index	Husband/partner's education level	Husband/partner's occupation	Respondent's occupation	Respondent worked in last 12 months
N	Valid	7319	7324	17842	17842	17833	17830	2683	17842
	Missing	10523	10518	0	0	9	12	15159	0
Mean		2.40	16.23	2.40	3.15	1.29	30.88	27.83	.29
Std. Dev.		2.910	9.185	2.910	1.419	1.042	17.005	11.853	.695
Min		0	11	0	1	0	11	12	0
Max		98	96	98	5	3	98	98	3

In table 3 firstly wealth index, then highest educational level of respondents provides a significant effect on number of antenatal visits during pregnancy. Husband partner's education level is also significant for antenatal visits. Surprisingly husband/partners occupation and respondent worked in last 12 months have negative coefficient and none are significant, suggesting that these variables have no effect on number of antenatal visit. Conferring one of the reasons for insignificant effect of respondent work in last 12 months because a large portion (85%) didn't work. Though respondents' occupation have positive coefficient but have no significance.

Table 3: Multiple regression results for number of Antenatal visits during pregnancy

		Coefficients	Std. Error	t	Sig.
	Highest educational level	.526	.130	3.955	.000
	Wealth index	.336	.076	4.427	.000
	Husband/partner's education level	.470	.124	3.786	.000
	Husband/partner's occupation	-.009	.007	-1.318	.188
	Respondent worked in last 12 months	-.318	.256	-1.240	.215
	Respondent's occupation	.018	.009	1.994	.046

The table 4 presents the same model applied to for Place of delivery. Like number of antenatal visits, here wealth index is highly significant and have noticeable positive coefficient also. Then respondents highest educational level is significant and have positive coefficient also. Afterwards husband/partners education level shows significant positive marginal effect on place of delivery. It is noticeable that likely the upper table husband/partner's occupation and respondent worked in last 12 months have positive coefficient but put insignificant effect on place of delivery. We assuming the similar cause of table 1 for insignificant effect of respondent worked in last 12 months. But unlikely table 3 here respondents' occupation has marginal effect on place of delivery and it also possess positive coefficient.

Table 4: Multiple regression results for Place of delivery

		Coefficients	Std. Error	t	Sig.
	Highest educational level	1.457	.424	3.439	.001
	Wealth index	1.346	.247	5.455	.000
	Husband/partner's education level	1.182	.403	2.934	.003
	Husband/partner's occupation	.024	.023	1.011	.312
	Respondent's occupation	.066	.030	2.206	.028
	Respondent worked in last 12 months	.827	.832	.994	.321

IV. Discussion

Several studies in other countries demonstrated that education of women was an important determinant of ANC use. A study in rural Bangladesh confirmed that higher education was associated with the higher use of ANC. 20 Primary-level of education ($p < 0.010$), secondary level of education ($p < .001$), living children ($p < 0.001$), read newspaper ($p < .024$), watching TV ($p < 0.001$), and mode of transport ($p < 0.001$) were the important correlates of ANC during pregnancy of the postnatal mothers. A study by Erlindawati et al. in Indonesia which found that literacy of women had a significant association with the use of ANC services, indicating that education has an impact on awareness among the population and use of health services by them. [6] The results of our multiple regressions analysis also support those studies, showing that wealth index, respondents' education level and husbands/partners education level also put effect on number of antenatal visits and place of delivery but still 13.7% respondents have no antenatal visit and 29.2% delivery is occurred in home following BDHS 2011. It is highly noticeable that the wealth index is putting greater effect for the both dependent variables. Moreover we find in our results that the independent variables husband/partners occupation, women's work in last 12 months, and women's occupation has very marginal significant effect which is dissimilar with previous researches. Following the study findings to reach out MDG-5 by 2015 policy makers of government and non government sectors need to work on reducing poverty level, to put more emphasis on women education and husband/partners education.

4.1 Caveats

This paper only depend on multiple regression analysis to catch the effect on number of ante natal visits and place of delivery for wealth index, women's education level, husbands/partners education level, husband/partners occupation, women's occupation and women works in last 12 months. It would be a safe position to use another method of analysis to make stronger our argument but for some limitations it was not possible.

V. Conclusion

Like the previous many studies we get the similar result that wealth, women's education has significant effect on number of antenatal visit and place of delivery. In addition we have findings that husbands/partners education and marginally women's occupation have significant effect on those antenatal visit and place of delivery which are not come out from many related previous studies. Besides, husbands/partners occupation and women work in last 12 months overall put insignificant effect on number of antenatal visit and place of delivery which are not also come out from previous studies. This article could support the health policy makers, health and reproductive health researchers to elaborate their working arena like to put emphasis on those independent variable which are strongly or minor way effect the goal of MDG-5 because we are still bit far from our goals.

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