Determinants of Contraceptive Use in Rural Bangladesh

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Abstract

Effective implementation of family planning plays a major role in reducing the total fertility rate in Bangladesh. The desired level of fertility could be achieved in near future if the contraceptive prevalence rate can be raised. Using the nationally representative data of Bangladesh Demographic and Health Survey 2011, this study focuses on the determinants of contraceptive use among the currently married women in rural Bangladesh. A series of multivariate logistic regression analyses were performed to assess the effect of fertility preference, women empowerment, exposure to family planning messages and programmatic interventions on contraceptive use in rural setting, after controlling for socio-demographic characteristics of the respondents. Multivariate logistic regression analyses suggest that desire to have more children reduces the likelihood of using contraception, while exposure to family planning messages significantly elevates the likelihood of the same, after adjusting for other socio-demographic variables. Programmatic interventions like family planning workers visit to rural women can increase the likelihood by two-fold. Decision-making power of women can also raise the odds of using contraception among the rural women in Bangladesh. Both formal and informal interventions exclusively for rural setting should be introduced to help the rural women in enhancing control over family decisions as well as desired family size, and in increasing access to family planning messages to adopt effective family planning method.

Keywords: Contraception, Fertility Preference, Women Empowerment, Media Exposure, Rural Bangladesh.

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Introduction

Family planning is considered as an aptitude for couples who want to regulate their desired number of children by limiting or spacing births (Anasel and Mlinga, 2014). The role of family planning is crucial in reducing fertility rate, which essentially depends on its effective implementation (Anasel and Mlinga, 2014). Moreover, the success of fertility regulation depends on factors like efficient use of contraception, which is considered to be one of the most important factors to regulate fertility. But the contraceptive prevalence rate (CPR) is not same across the world. This rate varies widely between developed and developing countries. Because the success of the programmatic factors in developed countries increased the prevalence of contraceptive use while in developing countries, they are facing significant challenges in achieving the desired level of CPR (Kabir et al., 2013, UN, 2009). However, fertility has declined substantially in developing countries since 1960 and family planning programmes play an important role to regulate fertility preference in developing countries (Feyisetan and Casterline, 2000). Bongaarts *et al.* (2012) show a correlation to argue that family planning programmes can have a large impact on fertility, even in poor, underdeveloped settings and without changes in fertility preferences (Bongaarts *et al.*, 2012). Despite lower socioeconomic status, family planning programmes in Bangladesh has become a great success. It has brought about significant decline in fertility. Appropriate knowledge of family planning methods possesses an impressive sevenfold increase in CPR in last 40 years. This eventually increased the use of contraception significantly from 8 percent in 1975 to 61 percent in 2011 (NIPORT *et al.*, 2013). Moreover, over the last 40 years, family planning programmes have been working successfully for which the total fertility rate (TFR) has declined radically from 6.15 children per woman in 1970-75 to 2.3 in 2011 – a decline of almost 60 percent. As a result, Bangladesh has been able to slow its natural population growth rate, which is expected to result in smaller population increase in the coming decades. To play a role in controlling fertility, particularly in reaching the replacement level of fertility, both government and non-governmental organizations (NGO) have been employing various strategies in our country. Furthermore, the National Population Policy and Health Population Nutrition Sector Development Programme (HPNSDP) plan to reduce the TFR to 2.1 children per woman by 2015-16 (NIPORT *et al.*, 2013).

However, the TFR in Bangladesh is 2.3 births per woman (NIPORT *et al.*, 2013) whereas the rural-urban difference in fertility has narrowed down over

the past decade, from 1.1 births measured in the BDHS, 1999-2000 to 0.5 births in the BDHS, 2011. Women aged 20-49 years gave birth to their first baby at the age of 18.3 years (BDHS, 2011). In Bangladesh 65 percent of the currently married women want to limit child bearing and 59 percent want no more children (NIPORT *et al.*, 2013). More encouragingly, the desire to stop childbearing among the currently married women with two children has increased rapidly over the past decade, from 66 percent in 1999-2000 to 82 percent in 2011 (NIPORT *et al.*, 2013). Although most women aged 15-49 years, surveyed by the BDHS 2011, had heard of a contraceptive method but only 61.2 percent of the currently married women said that they were using some form of family planning, a level comparable to developed countries.

The CPR in urban areas is now 67 percent (NIPORT *et al.*, 2015). But in rural areas, the CPR and TFR are trailing behind. The CPR in urban areas is always higher than that of rural areas (Fig. 1). Consequently, the TFR in urban area reached the replacement level while in rural areas it has ended up at 2.5 (NIPORT *et al.*, 2013). Therefore, it is evident that the urban-rural gap regarding CPR needs to address properly in order to achieve and sustain the replacement level of fertility all over the country.

Figure-1: Trend in TFR and CPR in Bangladesh by residence
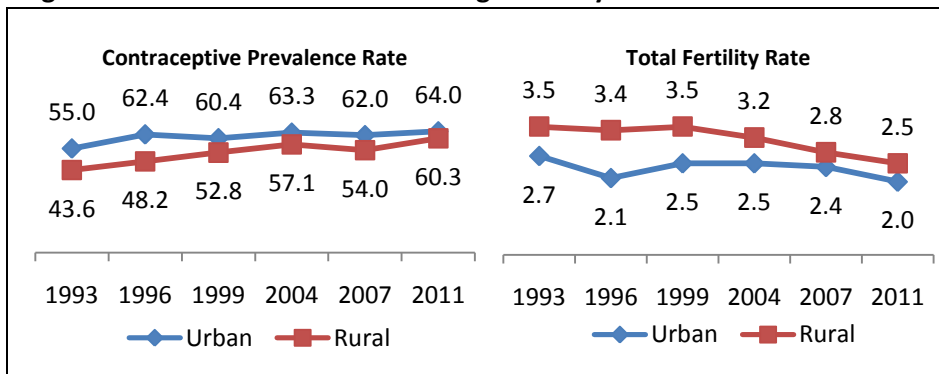
As such, the family planning programmes received huge attention of the researchers and policy-makers in the country. Most of the earlier research on contraceptive use in Bangladesh looked at CPR, socio-demographic correlation of the methods accepted by individual women, discontinuation of contraceptive use, fertility preferences, empowerment status and exposure to family planning messages versus family planning methods (Khan *et al.,* 2012, 1997; Khan, 1996; Kamal, 2009; Islam and Thorvaldsen, 2012; Kabir, 2013; Islam *et al.*, 1998). The findings of previous research suggest that the

determinants of contraceptive use in Bangladesh are multidimensional (Khan et al., 2012; Kamal, 2009; Sayem and Begum, 2008). Traditional analyses of the effects of socioeconomic factors to influence the use of contraception and recent analyses of contraceptive availability failed to establish any sound framework regarding the determinants of contraception in rural areas.

In this regard, the determinants of contraceptive method use should be identified properly in rural context, especially from the context of fertility preference, programmatic interventions and decision-making power of the women. Therefore, the objective of this study was to examine the determinants of contraceptive use among the currently married women in rural area. The study will contribute substantially in designing the family planning programs in the rural area.

Conceptual Framework

Studies conducted globally as well as in Bangladesh found that contraceptive use by women largely depends on various determinants like demographic, cultural, socioeconomic, societal factors and family planning programme (Kamal, 2009; Khan et al., 2012; Muhoza et al., 2013). Different studies showed that education plays a crucial role for fertility preference among women and hence women's education is the most important factor to use contraceptive (Kamal, 2009; Nidup and Choda, 2012; Muhoza et al., 2013). Some studies found that the practice of modern method was more prevalent among women with primary education or less education than the higher educated women (Kamal, 2009; Nidup and Choda, 2012). But on the other hand, Khan *et al.* (2012) and Ilyas (2011) revealed that the level of education and use of contraceptive methods among married women and female adolescents had a positive relationship. So, there is a literature contradictory about the effects of education on contraceptive use.

The number of living children is another important determinant of contraceptive use (Khan *et al.*, 2012; Jayaraman *et al.*, 2009). They exposed that number of living children of the respondents had a significant effect on the ever and current use of contraception. It was found that the desire for another child decreased and contraceptive use increased as the number of children and number of sons increased. Khan (1996) also found that contraceptive use increased with the number of living children but declined after 5 children (Khan, 1996). Different studies have found that Muslim women were less likely to regulate their fertility because of certain prevailing
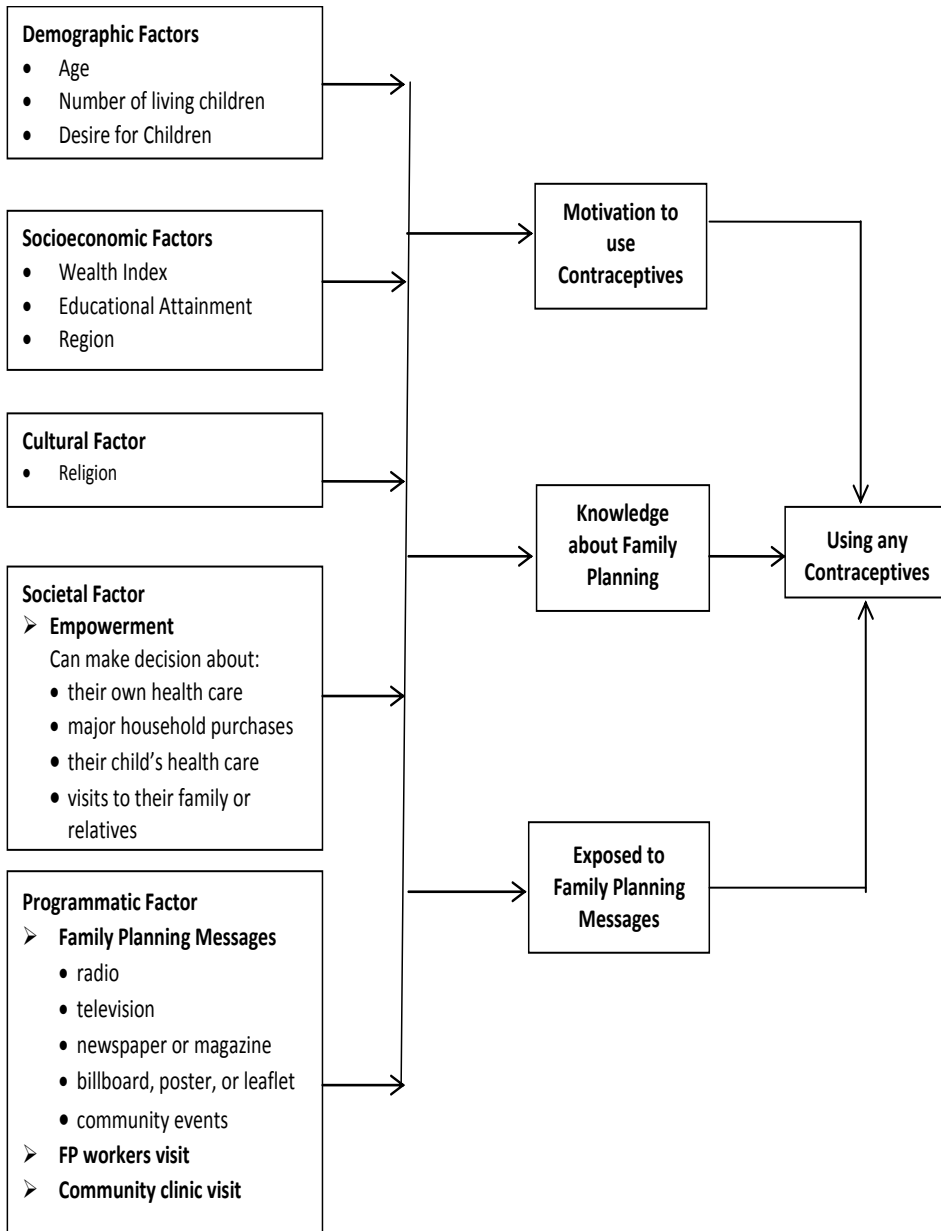
practices, such as emphasis on early and near universal marriage, the importance of marriage and motherhood for women's status, rather than from a direct religious injunction to procreate (Chamie, 1981; Fagley, 1965; Kirk and Nortman, 1967).

In Bangladesh, Schuler and Hashemi (1994) examined the positive effects on contraceptive use of women's participation in rural credit programmes and on their status or level of empowerment (Schuler and Hashemi, 1994). The reason behind this positive relationship is that strengthening women's economic roles gives them more autonomy and more control over important decisions affecting them and their families, as well as contributing to their self-confidence and their ability to plan for the future. Other studies conducted both in Bangladesh and aboard also found the similar results about the effects of women's empowerment on contraceptive use (Kamal, 2009; Cleland *et al*., 1996; Kinoshita, 2003; Shapiro and Tambashe, 1994). Some other studies found that exposure to higher mass media as another significant determinant of contraception use in Bangladesh, because media could both inform about different contraception methods and inspire couples, even about such complex subjects as their reproductive ways and goals (Islam et al., 2009; Kamal, 2009; Islam et al., 1998). These activities change in contraceptive behaviour of a population. Khan *et al*. (2012) found that the number of visits by field workers had a significant effect on the ever and current use of contraception (Khan *et al.*, 2012). They also noticed that the more the number of visits of family planning worker happen to respondents, the more they responds favourably to their use of contraception and there is a strong positive correlation between the number of visits by field workers and use of contraception. This finding is also consistent with another study (Islam *et al*., 1998).

This paper attempts to look into some of the prominent determinants of contraceptive use in rural Bangladesh by women of reproductive age. Based on the above literature review the following framework has been developed. Figure 2 shows the conceptual framework of the determinants of contraceptive use. Demographic, socioeconomic, social, cultural and programmatic factors affect contraceptive use through their influence on an individual's knowledge of contraception, motivation to use contraception, and social, physical, and economic access to family planning services. While the framework used is generalized for all rural women, we hypothesize that the factors associated with contraceptive use may operate differently within each age group due to differences such as empowerment, education, and desire for

children. This hypothesis is premised on the fact that, as in many of the least-developed countries, health services and policies in Bangladesh are not clearly streamlined to consider the special needs of rural women.

Figure-2: Conceptual framework of determinants of contraceptive use

Demographic Factors
- Age
- Number of living children
- Desire for Children

Socioeconomic Factors
- Wealth Index
- Educational Attainment
- Region

Cultural Factor
- Religion

Societal Factor
➢ **Empowerment**
Can make decision about:
- their own health care
- major household purchases
- their child's health care
- visits to their family or relatives

Programmatic Factor
➢ **Family Planning Messages**
- radio
- television
- newspaper or magazine
- billboard, poster, or leaflet
- community events
➢ **FP workers visit**
➢ **Community clinic visit**

Motivation to use Contraceptives

Knowledge about Family Planning

Exposed to Family Planning Messages

Using any Contraceptives

Data and Methods

Data

The recent and nationally representative 2011 Bangladesh Demographic and Health Survey (BDHS) data were used for this study. We used the information on 12,343 currently married women aged 15-49 years from rural areas given that the contraceptive use rate is low among the currently married rural women.

Dependent variable

We used a single dependent variable based on whether the women were currently using any contraceptive method or not.

Independent variables

In this study, we considered a number of independent variables. A binary variable on fertility desire (*did not want more children=1, wanted more=2*) was included as the independent variable to examine its effect on the practice of contraception. To assess the effect of exposure to family planning messages on the dependent, a dichotomous variable was defined - women did not heard or seen a message about family planning on the radio, on television, in a newspaper or magazine, on a billboard, poster, or leaflet, or at a community event were coded 1 while the counterparts coded as 2. 'Family planning workers visit' (*No=1, yes=2*) and 'community clinic visit' by the women (*No=1, yes=2*) were included to assess the immediate programme intervention on contraceptive use. The women empowerment scale was constructed by using four questions regarding women's participation in decision-making process related to own healthcare, major household purchases, child healthcare, and visits to family or relatives. This scale is positively related to women's empowerment and reflects the degree of control that women are able to exercise through making decisions. The Cronbach alpha of this scale was 0.82. The details on the construction of empowerment scale can be found elsewhere (BDHS, 2011). The marriage duration was also included (*≤3 years=1, >3 years=2*) as an independent variable.

Control variables

Socio-demographic, economic and cultural variables were taken into account while examining the effect of the above mentioned independent variables on

use of contraception. The control variables included are respondents' current age, number of living children, education, division, religion and economic status.

Analytical approach

Combinations of bivariate and multivariate analyses were applied to explore the determinants of contraceptive use among rural women. Bivariate association between contraceptive use and the independent variables were done by chi-square tests and variables found significant at 95 percent level of significance were considered for multivariate analyses. Due to the dichotomous nature of the dependent variable a series of multivariate logistic regression models were fitted to assess the effect of fertility preference, exposure to family planning messages, programme interventions, empowerment of women and marital duration on the use of contraception in rural setting, after adjusting for other selected control variables. The results of the multilevel logistic regression analyses are presented as odds ratios (OR) with 95 percent confidence intervals and corresponding p-values.

Results

Socio-demographic profile of the respondents

Table 1 shows the socio-demographic profile of the currently married rural women aged 15-49 years (N=12343). More than half of the respondents were less than 30 years old with a mean age of 30.3 years (± 9.1). The majority (26 percent) of women reside in Dhaka division, followed by Chittagong, Rajshahi, Rangpur, Khulna, Barisal, and Sylhet regions. Most of the women (48 percent) had 1-2 children, 42 percent had more than 3 children, and the rest had no child. Educational attainment of the women is one of the most influential determinants of an individual's knowledge, attitudes, and behaviours. About 29 and 30 percent of the women did not complete their primary and secondary education respectively. Only 8.4 percent completed higher secondary education. Vast majority of the women were Muslim (90 percent). More than 20 percent of the women belonged to poorest wealth quintile. Almost similar proportion observed for second and third quintiles. However, only 10 percent of them were richest.

Table-1: Background characteristics of the respondents 2011

Variables	Number of women	%
Age in years		
Below 30	6,422	52.0
30 and above	5,922	48.0
Mean age (±SD)	30.3 (±9.1)	
Number of living children		
0	1,176	9.5
1-2	5,971	48.4
3+	5,196	42.1
Division		
Barisal	795	6.4
Chittagong	2,272	18.4
Dhaka	3,186	25.8
Khulna	1,564	12.7
Rajshahi	2,094	17.0
Rangpur	1,687	13.7
Sylhet	746	6.0
Educational attainment		
No education	3,613	29.3
Primary incomplete	2,384	19.3
Primary complete[1]	1,548	12.5
Secondary incomplete	3,765	30.5
Secondary complete/Higher[2]	1,033	8.4
Religion		
Islam	11,086	89.8
Others	1,257	10.2
Wealth quintile		
Lowest	2,754	22.3
Second	3,030	24.5
Middle	2,981	24.2
Forth	2,407	19.5
Highest	1,171	9.5
Total	**12,343**	**100**

[1]Primary complete is defined as completing grade 5

[2]Secondary complete is defined as completing grade 10 and above

Table-2: Percentage distribution of use of any contraceptive method by currently married women in rural Bangladesh by background characteristics 2011

Characteristics	Using any contraceptive method		p-value	Number of women
	Yes	No		
More children preferred			<0.001	
No	65.8	34.2		8,603
Yes	47.5	52.5		3,740
Exposure to family planning messages			<0.001	
No	59.2	40.8		8,585
Yes	62.7	37.3		3,758
Family planning worker visited			<0.001	
No	57.1	42.9		10,370
Yes	76.6	23.4		1,973
Visited community clinics			0.028	
No	59.8	40.2		10,273
Yes	62.4	37.6		2,070
Empowerment index			<0.001	
0	50.6	49.4		2,500
1-2	60.3	39.7		3,026
3-4	63.8	36.2		6,818
Duration of marriage			<0.001	
Less or equal 3 years	40.2	59.8		1,370
More than 3 years	62.8	37.2		10,974
Total	**60.3**	**39.7**		**12,343**

Table-3: Multivariate logistic regression model showing the effect of determinants on contraception use, adjusted for various socio-demographic characteristics of women aged 15-49 years in Bangladesh 2011

	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Desire for more children					
No	1				1
Yes	0.74 (0.66, 0.82)[a]				0.73 (0.65, 0.81)[a]
Exposure to family planning messages					
No		1			1
Yes		1.17 (1.06, 1.28)[a]			1.16 (1.06, 1.27)[b]
Family planning worker visited					
No		1			1
Yes		2.07 (1.83, 2.33)[a]			2.06 (1.82, 2.32)[a]
Visited community clinics					
No		1			1
Yes		0.98 (0.88, 1.09)			0.96 (0.87, 1.07)
Empowerment index					
0			1		1
1-2			1.31 (1.17, 1.47)[a]		1.31 (1.17, 1.47)[a]
3-4			1.33 (1.17, 1.43)[a]		1.32 (1.16, 1.43)[a]

(continued)

Table-3: (continued)

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)
Duration of marriage					
≤ 3 years				1	1
>3 years				0.83 (0.71, 0.97)[b]	0.71 (0.60, 0.84)[a]
Age in years					
< 30	1	1	1	1	1
≥ 30 and above	0.90 (0.81, 1.00)[b]	0.99 (0.89, 1.09)	0.95 (0.86, 1.05)	0.99 (0.89, 1.09)	0.92 (0.83, 1.02)
Number of living children					
0	1	1	1	1	1
1-2	5.77 (4.92, 6.78)[a]	6.29 (5.39, 7.35)[a]	6.36 (5.45, 7.42)[a]	7.37 (6.15, 8.84)[a]	6.46 (5.36, 7.80)[a]
3+	7.59 (6.29, 9.15)[a]	8.91 (7.49, 10.61)[a]	9.04 (7.60, 10.75)[a]	10.58 (8.65, 12.94)[a]	8.54 (6.90, 10.57)[a]
Division					
Sylhet	1	1	1	1	1
Barisal	2.49 (2.00, 3.09)[a]	2.56 (2.06, 3.18)[a]	2.48 (2.00, 3.08)[a]	2.52 (2.03, 3.13)[a]	2.51 (2.02, 3.13)[a]
Chittagong	1.28 (1.08, 1.53)[b]	1.31 (1.10, 1.57)[b]	1.28 (1.07, 1.52)[b]	1.28 (1.08, 1.53)[b]	1.31 (1.10, 1.56)[b]
Dhaka	2.14 (1.81, 2.54)[a]	2.09 (1.76, 2.48)[a]	2.18 (1.80, 2.52)[a]	2.16 (1.83, 2.56)[a]	2.06 (1.73, 2.44)[a]
Khulna	2.91 (2.41, 3.51)[a]	2.98 (2.46, 3.60)[a]	2.91 (2.41, 3.51)[a]	2.98 (2.47, 3.60)[a]	2.88 (2.38, 3.49)[a]
Rajshahi	3.19 (2.66, 3.82)[a]	3.13 (2.61, 3.76)[a]	3.22 (2.69, 3.86)[a]	3.28 (2.73, 3.93)[a]	3.07 (2.56, 3.69)[a]
Rangpur	3.10 (2.57, 3.73)[a]	3.00 (2.49, 3.63)[a]	3.09 (2.56, 3.73)[a]	3.18 (2.64, 3.84)[a]	2.90 (2.40, 3.50)[a]

Determinants of Contraceptive Use in Rural Bangladesh

Table-3: (continued)

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)
Women's education					
No education	1	1	1	1	1
Primary Incomplete	1.22 (1.09, 1.37)[a]	1.20 (1.07, 1.34)[b]	1.21 (1.08, 1.36)[a]	1.22 (1.09, 1.37)[a]	1.19 (1.06, 1.34)[b]
Primary complete	1.17 (1.03, 1.34)[b]	1.12 (0.98, 1.28)	1.17 (1.02, 1.33)[b]	1.17 (1.02, 1.34)[b]	1.12 (0.98, 1.29)[c]
Secondary Incomplete	1.33 (1.18, 1.50)[a]	1.22 (1.08, 1.38)[b]	1.29 (1.14, 1.45)[a]	1.30 (1.15, 1.47)[a]	1.22 (1.08, 1.38)[a]
Secondary or Higher	1.92 (1.61, 2.30)[a]	1.75 (1.46, 2.10)[a]	1.81 (1.51, 2.17)[a]	1.86 (1.56, 2.22)[a]	1.73 (1.44, 2.08)[a]
Religion					
Islam	1	1	1	1	1
Others	1.44 (1.26, 1.65)[a]	1.44 (1.25, 1.64)[a]	1.46 (1.28, 1.67)[a]	1.47 (1.29, 1.68)[a]	1.40 (1.22, 1.60)[a]
Wealth quintile					
Lowest	1	1	1	1	1
Second	1.11 (0.99, 1.25)[c]	1.10 (0.98, 1.24)[c]	1.12 (1.00, 1.25)[c]	1.11 (0.99, 1.24)[c]	1.10 (0.98, 1.23)
Middle	1.01 (0.90, 1.13)	0.98 (0.87, 1.10)	1.02 (0.91, 1.15)	1.01 (0.89, 1.13)	0.98 (0.87, 1.11)
Forth	0.85 (0.75, 0.97)[b]	0.82 (0.72, 0.93)[b]	0.86 (0.76, 0.98)[b]	0.85 (0.75, 0.97)[b]	0.82 (0.72, 0.94)[b]
Highest	0.77 (0.66, 0.91)[b]	0.75 (0.63, 0.88)[a]	0.78 (0.66, 0.92)[b]	0.77 (0.65, 0.91)[b]	0.75 (0.63, 0.89)[a]
-2 log likelihood	**15239.825**	**15080.989**	**15243.487**	**15266.75**	**15013.21**
Total	**12343**	**12343**	**12343**	**12343**	**12343**

[a] p value < 0.001, [b] p value < 0.05, [c] p value <0.10

Determinants of contraceptive use

A number of chi-square tests were conducted to assess the association between the dependent variable, namely 'use of any contraceptive method' and the following independent variables: 'more children preferred', 'exposure to family planning massages', 'family planning worker visited', 'visited community clinics', 'empowerment index', 'duration of marriage', 'current age of the women', 'administrative regions', 'women's education', 'religion', and 'wealth quintile'. The bivariate associations (table not shown) were found significant (p<0.05) and thus all the independent variables were included in the multivariate logistic regression analysis. A series of multivariate logistic regression models were fitted to identify the factors influencing the use of contraceptives among the women in rural Bangladesh.

Model 1 incorporates the variable representing the desire for more children, in order to estimate the net of child preference on contraceptive use, after controlling for the basic socio-demographic variables, namely age of the respondents, number of living children, division, women's educational attainment, and wealth quintiles. In Model 2, the programmatic variables, namely- 'exposure to family planning massages', 'family planning worker visited' and 'visited community clinics' to assess their effect on contraceptive use after controlling for the basic demographic variables. Model 3 incorporates the empowerment index, which is constructed based on the information on women's participation in four types of decisions, keeping all the demographic variables controlled. In Model 4, the duration of marriage were incorporated along with all the basic demographic variables to assess the net effect of the variable. Finally in Model 5, all the independent variables were included to find the adjusted effects on contraceptive use, controlling for all the variables included in previous models as controlling variable.

Table 3 represents the odds ratios with 95 percent confidence intervals and corresponding p-values for all five models. Model 1 shows the effects of child preference on the use of family planning methods. It was found that the women desired to have more children had 26 percent lower odds of using contraceptive as compared to women not interested to have more (OR: 0.74; p<0.001). This pattern in ORs seemed consistent in the full model (model 5) as well. Women aged ≥30 years were less likely to use contraceptives than the younger women (OR: 0.90; p<0.05). The likelihood of using contraception is 7.59 times higher for women having ≥ 3 children than women with no child (OR: 7.59; p<0.001). Moreover, the odds of using contraceptives are much higher (OR: 1.92; p<0.001) for educated women than those with no education. This likelihood found consistently higher across all models fitted. Women with religious affiliation other than Islam are more likely to use contraceptives (OR: 1.44; p<0.001). This trend remained constant across the various models fitted. As for the divisional variations in use, there was a strong regional variation in the use of contraceptives. It was found that women in divisions other than Sylhet were more likely to practice contraception when compared. Women

from Rangpur division had three times higher odds of using contraceptives (OR: 3.10; p<0.001) than those from Sylhet. This pattern of higher likelihood was found almost similar in all the subsequent models fitted. Lastly, women from well-off quintiles were found less likely to use contraceptives than their poor counterparts (OR: 0.77; p<0.05). This pattern was also found almost invariant across different models fitted afterward.

Model 2 reveals the effect of programmatic factors on contraceptive use. It was observed that women with exposure to family planning messages had 17 percent higher likelihood (OR: 1.17; p<0.001) of using any contraception method as compared to those who had no exposure. This odd ratio seemed to be constant in the full model. Moreover, the visit by family planning workers were found to have significant effect on contraceptive use since the odds of using contraceptives were found two times higher (OR: 2.07; p<0.001) for women visited by them as compared to those who were not visited by any family planning workers. On the other hand, community clinic visits were found to have insignificant effect on contraceptive use in this study.

The inclusion of empowerment index variable in Model 3 reveals that women who had greater opportunity in making decisions were more likely to use contraception method than their lower level counterpart (OR: 1.33; p<0.001). This pattern of higher odds kept consistent in the full model (Model 5). It is noteworthy that the effects of controlling variables were found almost similar as in Model 1 and Model 2.

In model 4, the duration of marriage was incorporated, and was found to have around 17 percent lower likelihood of using contraceptives among women who were married for more than 3 years (OR: 0.83; p<0.05) than those who were newlywed (married for less than 3 years) after controlling for all the demographic variables. This likelihood of lower use further found significant with greater magnitude (OR: 0.71; p<0.001) when controlled for other independent variables.

Lastly in Model 5, all the independent variables of interest are incorporated to assess their adjusted effects on the use of contraceptives. Except for the coefficient of marital duration, all the variables were found to have almost invariant odds found in their individual models. In summary, the exposure to family planning messages (OR: 1.16; p<0.05), family planning worker visits (OR: 2.06; p<0.001), and decision-making power (OR: 1.32; p<0.001) elevate the chance of using contraceptives among the women in rural Bangladesh. On the contrary, desire to have more children (OR: 0.73; p<0.001) and marital duration (OR: 0.71; p<0.001) demote the likelihood of the same.

Discussion and Conclusion

The main objective of this study was to identify the determinants that are associated with contraceptive use among rural women in Bangladesh through the application of multivariate regression analysis. The findings show that demographic, socioeconomic, social, cultural and programmatic factors have association with contraceptive use among rural women in Bangladesh. The variables like duration of marriage, age, women's education, exposure to media, number of living children, women's empowerment, and religion are important determinants of contraceptive use, which is consistent with the findings of earlier studies (Kamal, 2009; Khan et al., 2012; Islam et al., 1998; Chamie, 1981; Fagley, 1965; Kirk and Nortman, 1967; Jayaraman et al., 2009).

There is a significant relationship between women's age and contraceptive use. However, women aged 40-49 years were fewer users of contraceptives as they have reached menopause and infecundity (Khan et al., 2012). On the other hand, Khan *et al.* (2012) and Sayem and Begum (2008) found lower prevalence and lower likelihood of any contraceptive use at younger age as they had not yet achieved desired number of children (Khan *et al.*, 2012; Sayem and Begum, 2008). In this paper the overall trend suggests that the rate of contraceptive use also increases with the increase of age, and women aged 30 years or above were found less likely to use contraceptives than their younger counterpart.

Number of living children and desire for more children are two influential factors of contraceptive use. The use of contraceptives increased with the increase of number of living children. The possible explanation for this finding is that these women who have already achieved their desired number of children are not willing to have more children. Number of living children and desire for more children had been found to be major determinants of contraceptive use in previous studies (Jayaraman et al., 2009; Khan and Rahman, 1997). Therefore, it confirms that the demand for children is still a major determinant of contraceptive use.

However, female education emerged as the single most vital variable affecting contraceptive use among rural women, because education increases the level of knowledge of fertility regulation. The results show increasing likelihood in use of contraceptive methods among women with primary education to secondary and higher. Our findings are consistent with most of the literatures of Bangladesh, South Asia, and elsewhere where they have found a significant relationship between education level and contraceptive using (Ilyas *et al.,* 2011; Kamal, 2009; Cleland et al., 1996; Schwandt et al., 2009).

Bangladesh is a traditional male dominated society where women are expected to be guided by their husband's decision in every sphere of life. But participation in household decision-making also empowers women to make decision on using family planning methods. This study reveals that the empowered women are more likely to use contraceptives than those who are less empowered. This finding is also analogous to many other studies where it was found that empowerment of women, employment and domestic decision-making power were positively associated with contraceptive use in Bangladesh and elsewhere (Kamal, 2009; Cleland *et al.*, 1996; Shapiro and Tambashe, 1994; Schuler and Hashemi, 1994).

Programmatic factors such as increasing exposure to family planning messages and visit by any family planning worker increases tremendously the prevalence rate or intention to use contraceptives (Arends-Kuenning, 2001; Kabir et al., 2013; Tsui et al., 1981; Sayem and Begum, 2008; Islam et al., 1998; Khan, 1996; Muhoza et al., 2013; Islam and Thorvaldsen, 2012). Consistent with these studies, our study also found significant effect of family planning message exposure and visit by any family planning worker implying that women with higher exposure are more likely to use contraceptive than their counterpart. This study, consistent with the findings of other studies (Mahmood and Ringheim, 1996; Tsui et al., 1981; Muhoza et al., 2013) which found that the contraceptive use rate was markedly higher among the women who were exposed to family planning messages and visit by any family planning worker than those who were not.

Moreover, through multivariate logistic regression model, we also found that duration of marriage is a crucial determinant in contraceptive use. Women married for more than 3 years are less likely to use contraceptives than those who were married for less than 3 years. Our finding is consistent with that of Islam *et al.* (1998) where they also have found that as the duration of marriage increases the use of contraceptives decreases (Islam *et al.*, 1998). On the other hand, various studies suggested that religious belief had large impact to influence the fertility behaviour (Chamie, 1981; Fagley, 1965: Kirk and Nortman, 1967). However, in our study, we also found that contraceptive use and prevalence were higher among non-Muslims than Muslims.

To our knowledge, there is limited study on determinants of use of contraceptives in rural Bangladesh. Therefore, the principal contribution of this study is to driving up the understanding of contraceptive use among rural women using a nationally representative survey data of 2011. The major findings of this study are that the use of contraceptives by women in rural Bangladesh is influenced by their desire for more children, decision-making power, exposure to family planning messages, and programme interventions

like family planning worker visits to them, and their visit to community or satellite clinics.

This study has some limitations too. First and foremost, it made use of self-reported calendar data on contraceptive use, which are subject to recall bias and misreporting. It also used the duration of conjugal life, which is calculated based on the age at first cohabitation. The data collection is made on 'age at first cohabitation' rather 'age at first marriage' which presents different idea of marriage in the context of Bangladesh. Many important variables have been left out such as parent's education, parent's socioeconomic status due to scarcity of data. Despite these limitations, the study used nationally representative DHS data, which ensures international-standard quality and hence enhances the strength of the study.

To increase contraceptive use in rural areas, we recommend that the socioeconomic status of the rural area has to be raised through formal and informal activities. To make any substantial impact on fertility preference in a patriarchal society like Bangladesh, there is need to broaden the focus beyond recommendations about improving female education, and undertake a critical examination of the existing social structures. Exposure to family planning messages and visit by any family planning worker has the greatest impact on women with no education and women who live in the least developed areas. Therefore, policy-makers may develop appropriate educational programmes, visit by family planning workers, family planning messages, and other motivation strategies for less educated women. Other means of delivering services like mothers clubs, mobile help lines established for addressing needs of such groups of women, and a regular client-worker contact that would help women to use contraceptives without leaving their households.

In some regions cultural belief has influence on contraceptive use suggesting comprehensive programme intervention to clarify the misperceptions about family planning through enhancing motivational campaigns as well as seeking cooperation and support of community leaders. Above all, the government needs to commit at universal access to family planning services and messages. Efforts should continue at policy level to make this a reality. At the same time the government programmes need to focus in the variation in rural areas across regions of contraceptive use especially in low performing areas. Further research will deepen our understanding of contraceptive use. Attention should be given to collecting information pertaining to fertility regulation, desire for more children, and fertility-related behaviour across parities.

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