Determinants of Safe Maternity Delivery Practices in Bangladesh: A Logistic Regression Analysis

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Abstract: This study is designed to evaluate the effects of some selected demographic, socio-economic, cultural and programmatic factors on safe maternity deliver practices (delivery assisted by doctors, trained nurses or midwives, or family welfare visitors) among the Bangladeshi women, through the logistic regression method. This study is based on the national-level data drawn from Bangladesh Demographic and Health Survey (BDHS), 2004 with a sample of 10146 ever-married women aged 10-49 years who had at least one delivery before they were interviewed. The result of logistic regression shows that uneducated is less likely to have safe maternity deliveries. Exposed to mass media is positive and significantly associated with safe-delivery practices. Conservatism and religious taboos are likely to affect the practices, since Muslim women are less likely to have safe-delivery practices compared to non-Muslims women. Finally, the results suggest some suggestive policy measures so that the planners and implementers may take appropriate initiatives to ensue the safe maternity delivery practices especially in Bangladesh.

Key words: Safe maternity delivery, logistic regression model, Bangladesh Demographic and Health Survey (BDHS)
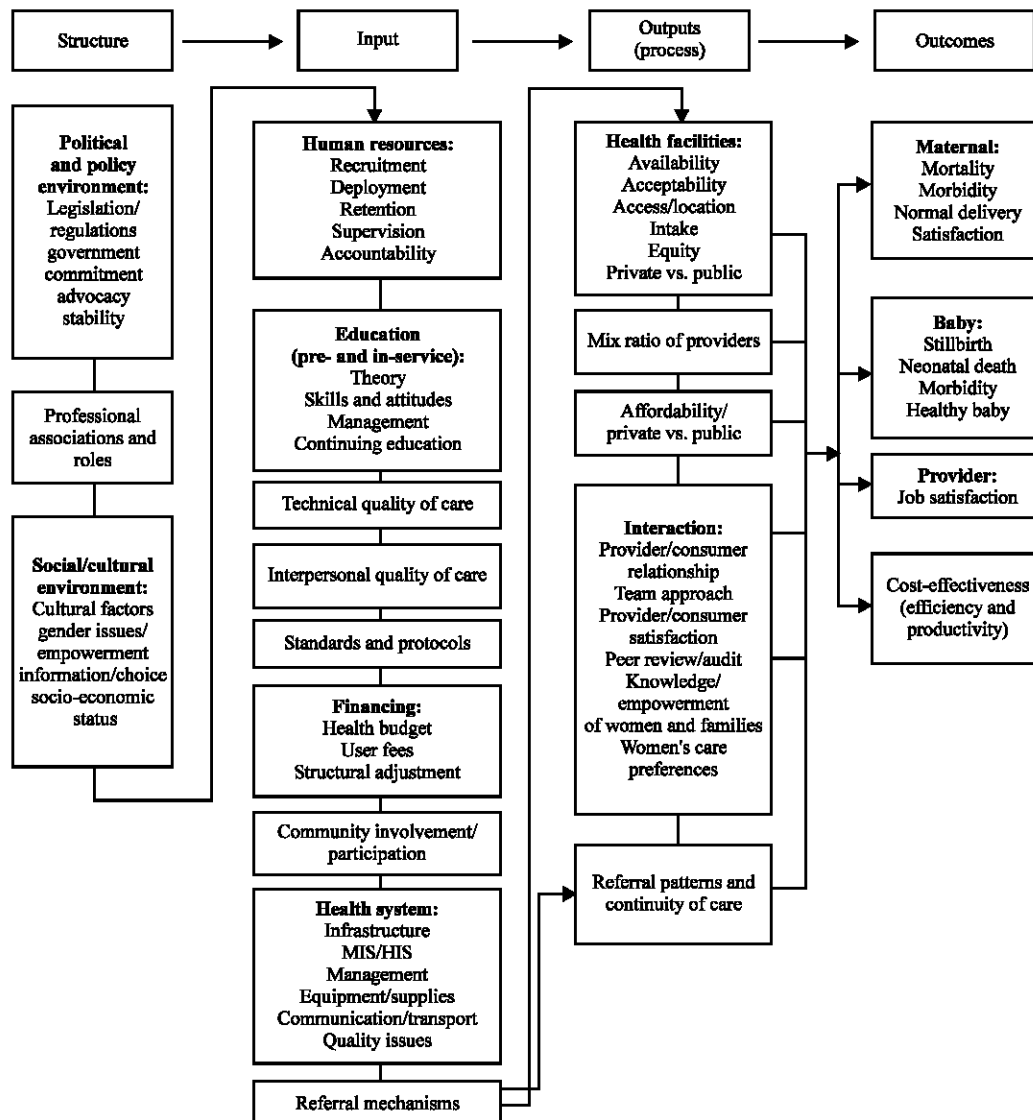
INTRODUCTION

Bangladesh, situated in South Central Asia, is the seventh largest populous countries in the world. Despite some improvement, maternal mortality ratio in Bangladesh is still very high (380 per 100,000 live births), even by the standards of other developing countries (State of the World Population, 2007). Delivery-related complication is one of the leading causes of maternal morbidity and mortality in Bangladesh.

Most maternity deliveries in Bangladesh take place at homes and are assisted by untrained traditional birth attendants (UTBAs) and relatives (Mitra *et al.*, 2004). Assistance by medically trained birth attendants during delivery is considered to be effective in the reduction of maternal and neonatal mortality. Medically trained providers (e.g., doctors, trained nurses or midwives, or family welfare visitors) assist in the delivery of only 13.4% of births of Bangladesh (Mitra *et al.*, 2004). Proper medical attention and hygienic conditions during delivery among women can partially be reduced the high rate of maternal mortality in Bangladesh. Antenatal care provides an opportunity for a variety of preventive interventions during pregnancy, including tetanus toxoid injections and educating women about nutrition, safe-delivery and postpartum care (Govindasamy and Ramesh, 1993). It also allows women who face a high-risk pregnancy to be identified and monitored during pregnancy to ensure a safe-delivery. Safe-delivery reduces the probability of mortality of mother and her baby (Ekwempu, 1988).

The midwife was present around the time of labor and/or delivery in the case of 3909 (40.7%) of the women who received antenatal care compared to only 748 (11.1%) of the women not receiving antenatal care (relative risk = 3.73, p = 0.000). About one quarter (26.5%) of the women who received antenatal care experienced a labor or delivery complication, including the 21 women who died as a consequence of pregnancy (Vanneste *et al.*, 2000). Result of a study conducted in rural Bangladesh showed that one-third of the women experienced delivery related complications during their last delivery (Rahman *et al.*, 1997). Ahmed *et al.* (1997) showed that prolonged labors were the most common delivery related complications, followed by hemorrhage and retained placenta.

In Bangladesh, a vast infrastructure exists to provide maternal healthcare, including delivery services, to women under the national health and family planning program. A conceptual framework has recently been proposed

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Source: Graham and Bell (2000). Adapted by J. Fullerton.

Fig. 1: A conceptual framework for skilled attendance at delivery

(Graham and Bell, 2000) and a modified version is depicted in Fig. 1. The model posits that there are essential interrelationships among the political, policy, social and cultural environments within which prenatal care is provided (e.g. government commitment to health services, legislation and advocacy for the rights of women and children). These relationships affect the setting of priorities for the provision of health services, health care financing and provider education systems. These structural factors affect the nature and extent of efforts to improve health service delivery ("inputs"). The impact of each of these input factors is mediated through the process by which health services are actually provided

("outputs"). The outcomes of care (several overarching examples are provided) are the result of the synergy, or reflect the barriers to effective interaction, between and among all other elements of the framework.

The objective of providing safe maternity delivery services is to protect the life and health of the mother and her child by ensuring safe and hygienic conditions during deliveries. This study is important because it will identify some selected factors that are associated with safe-delivery practices in Bangladesh and also will helpful to indicate necessary changes in customs and laws to improve existing safe-delivery programs, with a view to reducing maternal morbidity and mortality in Bangladesh.

Therefore, this study is an attempt to investigate some selected demographic, socio-economic, cultural and programmatic factors that are influencing women in taking assistance medically trained person (s) during their maternity delivery.

MATERIALS AND METHODS

The data for the present study are taken from the Bangladesh Demographic and Health Survey (BDHS), 2004 conducted during the period 1 January to 25 May 2004, on behalf of the Government of Bangladesh by the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare and implemented by Mitra and Associates of Dhaka, with funding from the USAID/Bangladesh. This survey is the fourth in a series of national-level population and health survey utilized a multi-stage cluster sample based on the 2001 Bangladesh Census. A total of 10,500 households were selected for the sample size covering 361 sample points (clusters) throughout Bangladesh (122 in urban areas and 239 in the rural areas). In these households, 11,440 women were identified as eligible for the individual interview (i.e. ever-married and aged 10-49). But this analysis covered only 10146 eligible women. The women who had no any delivery before the survey are excluded from the study.

An interesting method that does not require any distributional assumptions concerning explanatory variables is Cox's linear logistic regression model (1970). The logistic regression model can be used not only to identify risk factors but also to predict the probability of success. The general logistic model express a qualitative dependent variable as a function of several independent variables, both qualitative and quantitative (Fox, 1984). In this study, the dependent variable is a dichotomous response variable that is assigned the value of 1 if the delivery assisted by a medically trained person (e.g., doctors, trained nurses or midwives, or family welfare visitors or combination of these) during last pregnancy and 0 otherwise. The explanatory variables are: age of the respondents, their education, working status, religion, their husband's education, exposed to mass media (a composite index computed for this purpose, based upon three factors-whether she reads news papers/magazines, watches T.V. and listens to radio at least once a week), parity, visited by family planning (FP) workers and place of residence.

RESULTS AND DISCUSSION

The background characteristics of the respondents that are considered for analysis are shown in Table 1. The result shows that about half (47.0%) of the respondents are aged under 30 years and about more than half (56.7%) of the women have 3 or more children. From Table 1, it is also observed that 43.6% of the respondents are uneducated whereas in case of husband, this figure is 39.2%. Among the all women, only one-fourth (23.0%) is working for earning. The result also indicates that 68.7% of the women are exposed to mass media but only 13.8% of them being visited by FP workers during their last pregnancy.

Safe maternity delivery practices: logistic regression analysis: Logistic regression analysis shows that age of the respondents, their education, working status, religion, exposed to mass media and place of residence are significantly associated with maternity delivery assisted by medically trained persons. Table 2 presents the estimate of logistic coefficients, standard error of estimates, significant probability and the relative odds calculated for each category of the categorical variables.

From Table 2, it is observed that the likelihood of delivery assisted by a medically trained person decreased with the increase of age of the respondents. The women of the age group 20-24, 25-29, 30-34, 35-39 and 40+ have lower probability of having their deliveries assisted by medically trained persons than the women of the age <20 years (reference category). This may happen because most of the women get married before the age of 20 years and also often become a mother of more than one child. As a result, the women who become pregnant after 20 years of age, they feel that they have enough experiences to tackle the delivery related complications and that is why, they do not go for assistance during their maternity delivery.

As expected, the uneducated women were less likely to have their maternity deliveries assisted by a medically

Table 1: Distribution of the respondents by background characteristics

Background characteristics	Percentage	Background characteristics	Percentage
Age in years		**Husband's education**	
<20	12.5	No education	39.2
20-24	15.6	1-4 years	14.7
25-29	18.9	5 years +	46.2
30-34	17.0	**Exposed to mass media**	
35-39	14.2	Not exposed	31.3
40+	21.8	Exposed	68.7
Respondent's education		**Parity**	
No education	43.6	1-2	43.3
1-4 years	18.5	3-4	32.9
5 years+	38.0	5+	23.8
Working status		**Visited by FP worker**	
Not working	77.0	No	86.2
Working for earning	23.0	Yes	13.8
Religion		**Place of residence**	
Muslim	88.7	Rural	66.0
Non-Muslim	11.3	Urban	34.0

Table 2: Logistic regression estimates of the effects of different background characteristics on safe-delivery practices among Bangladeshi women

Background characteristics	Coefficient (β)	S.E. of estimates	Wald	Sig.	Odds ratio [Exp(β)]
Age in years					
<20(r)	-	-	-	-	1.000
20-24	-0.010	0.111	0.008	0.927	0.990
25-29	-0.169	0.117	2.066	0.151	0.845
30-34	-0.517	0.137	14.202	0.000	0.596
35-39	-1.613	0.187	74.041	0.000	0.199
40+	-2.817	0.495	32.344	0.000	0.060
Respondent's education					
No education(r)	-	-	-	-	1.000
1-4 years	0.441	0.148	8.910	0.003	1.554
5 years+	1.218	0.126	93.295	0.000	3.381
Working status					
Not working(r)	-	-	-	-	1.000
Working	-0.422	0.109	15.043	0.000	0.656
Religion					
Muslims(r)	-	-	-	-	1.000
Non-Muslims	0.469	0.111	18.043	0.000	1.599
Husband's education					
No education(r)	-	-	-	-	1.000
1-4 years	0.054	0.153	0.123	0.725	1.055
5 years+	0.730	0.114	41.325	0.000	2.076
Exposed to mass media					
Not exposed(r)	-	-	-	-	1.000
Exposed	0.550	0.125	19.269	0.000	1.732
Parity					
1-2(r)	-	-	-	-	1.000
3-4	-0.273	0.104	6.914	0.009	0.761
5+	0.197	0.169	1.361	0.243	1.217
Visited by FP workers					
No(r)	-	-	-	-	1.000
Yes	-0.097	0.113	0.736	0.391	0.908
Place of residence					
Rural(r)	-	-	-	-	1.000
Urban	1.060	0.079	177.810	0.000	2.886

trained person. From Table 2, it is observed that respondent's education is the most significant factors affecting the maternity delivery assisted by a medically trained person. The relative odds ratio for mothers who have 1-4 years and 5 years+ schooling are found to be 1.554 and 3.381, respectively. This clearly indicates that the respondents, having 1-4 years and 5 years+ schooling have 1.554 and 3.381 times, respectively higher probability of having their maternity deliveries assisted by a medically trained person than the uneducated women (reference category).

The husbands of women having 5 or more years of schooling have 2.076 times more likely to go for the deliveries assisted by a medically trained person than the husbands of women having no education. And the result also shows the statistically significant effect in taking assistance medically trained person during the last delivery of mothers.

Working status is also the most significant (statistically) factors affecting the women in taking assistance a medically trained person during the maternity delivery. But the result does not show the expected sign.

Religion is also significantly associated with the safe maternity delivery practices. The relative odds ratio

corresponding to non-Muslim women is 1.599. This implies that the non-Muslims women have 1.599 times higher probability of having their deliveries assisted by medically trained persons than that of the Muslims women (Table 2). There may two plausible explanations of this. The first one may that the non-Muslims are less conservative than the Muslims, which lead them to have their maternity deliveries assisted by medically trained persons in a relatively higher proportion than the Muslims. The second explanation may that the non-Muslims women come to health facilities to have their maternity delivery not because they consider it safer, but to escape from rituals and difficulties arising out of their beliefs in "untouchable" statement of parturient women.

Mass media can play a strong role by creating awareness about the complications that may occur during maternity delivery in unsafe and unhygienic conditions and also about the bad effect of these complications in the future health of mothers and their new born babies. The result shows that the mothers who are exposed to mass media are 1.732 times more likely to go for assistance to medically trained persons during their last maternity delivery than that of mothers who are not exposed. The result also shows the highly significant (statistically) effect in taking assistance during the maternity delivery. Therefore, the role of mass media should be enhanced to reduce the overall maternity delivery related morbidity and mortality in the country.

Parity is another important significant factor influencing the women of having their deliveries assisted by medically trained persons. The logistic regression coefficient indicates that the lowest occurrence of safe maternity delivery (0.761 times lower) is among the women of 3-4 parity. But the occurrence of safe maternity delivery is higher (1.217 times higher) among the women having parity 5+ than that of the women of 1-2 parity (Table 2).

The effect of the place of residence is also an important factor influencing the respondents in taking assistance during maternity delivery from a medically trained person. The relative odds ratio corresponding to women who lived in urban areas is 2.886. It clearly indicates that the urban women have 2.886 times higher probability to go for assistance to medically trained persons during their last maternity delivery than the rural women.

CONCLUSIONS AND POLICY RECOMMENDATION

The maternity deliveries, which take place at homes and are assisted by medically untrained persons, are likely to be done in unsafe and unhygienic conditions, which often result in delivery related complications leading to

maternal and neonatal morbidity and mortality. The results indicate that about 47.0% of the respondents are aged under 30 years, 68.7% of the women are exposed to mass media but only 13.8% of them being visited by FP workers during their last pregnancy. The results of logistic regression analysis show that age of the respondents, their education, working status, religion, exposed to mass media and place of residence are significantly associated with safe maternity delivery.

Effective policies and recommendations are needed to improve the safe maternity delivery practices in Bangladesh. The specific recommendations are as follows:

- Appropriate behavior change communication (BCC) strategies should be undertaken to make the uneducated and relatively younger and older women aware of the benefits of safe maternity delivery by medically trained persons and to overcome conservatism and religious taboos against safe-deliveries.
- Government and NGOs should take various strategies to aware the community people about the dangerous effect of maternity deliveries in unhygienic conditions. This could be done through various mass media campaign like radio, TV, newspaper, billboard etc.

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