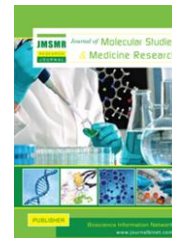


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## Factors affecting contraceptive use among married women of reproductive age in Bangladesh

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### ABSTRACT

**Background:** Contraceptive prevalence rate is low in Bangladesh. It needs to increase contraceptive prevalence rate in order to achieve the health related targets of Sustainable Development Goals (SDGs) by reducing pregnancy and pregnancy related outcomes. Aim of this study is to observe the factors which affect contraceptive use among Bangladeshi women. The hypothesis is that contextual factors along with individual and fertility related factors contribute to the use of contraceptives.

**Materials and Methods:** Bangladesh Demographic and Health Survey (BDHS) of 2014 is the seventh DHS undertaken from June to December, 2014. 18,245 ever-married women were identified and 17,863 were interviewed. Finally, 12,042 women were eligible for analysis after excluding pregnant women, women who were not married, with hysterectomy, postpartum amenorrheic, infertile or subfecund and sexually inactive. Main outcome measure was current use of contraception by married non-pregnant women.

**Results:** Contraceptive prevalence rate was 81.27%. Logistic regression was applied to calculate odds ratios (OR), 95% confidence interval (CI) and P value. Contraceptive use was affected by contextual factors along with individual and fertility related factors. Visits by a family planning worker (FPW) within the previous six months had the biggest impact on contraceptive use (the adjusted OR, 2.06; 95% CI, 1.61-2.64;  $p < 0.001$ ). Education level (adjusted OR, 1.67; 95% CI, 1.10-2.37;  $p < 0.05$  in the group with higher education) and number of children who are alive were also positively associated with contraceptive use ( $p < 0.001$ ). Contraceptive use was lower among Muslims (adjusted OR, non-Muslims vs. Muslims, 1.68; 95% CI, 1.27-2.22;  $p < 0.001$ ), desire for a son (adjusted OR, 0.69; 95% CI, 0.59-0.79;  $p < 0.001$ ), living in rural area (adjusted OR of rural vs. urban, 0.7; 95% CI, 0.59-0.84;  $p < 0.001$ ) and Sylhet Division (adjusted OR of Sylhet vs. Barisal, 0.54; 95% CI, 0.40-0.71;  $p < 0.001$ ).

**Conclusion:** Providing service through FPW, increasing the education level of women, intervention in rural areas and in Sylhet division, targeting Muslim population and women with higher age could increase the use of contraceptives among Bangladeshi women.

**Key Words:** Contraceptive, Married-women and Bangladesh

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## I. Introduction

Bangladesh has made a substantial progress in contraceptive use from 08% in 1975 to 62% in 2014 among married women of reproductive age (NIPORT, 2016). Slowing population growth and contraceptive use has other benefits including reducing pregnancy-related health risks and maternal mortality, reducing adverse perinatal outcomes of infants and infant mortality, empowering people and enhancing education (Cleland et al., 2016; Ahmed et al., 2012; Chola et al., 2015; Kost et al., 1991; Stover & Ross, 2010). Modern contraceptive methods include oral contraceptive pills, implants, injectable contraceptives, contraceptive patches, rings, intrauterine devices, condoms. Traditional contraceptives include rhythm method and coitus interruptus (Jain & Muralidhar, 2011). Reducing child mortality and empowering women were highlighted in Millennium Development Goals (MDGs). Under the Health Goal (Goal 3) of the Sustainable Development Goals (SDGs), SDG 3.1 targets to reduce maternal mortality ratio to less than 70 per 100,000 live births and SDG 3.2 targets to reduce neonatal mortality rate to less than 12 per 1,000 live births by the year 2030. Currently, Bangladesh has a higher maternal mortality ratio and neonatal mortality rate than the targets placed in the SDGs. Though Bangladesh was able to meet most health targets of MDGs, the country still needs to do more to meet the targets of SDGs. One possible approach to reduce child and maternal mortality is to increase use of contraception among married women of reproductive age (El Arifeen et al., 2014; Saha & Van Soest, 2013; Razzaque et al., 2007). Moreover, the Health, Population and Nutrition Sector Development Program (HPNSDP), is being implemented by the Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh (GOB) in order to accelerate the progress of the health, population, and nutrition (HPN) (NIPORT, 2016). This program has adopted strategies to make family planning services available, accessible, acceptable, and affordable to all women and men of reproductive age so to increase overall use of family planning to 72% by 2016. To meet the targets of SDGs and HPN, still we need to direct significant efforts toward family planning. Several studies have been conducted in different parts of the world including Bangladesh which have identified factors that could impact use of contraceptives (Saha & Van Soest, 2013; Razzaque et al., 2007; Khan, 1997; Kamal & Islam, 2010; Vu et al., 2016; Mbizvo & Phillips, 2014; Aremu, 2013; Gereltuya et al., 2007; Lethbridge, 1990; Jacobsen & Lund, 1990; Achana et al., 2015; Dias & de Oliveira, 2015; Kamal, 2015; Mannan, 2002; Islam et al., 2009; Ullah & Chakraborty, 1994; Khan, 2003; Laskar et al., 2006; Goni & Rahman, 2012). Most of the studies revealed association of education, number of children, duration of marriage, access to mass media, place of residence, religion and wealth quintile with contraceptive use among married women of reproductive age. Our primary hypothesis is that the above factors have an association with contraceptive use. We also hypothesized that individual factors, fertility-related factors, and contextual factors simultaneously affect contraceptive use. Aim of this paper is to explore which factors could affect contraceptive use and the potential areas to be intervened by the government of Bangladesh to increase contraceptive use among married women of reproductive age.

## II. Materials and Methods

**Ethics:** We used Demographic and Health Survey (DHS) data which was available for academic use, ethical approval for this study was not required. Approval to use the data was obtained by the corresponding author from the ICF International, Rockville, Maryland, USA on 5th May, 2016. The detail of the survey has been described elsewhere (NIPORT, 2016).

**Participants and procedure:** The Seventh Bangladesh Demographic and Health Survey of 2014 (2014 BDHS) was conducted by Mitra and Associates from June to November 2014. Initially, 17,989 households were selected and among these selected households 17,565 were found occupied. 17,300 (99%) of the households were then interviewed. 18,245 ever-married women of reproductive age (15-

49years) were identified in these households and 17,863 women were interviewed (response rate 98%). The response rate was similar in rural and urban areas. Among the 17,863 ever-married women of reproductive age who were interviewed, 1,077 women were pregnant during the time of interview. Of the remaining 16,786 women, an additional 4,844 women were then excluded because 1,033 women were no more in a marital relationship, 379 women were postpartum amenorrheic, 78 women were subfecund or infertile, 932 women had history of hysterectomy and 2,312 women were not sexually active. They were removed from the analysis as they were not eligible for using contraceptives. At last 12,042 women were included for final analysis. In BDHS surveys, current use of contraception is defined as the proportion of currently married women who report that they are using a family planning method at the time of the survey (NIPORT, 2016).

**Statistical analyses:** Simple and multiple logistic regressions were applied to analyze the data. A woman was used as a unit of analysis. For the analysis with regression model, if a woman or her husband was using any contraceptive method, she was coded "1" and "0" for otherwise. In multiple logistic regression analysis, women were compared according to the factors that could potentially affect their use of contraceptives. Odds ratio (OR) with 95% confidence interval (CI) was calculated to observe the association. The OR was calculated at the individual level, factors related to fertility and in other contextual factors along with crude OR. Four stages of estimation were done in the model fitting process. After calculating the crude odds ratio (OR), the first model included only the individual background variables. The second model included two fertility-related factors along with individual level variables. The last model incorporates the contextual variables in addition to all the variables from the previous models. To select factors of which level (individual level factors, fertility level factors or contextual factors) affect contraceptives use by women, several tests were applied in the model fitting process. Akaike's Information Criteria (AIC), Pearson's goodness-of-fit test, Hosmer-Lemeshow test, sensitivity-specificity analysis and receiver's operating characteristics (ROC) curve were used to finalize the model. In this way, the last model where contextual factors were incorporated with individual and fertility-related factors was finalized to be reported. Variables were checked for multi-collinearity before incorporated into the model. Stata 13.0 (Stata Corp, College Station, TX) was used for all data analysis.

### III. Results

Contraceptive prevalence rate (CPR) was 81.27%. Table 01 provides distribution of the respondents according to background characteristics. Of the 12,042 women, 9,786 (81.27%) used any types of contraceptives. The mean age of women of both groups was 30 years. Mean years of education of the women and husbands were similar (about 3.5 years). Both groups have 2 children on average. Most of the women had at least one son (71.7%). A majority of the women in this analysis lived in rural areas (about 65%). Dhaka division had the highest percentage of respondents (18.02%).

**Table 01. Distribution of currently married and non-pregnant women by their current use of contraceptives, with selected background characteristics**

Background characteristics	Number of Women (%) <sup>1</sup>	Using contraceptive – Number (%) <sup>2</sup>	
		Yes	No
Total Women	12,042	9,786(81.27)	2,256(18.73)
Have son(s)			
Yes	8,681(72.09)	7,479(86.15)	1,202(13.85)
No	3,361(27.91)	2,307(68.64)	1,054(31.36)
Residence			
Urban	4,286(35.59)	3,548(82.78)	738(17.22)
Rural	7,756(64.41)	6,238(80.43)	1,518(19.57)
Division			

Barisal	1,368(11.36)	1,145(83.70)	223(16.30)
Chittagong	1,713(14.23)	1,356(79.16)	357(20.84)
Dhaka	2,170(18.02)	1,748(80.55)	422(19.45)
Khulna	1,830(15.20)	1,498(81.86)	332(18.14)
Rajshahi	1,855(15.40)	1,573(84.80)	282(15.20)
Rangpur	1,874(15.56)	1,571(83.83)	303(16.17)
Sylhet	1,232(10.36)	895(72.65)	337(27.35)
Religion			
Islam	10,862(90.21)	8,763(80.68)	2,099(19.32)
Others	1,179 (9.79)	1,022(86.68)	157(13.32)
Wealth quintile			
Lowest	2,229(18.51)	1,791(80.35)	438(19.65)
Second	2,316(19.23)	1,879(81.13)	437(18.87)
Middle	2,421(20.10)	1,963(81.08)	458(18.92)
Fourth	2,467(20.49)	2,021(81.92)	446(18.08)
Highest	2,609(21.67)	2,132(81.72)	477(18.28)

1. Column percentage 2. Row percentage

**Table 02** presents odds ratios (OR) calculated by selected characteristics. ORs were obtained by logistic regression. Second column of the table shows the crude ORs. Age of women was significantly associated with contraceptive use. Compared with women early and late reproductive age, women in the age group of 25-34 years used contraceptives more where crude odds ratio (OR) was 1.65, with 95% confidence interval(CI), 1.47-1.86;  $p < 0.001$ . Education was also a major predictor. Women with formal education (primary, secondary or higher education) were more likely to use contraceptives by 20% than women without formal education. Employed women were also more likely to use any type of contraceptives (crude OR, 1.15; 95% CI, 1.04-1.27;  $p < 0.05$ ) than women who were not employed. Women with 3-4 children were more likely to use contraceptives than women with up to 2 children. Women with dead children (both male and female) were also associated with reduced use of contraception. Women with only daughters but no sons were less likely to use contraceptives (crude OR, 0.77; 95% CI, 0.67-0.89;  $p < 0.05$ ) than the women with only sons. Non-Muslims used contraceptives more than the Muslims (crude OR 1.56; 95% CI, 1.27-1.90;  $p < 0.001$ ). As predicted, women who got a family planning worker (FPW) visit within last 6 months appeared to use contraceptives 2.3 times more than the women who were not visited. NGO membership was associated with increased contraceptive use (crude OR, 1.44; 95% CI, 1.3-1.6;  $p < 0.001$ ). Education of husbands, access to mass media and wealth quintile were not associated with contraceptive use. Contraceptive use was lower in Sylhet, Chittagong, and Dhaka than the other four divisions. Rural women were 14% less likely to use contraceptive compared to urban women (crude OR, 0.86; 95% CI, 0.78-0.95;  $p < 0.05$ ).

When adjusted at the individual level in the first model, all three predictors of the individual level remained significantly associated with contraceptive use. After including factors related to fertility, the previous factors of the individual level remained significant. As assumed, increasing number of children in the family increases contraceptive use. However, the crude OR of women with five or more children compared to women with 0-2 children appeared significant (adjusted OR, 1.67; 95% CI, 1.38-2.01 &  $p < 0.001$ ). Contraceptives use was reduced with increasing number of dead children ( $p < 0.001$ ).

In the last model, contextual factors were added. After addition, the direction and magnitude of current age and education level changed little from the second model. However, working status did not remain a significant predictor. Having only daughter without any son was associated with decreased contraceptives use. Number of dead children did not have any association like the factors adjusted for fertility. Muslims had less contraceptives use similar to the unadjusted level (adjusted OR 1.68 of non-

Muslims vs. Muslims with 95% CI, 1.27-2.22;  $p < 0.001$ ). Again an FPW visit within previous six months was positively associated with contraceptive use. Involvement with NGO did not have any association ( $p > 0.05$ ). Sylhet division had lower use of contraception than Barisal (adjusted OR, 0.54; 95% CI, 0.40-0.71;  $p < 0.001$ ). Women living in rural areas were also less likely to use contraceptives.

**Table 02. Odds ratios (95% confidence intervals) and significance level (p-value) of current use of contraceptives for selected characteristics among currently married and non-pregnant women, Bangladesh (obtained by simple and multiple logistic regressions)**

Characteristics	Crude (unadjusted)	Adjusted at Individual	Adjusted for Fertility factors	Adjusted for contextual factors
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
	P value	P value	P value	P value
<b>Current age</b>				
15-24	Ref	Ref	Ref	Ref
25-34	1.65(1.47-1.86) <0.001	1.70(1.50- <0.001	1.36(1.20-1.53) <0.001	0.59(0.49-0.70) <0.001
35-49	0.98(0.87-1.08) 0.624	1.03(0.93- 0.531	0.75(0.65-0.85) <0.001	0.32(0.27-0.39) <0.001
<b>Education level</b>				
No education	Ref	Ref	Ref	Ref
Primary	1.22(1.08-1.38) 0.001	1.22(1.08- 0.002	1.25(1.10-1.41) 0.001	0.97(0.78-1.19) 0.769
Secondary	1.27(1.12-1.42) <0.001	1.29(1.14- <0.001	1.41(1.23-1.60) <0.001	1.31(1.02-1.66) 0.028
Higher	1.22(1.02-1.44) 0.02	1.42(1.04- 0.016	1.47(1.23-1.76) <0.001	1.62(1.10-2.37) 0.013
<b>Working women</b>				
No	Ref	Ref	Ref	Ref
Yes	1.15(1.04-1.27) 0.006	1.15(1.04- 0.008	1.17(1.07-1.30) 0.002	1.03(0.89-1.20) 0.696
<b>Number of alive children</b>				
0-2	Ref		Ref	Ref
3-4	1.81(1.60-2.06) <0.001		2.20(1.92-2.52) <0.001	2.48(1.92-2.30) <0.001
5+	1.03(0.88-1.22) 0.671		1.67(1.38-2.01) <0.001	2.69(1.34-5.41) 0.005
<b>Number of dead children</b>				
0	Ref		Ref	Ref
1	0.86(0.75-0.98) 0.026		0.86(0.79-0.99) 0.043	0.93(0.74-1.15) 0.493
>2	0.53(0.45-0.65) <0.001		0.59(0.49-0.73) <0.001	0.78(0.55-1.12) 0.183
<b>Presence of sons</b>				
Only son, no daughter	Ref			Ref
Only daughter, no son	0.77(0.67-0.89) 0.001			0.69(0.59-0.79) <0.001
<b>Religion</b>				
Muslim	Ref			Ref

Characteristics	Crude (unadjusted)	Adjusted at Individual	Adjusted for Fertility factors	Adjusted for contextual factors
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
	P value	P value	P value	P value
Non-Muslim	1.56(1.27-1.90)			1.68(1.27-2.22)
	<0.001			<0.001
FPW visits within last 6 months				
No	Ref			Ref
Yes	2.34(1.96-2.77)			2.06(1.61-2.64)
	<0.001			<0.001
NGO membership				
No	Ref			Ref
Yes	1.44(1.30-1.60)			1.11(0.95-1.31)
	<0.001			0.186
Husband's education				
No education	Ref			Ref
Primary	1.18(1.04-1.33)			1.17(0.95-1.45)
	0.009			0.96
Secondary	1.03(0.92-1.16)			1.02(0.82-1.28)
	0.545			0.81
Higher	1.15(0.99-1.33)			1.05(0.77-1.44)
	0.057			0.74
Reading newspaper				
No	Ref			Ref
Less than once a week	1.22(1.02-1.47)			0.91(0.70-1.18)
	0.029			0.49
At least once a week	0.94(0.80-1.11)			0.79(0.59-1.06)
	0.465			0.11
Listening to radio				
No	Ref			Ref
Less than once a week	1.36(0.89-2.06)			1.09(0.63-1.94)
	0.146			0.74
At least once a week	1.07(0.80-1.47)			1.54(0.88-2.68)
	0.627			0.12
Watching television				
No	Ref			Ref
Less than once a week	1.17(0.98-1.40)			1.01(0.78-1.30)
	0.076			0.94
At least once a week	1.18(1.06-1.29)			1.13(0.94-1.37)
	0.001			0.19
Region				
Barisal	Ref			Ref
Chittagong	0.74(0.61-0.89)			0.78(0.58-1.02)
	0.002			0.075
Dhaka	0.80(0.68-0.97)			0.98(0.74-1.30)
	0.022			0.89
Khulna	0.88(0.73-1.06)			1.19(0.94-1.37)

Characteristics	Crude (unadjusted)	Adjusted at Individual	Adjusted for Fertility factors	Adjusted for contextual factors
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
	P value	P value	P value	P value
	0.189			0.22
Rajshahi	1.08(0.89-1.33)			1.33(0.99-1.78)
	0.426			0.054
Rangpur	1.00(0.83-1.23)			1.26(0.94-1.70)
	0.924			0.12
Sylhet	0.51(0.43-0.63)			0.54(0.40-0.71)
	<0.001			<0.001
Place of residence				
Urban	Ref			Ref
Rural	0.86(0.78-0.95)			0.70(0.59-0.84)
	0.002			<0.001
Wealth Quintile				
Poorest	Ref			Ref
Poorer	1.05(0.91-1.22)			0.97(0.77-1.20)
	0.50			0.73
Middle	1.04(0.91-1.21)			1.01(0.79-1.31)
	0.52			0.88
Richer	1.11(0.96-1.28)			1.11(0.83-1.46)
	0.17			0.47
Richest	1.09(0.95-1.26)			1.00(0.72-1.38)
	0.22			0.99

#### IV. Discussion

According to the BDHS report, contraceptive prevalence rate (CPR) increased slightly from 61.2% in 2011 DHS to 62.4% in the 2014 DHS (NIPORT, 2016). However, we found that the actual CPR is 81.3%. In BDHS report, women who were currently not in any marital relationship (1,033), had hysterectomy (932), postpartum amenorrhoeic (379), infertile or subfecund (78) and sexually inactive (3,711) were not excluded to calculate CPR. After excluding, we found that CPR is 81.3%. In this study, our hypothesis was that individual factors, factors related to fertility and contextual factors simultaneously affect contraceptives use. We found that working status of women, husbands' education, number of dead children, NGO membership, access to mass media and wealth quintile did not have any association with contraceptive use when they were adjusted for other factors. This finding is important as previous studies revealed that these factors have association with use of contraceptives (Kamal & Islam, 2010; Lethbridge, 1990; Jacobsen & Lund, 1990; Dias & de Oliveira, 2015; Khan, 2003). The finding of this study that educated women are more likely to use contraceptives is supported by other studies (Kamal & Islam, 2010; Gereltuya et al., 2007; Jacobsen & Lund, 1990; Goni & Rahman, 2012). The surprising finding of this analysis is that women were less likely to use contraceptives with increasing age when other factors were taken into account (Goni & Rahman, 2012). Most studies in the past revealed that working women tend to use contraceptives more, this analysis, however, did not support that when contextual factors were added (khan, 1997; Laskar et al., 2006). Another finding in this study is that there is no association between contraceptive use and women who experienced the death of children when they have at least one alive son regardless of daughter. As previous studies, this desire for son has major impact on contraceptive use (khan, 1997; Kamal & Islam, 2010; Kamal, 2015; Islam et al., 2010; Sahu & Hutter, 2012). Among studies and analysis in some other research articles, it was said that religion did not have any significant effect on contraceptive use though some articles highlighted impact of religion on contraceptive use (Kamal & Islam, 2010; Islam et al., 2010; Sahu & Hutter, 2012; Begum, 1997). We found that contraceptives use among non-Muslims was higher than Muslims. Contraceptive use in

rural regions is lower, likewise previous studies (khan, 1997; Kamal & Islam, 2010; Kamal, 2015). CPR was lower in Sylhet than other divisions. This division also had lower contraceptive use in previous analyses of DHS data. Visit by a family planning worker within the last six months had the highest impact like previous studies (Kamal & Islam, 2010; Kamal, 2015; Khan, 2003). This study has several strengths. The study sample that was used for analysis is representative. However, a weakness of the survey conducted by the organization was that they did not take into account women for whom contraceptive use is not required. The survey reported the prevalence without excluding those women. The limitation of this study was that researchers did not have any control in the data collection procedure. This study included only currently married women, so women who were divorced or widowed but may have sexual exposure were not included. However, the proportion of widowed and divorced women is only about 2% so we do not expect to find any noteworthy difference in results.

## V. Conclusion

To scale up the contraceptive campaign in Bangladesh, the government of Bangladesh requires addressing the inequality of contraceptive use. Factors which are addressable by the government have to be intervened on the priority basis to achieve targets of Sustainable Development Goals (SDG) and Health, Population and Nutrition Sector Development Program (HPNSDP).

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## Conflicts of Interest

None of the authors have found any conflicts of interest with this study.

## VI. References

- [1]. Achana, F. S., Bawah, A. A., Jackson, E. F., Welaga, P., Awine, T., Asuo-Mante, E., Oduro, A., Awoonor-Williams, J. K. & Phillips, J. F. (2015). Spatial and socio-demographic determinants of contraceptive use in the upper east region of Ghana. *Reprod. Health*, 12, 29,015-0018. <https://doi.org/10.1186/s12978-015-0017-8>
- [2]. Ahmed, S., Li, Q., Liu, L. & Tsui, A. O. (2012). Maternal deaths averted by contraceptive use: An analysis of 172 countries. *The Lancet*, 380(9837), 111-25. [https://doi.org/10.1016/S0140-6736\(12\)60478-4](https://doi.org/10.1016/S0140-6736(12)60478-4)
- [3]. Aremu, O. (2013). The influence of socioeconomic status on women's preferences for modern contraceptive providers in Nigeria: A multilevel choice modeling. *Patient Prefer Adherence*, 7, 1213. <https://doi.org/10.2147/PPA.S51852> PMID:24353406 PMCID:PMC3862587
- [4]. Begum, H. (1997). Issues related to the implementation of reproductive technology in Islamic societies: Report from Bangladesh. *Bioethics*, 11(3-4), 341-7. <https://doi.org/10.1111/1467-8519.00074>
- [5]. Chola, L., McGee, S., Tugendhaft, A., Buchmann, E. & Hofman, K. (2015). Scaling up family planning to reduce maternal and child mortality: The potential costs and benefits of modern contraceptive use in South Africa. *PLoS One*, 10(6): e0130077. <https://doi.org/10.1371/journal.pone.0130077> PMID:26076482 PMCID:PMC4468244
- [6]. Cleland, J., Conde-Agudelo, A., Peterson, H., Ross, J. & Tsui, A. (2016). Contraception and health. *The Lancet*, 380(9837), 149-56. [https://doi.org/10.1016/S0140-6736\(12\)60609-6](https://doi.org/10.1016/S0140-6736(12)60609-6)



- [7]. Dias, J. G., de Oliveira, I. T. (2015). Multilevel effects of wealth on women's contraceptive use in Mozambique. *PLoS One*, 10(3): e0121758. <https://doi.org/10.1371/journal.pone.0121758>  
PMid:25786228 PMCID:PMC4364712
- [8]. El Arifeen, S., Hill, K., Ahsan, K. Z., Jamil, K., Nahar, Q. & Streatfield, P. K. (2014). Maternal mortality in Bangladesh: A countdown to 2015 country case study. *Lancet*, 384(9951), 1366-74. [https://doi.org/10.1016/S0140-6736\(14\)60955-7](https://doi.org/10.1016/S0140-6736(14)60955-7)
- [9]. Gereltuya, A., Falkingham, J. & Brown, J. (2007). Determinants of current contraceptive use and method choice in Mongolia. *J. Biosoc. Sci.* 39(6), 801-17.  
<https://doi.org/10.1017/S0021932007002003>  
PMid:17445329
- [10]. Goni, A., Rahman, M. (2012). The impact of education and media on contraceptive use in Bangladesh: A multivariate analysis. *Int. J. Nurs. Pract.* 18(6), 565-73.  
<https://doi.org/10.1111/ijn.12013>  
PMid:23181958
- [11]. Islam, M. A., Islam, M. R. & Banowary, B. (2009). Sex preference as a determinant of contraceptive use in matrilineal societies: A study on the garo of Bangladesh. *Eur. J. Contracept. Reprod. Health Care*, 14(4), 301-6. <https://doi.org/10.1080/13625180903033460>  
PMid:19629855
- [12]. Islam, S., Islam, M. A. & Padmadas, S. S. (2010). High fertility regions in Bangladesh: A marriage cohort analysis. *J Biosoc Sci.* 42(6), 705-19. <https://doi.org/10.1017/S0021932010000428>  
PMid:20868540
- [13]. Jacobsen, B. K. & Lund, E. (1990). Level of education, use of oral contraceptives and reproductive factors: The Tromso study. *Int J Epidemiol.* 19(4), 967-70.  
<https://doi.org/10.1093/ije/19.4.967>  
PMid:2084029
- [14]. Jain, R. & Muralidhar, S. (2011). Contraceptive methods: Needs, options and utilization. *J Obstet Gynaecol India*, 61(6), 626-34. <https://doi.org/10.1007/s13224-011-0107-7>  
PMid:23204678 PMCID:PMC3307935
- [15]. Kamal, S. M & Islam, M. A. (2010). Contraceptive use: Socioeconomic correlates and method choices in rural Bangladesh. *Asia Pac J Public Health.* 22(4), 436-50.  
<https://doi.org/10.1177/1010539510370780>  
PMid:20659903
- [16]. Kamal, S. M. (2015). Socioeconomic factors associated with contraceptive use and method choice in urban slums of Bangladesh. *Asia Pac. J. Public Health*, 27(2), 2661-76.  
<https://doi.org/10.1177/1010539511421194>  
PMid:21914707
- [17]. Khan, H. T. (1997). A hierarchical model of contraceptive use in urban and rural Bangladesh. *Contraception*, 55(2), 91-6. [https://doi.org/10.1016/S0010-7824\(96\)00278-8](https://doi.org/10.1016/S0010-7824(96)00278-8)
- [18]. Khan, M. A. (2003). Factors associated with oral contraceptive discontinuation in rural Bangladesh. *Health Policy Plan.* 18(1), 101-8. <https://doi.org/10.1093/heapol/18.1.101>  
PMid:12582113
- [19]. Kost, K., Forrest, J. D. & Harlap, S. (1991). Comparing the health risks and benefits of contraceptive choices. *Fam. Plann. Perspect.* 23(2), 54-61.  
<https://doi.org/10.2307/2135450>  
PMid:2060612
- [20]. Laskar, M. S., Mahbub, M. H., Yokoyama, K., Inoue, M. & Harada, N. (2006). Factors associated with contraceptive practices of married women in Bangladesh with respect to their employment status. *Eur. J. Contracept. Reprod. Health Care*, 11(3), 227.  
<https://doi.org/10.1080/13625180600759854>  
PMid:17056454
- [21]. Lethbridge, D. J. (1990). Use of contraceptives by women of upper socioeconomic status. *Health Care Women Int.* 11(3), 305-18. <https://doi.org/10.1080/07399339009515900>  
PMid:2391287
- [22]. Mannan, H. R. (2002). Factors in contraceptive method choice in Bangladesh: Goals, competence, evaluation and access. *Contraception*, 65(5), 357-64.  
[https://doi.org/10.1016/S0010-7824\(01\)00303-1](https://doi.org/10.1016/S0010-7824(01)00303-1)

- [23]. Mbizvo, M. T. & Phillips, S. J. (2014). Family planning: Choices and challenges for developing countries. *Best Pract Res Clin Obstet Gynaecol*, 28(6), 931-43.  
<https://doi.org/10.1016/j.bpobgyn.2014.04.014>  
PMid:24957693
- [24]. National Institute of Population Research and Training (NIPORT) (2016). Mitra and Associates and ICF International. Bangladesh Demographic and Health Survey 2014. Dhaka, Bangladesh.  
<http://www.dhsprogram.com/publications/publication-FR311-DHS-Final-Reports.cfm>
- [25]. Razzaque, A., Streatfield, P. K. & Evans, A. (2007). Family size and children's education in Matlab, Bangladesh. *J. Biosoc. Sci.* 39(2), 245-56. <https://doi.org/10.1017/S0021932006001398>  
PMid:16686965
- [26]. Saha, U. R. & Van Soest, A. (2013). Contraceptive use, birth spacing, and child survival in Matlab, Bangladesh. *Stud. Fam. Plann.* 44(1), 45-66.  
<https://doi.org/10.1111/j.1728-4465.2013.00343.x>  
PMid:23512873
- [27]. Sahu, B. & Hutter, I. (2012). 'Lived Islam' in India and Bangladesh: Negotiating religion to realise reproductive aspirations. *Cult. Health Sex.* 14(5), 521-35.  
<https://doi.org/10.1080/13691058.2012.672652>  
PMid:22468853
- [28]. Stover, J. & Ross, J. (2010). How increased contraceptive use has reduced maternal mortality. *Matern Child Health J.* 14(5), 687-95. <https://doi.org/10.1007/s10995-009-0505-y>  
PMid:19644742
- [29]. Ullah, M. S. & Chakraborty, N. (1994). The use of modern and traditional methods of fertility control in Bangladesh: A multivariate analysis. *Contraception*, 50(4), 363-72.  
<https://doi.org/10.1007/s10995-009-0505-y>
- [30]. Vu, L. T., Oh, J., Bui, Q. T & Le, A. T. (2016). Use of modern contraceptives among married women in Vietnam: A multilevel analysis using the multiple indicator cluster survey (2011) and the Vietnam population and housing census (2009). *Glob Health Action*, 9, 295.  
<https://doi.org/10.3402/gha.v9.29574>  
PMid:26950565 PMCID:PMC4780115