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DO INCREASING LEGAL AGE AT MARRIAGE AND INCREASED USE OF CONTRACEPTION WILL MATTER TO ACHIEVE DEMOGRAPHIC GOAL: REVISITING THE ROLE OF PROXIMATE DETERMINANTS IN BANGLADESH

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Abstract

According to 2010 world population prospects (WPP), Bangladesh is passing second phase of fertility transition. The recent aggregate fertility level (TFR) of Bangladesh is 2.3 births per woman, which is very close to the replacement level. This transition raises questions about possible factor for fertility decline in Bangladesh as uses of family planning methods are almost stable since last decade. Using recent national level survey data and the Bongaarts framework of the proximate determinants of fertility, an attempt has been made in this study to identify the factors responsible for such notable decrease in fertility level of Bangladesh. The results demonstrate that contraception appears as the most prominent determinant in fertility reduction in Bangladesh; followed by lactational infecundability, marriage and induced abortion. High proportion of adolescent marriages in Bangladesh yields high value of the index of marriage which consequently influences fertility level and in particular, adolescent fertility. Simulation on proportion married at adolescent ages suggest policy implication for raising the current legal age at marriage will decrease the proportion married at adolescent ages which with the increased use of contraceptive prevalence rate would help to achieve demographic objective in Bangladesh.

Key words: Bangladesh, Proximate determinants of fertility, Adolescent marriage

Introduction

According to 2010 world population prospects, fertility transition of a country is modeled in three Phases (UN 2011). These phases are based on level of total fertility rate (TFR) of a country and Bangladesh is passing the second phase or the fertility transition at this moment. The current total fertility rate (TFR) of Bangladesh is 2.3 births per woman (BDHS 2011). Bangladesh aims to reduce the total fertility rate (TFR) to 2.1 births per woman by 2016 through improved access to health and nutrition services for the poor and geographically marginalized population (BDHS 2011). The TFR declined from 6.3 births per woman in 1971 - 1975 to 2.3 births per woman in 2009 - 2011. The trend of TFR from 1975 to 2011 is presented in Fig. 1.

In Fig.1, the plain line represents the projected fertility level up to 2025, and dotted straight line present the replacement level of fertility (TFR = 2.1). The projection suggests that Bangladesh will achieve replacement level of fertility by 2015 if the current trend continues. Though increase is observed in the level of using family planning method in the recent DHSs, still the relation between fertility level and contraceptive use prevalence are not well synchronized. The

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contraceptive prevalence rate (CPR) of 61 percent reflects a notable rise from previous BDHS, but much of that rise is due to a rebound in use of injectables after sudden fall in 2006 due to stock outs (injetctable methods) and an increase in the non program method, periodic abstinence (BDHS 2011). Since 2000, the annual rate of increase in CPR has been less than half of the 1.5 per cent annual rate in the 1990s (BDHS 2011).

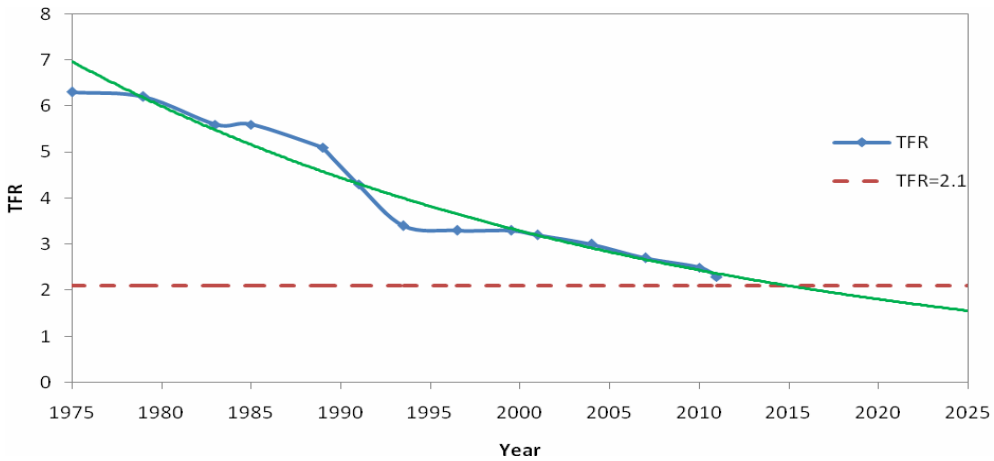

Fig. 1. Trend of fertility rates in Bangladesh (1975-2011).
The data are obtained from two World Fertility Surveys (BFS-1975&1989), five contraceptive prevalence surveys (during 1989-1991), six BDHSs (during 1993-2011) and two maternal mortality surveys (BMMS-2001&2010).
The fertility projections are done using exponential regression of TFR against time, as exponential model fitted the data with maximum goodness of fit compare to other regression approach. The fitted model is TFR = $4E + 26e^{-0.03 * Year}$ with $R^2 = 0.9517$.

The principal characteristic of biological and behavioral factors is that they can influence fertility directly, while socioeconomic and environmental factors affect fertility through modification of one or more biological or behavioral factors (Bongaarts 1978). Bongaarts (1978) in his classical paper termed these biological and behavioral factors as proximate determinants of fertility, since they directly affect fertility; and all other social, economic and environmental factors affect fertility through these factors. As these proximate determinants are well recognized for explaining aggregate fertility level, many researches exist till now for Bangladesh along with others developing and developed countries (Kabir and Uddin 1987, Islam *et al.* 1998, Islam *et al.* 2011, Rabbi and Kabir 2014). However, most of these approaches overlooked policy proposition regarding others proximate determinants; those also have précised influence on fertility decline. Furthermore, with an inconsistent relationship between aggregate fertility levels and contraceptive prevalence rate, further in-depth analysis on other proximate determinants is required for Bangladesh to ensure that Bangladesh is on right track to achieve replacement level of fertility.

To improve our understanding of the causes of fertility transition decline in Bangladesh, the present study analyzes the levels of the proximate determinants in Bangladesh. Furthermore, using the estimated indices simulations are performed under Bongaarts (1978) framework to identify the

relative contribution of changes in each of the different proximate determinants to corresponding decline in total fertility.

Data and Methodology

The data utilized for this research is a secondary data extracted from the Bangladesh Demographic and Health Survey conducted at 2011. BDHS 2011 contains 17749 ever-married women of child bearing age of all the regions of Bangladesh. To measure the fertility inhibiting effects of the four principal proximate determinants of fertility in a given population, aggregate fertility model of Bongaarts (1978) and Bongaarts and Potter (1983) have been used in current study. The fertility-inhibiting effects of the four principal proximate determinants are proportion married, contraception, induced abortion, and postpartum infecundability and they are measured in the model by four indices: C_m = index of marriage, C_c = index of contraception, C_a = index of induced abortion, and C_i = index of post-partum infecundability. The value of each index lies between 0 and 1; 0 signifying complete fertility inhibition and 1 meaning no fertility inhibition. Symbolically, the relationship between the actual level of fertility in a population, as measured by total fertility rate (TFR) and the biological maximum TF is,

$$TFR = C_m \times C_c \times C_a \times C_i \times TF \quad (1)$$

The complement of the value of an index is the proportionate reduction in fertility due to the inhibiting effect of that proximate variable. Estimation of the model indices are available elsewhere (Bongaarts and Potter 1983).

The difference between the total fecundity (TF, taken as 15.3) and the predicted or model-estimated TFR demonstrate the resultant inhibitory effect of each determinant while, the fertility controlling effect is prorated by the product of difference between TF and model TFR to the proportion of the logarithm of each index to the sum of the logarithms of all indices (Wang *et al* 1987). For example, fertility inhibiting effect of marriage can be expressed symbolically as,

$$[TF - TFR(estimated)] \times \frac{\log C_m}{\log C_m + \log C_c + \log C_i + \log C_a}$$

Results

The summary measures required for the application of Bongaarts (1978) model and corresponding reproductive indicators for Bangladesh (BDHS 2011) are presented in the following table (Table 1). Multiplying all of the indices together by the total fecundity rate of 15.3 produces the predicted TFR for the population. The predicted TFR typically differs from the observed TFR because of underreporting of births, measurement errors of the proximate determinants, or the omission of any other potential proximate determinants that are influential in determining fertility levels in that particular population under study (Islam *et al.* 2011).

Clearly, least impact of marriage may be seen on recent fertility decline in Bangladesh; having a value of 0.871, C_m may reduce only 13 percent of the total fertility in Bangladesh. Impact of family planning on current fertility is high for Bangladesh; almost 58 percent of total fertility declined due to contraceptive use. Besides contraception, highest fertility decline occurred by

Post-partum infecundability, which decline almost 51 percent of fertility for that index. A small effect of abortion is seen in fertility level; approximately 1 percent of fertility is declined by abortion.

Table 1. Reproductive indicators and derived indices of proximate determinants of fertility (Bongaarts 1978) for Bangladesh (BDHS 2011).

A. General reproductive indicators	
TFR	2.3
TMFR	2.64
Median age at first marriage (25-49)	15.5 years
CPR *(u)*	61.2 percent
Contraceptive use effectiveness *(e)*	0.88
Median duration of breastfeeding	31.2 months
Median duration of Post-partum infecundability	22.08 months
Total Abortion rate (TA)	0.028
B. Model indices	
C_m	0.871
C_c	0.42
C_a	0.991
C_i	0.493
Combined effect of four determinants ($C_m \times C_c \times C_a \times C_i$)	0.1787
Total fecundity (TF)	15.3
Predicted TFR	**2.73**

Table 2 exhibits the magnitude of the total inhibiting effect being accounted for by each proximate determinant at BDHS (2011). For Bangladesh, out of 12.57 (=15.3-2.73) births being inhibited; 1.01 births (or 8 percent) were due to the marriage variable, 6.33 births (or 50 percent) were due to contraception, 0.07 births (or 0.5 percent) were due to abortion and 5.16 births (or 41 percent of total inhibiting effects) were due to the effect of post-partum infecundability.

Undersized gap between TFR and TMFR (marital fertility rate) is responsible for lowest index value of marriage, which occurred due to high proportion of marriage. Specifically, this occurs due to higher proportion of adolescents getting married in Bangladesh. It is found that two thirds of the adolescents get married before legal age at marriage which is 18 years (BDHS 2011). The age specific fertility rate (ASFR), age specific marital fertility rate (ASMFR) and proportion married for BDHS (2011) for all age groups are presented in Table 3.

Age at first marriage has a major effect on childbearing because the risk of pregnancy depends primarily on the age at which women first marry (Islam *et al*. 1998). For BDHS (2011), 80 per cent women aged 15 - 49 get married, among them 44.7 per cent women aged 15 - 19 are married, which affect the corresponding age specific marital fertility rate also. Early age at marriage is still common in Bangladesh. Compared to earlier BDHSs; median age at first marriage increase slightly in Bangladesh in the last twenty years with highest value at BDHS (2011). The

rate did not increase with a secular trend, decrease was observed at 1996 - 97 and 2004. It should be noted that, low median age at first marriage is observed in Bangladesh compared to the neighbor South Asian countries (BDHS 2011). Although age specific fertility rate for women aged 15 - 19 declined since BDHS (1996 - 97); but its contribution to the overall TFR has been increasing. Since BDHS (1996 - 97), it falls steadily to 118 at BDHS (2011). Proportion of married women also varied during the last twenty years, though it always concentrated around 77 to 78 per cents. This sudden rise indicates change in socio-economic perspective of the country (Simmons 1985). Proportion married at age group 15 - 19 changed slowly in the six BDHS (2011). To achieve replacement level of fertility, marriage should have been the priority area by the policy makers. Despite various interventions there has been little change in the level of age at first marriage (Rabbi and Kabir 2014).

Table 2. Magnitude of the total fertility-inhibiting effect being accounted for each proximate fertility determinants for Bangladesh (BDHS 2011).

Proximate determinants	Value of index	Fertility-inhibiting effect	
		Reduction of births per woman	Percentage reduction
C_m	0.871	1.01	8.03
C_c	0.42	6.33	50.36
C_a	0.991	0.07	0.56
C_i	0.493	5.16	41.05
Total [TF-TFR(est)]	12.57	12.57	100.0

Table 3. ASFR, ASMFR and proportion married for Bangladeshi women (BDHS 2011).

Age group	Proportion married	ASFR	ASMFR	Median age at cohabitation
15-19	0.447	118	137*	-
20-24	0.837	153	183	16.6
25-29	0.932	107	115	16.0
30-34	0.943	56	59	15.8
35-39	0.919	21	23	15.5
40-44	0.898	6	7	15.1
45-49	0.823	3	4	14.9
Total	0.800	TFR = 2.3	TMFR = 2.64	15.5

*****Bongaarts multiplier is applied. ASMFR for 15-19 is computed as 0.75 × ASMFR for women 20-24 (Bongaarts and Potter 1983). The age at first marriage is defined as the age at which the respondent began living with her first spouse/partner (cohabitation). Median age at marriage for women aged 25-49 is 15.5 years. For women aged 20-49, the median age at marriage is 15.8 years. Median age at marriage is not applicable for age group 15-19 due to censoring.

From the findings of this study, it is evident that, to achieve replacement level of fertility further decline is required for proximate determinants. Among all of the indices, small fertility decline is observed for marriage. For achieving replacement level of fertility, new policies are needed to reform the proportion married in different age groups. Marriages after age 20 and

onward are natural, but large proportion of TFR is attributable to adolescents (15 - 19) in Bangladesh. Governments of Bangladesh have strict policy for legal age at marriage of 18 years for women, but it is not well implemented. To assess the change in the marriage we simulated *Cm* to have insight on level of early age at marriage and its impact on TFR.

With 0.447 proportion married at age group 15 - 19, ASMFR is 137 while ASFR was 118; where ASMFR were estimated using Bongaarts multiplier (Bongaarts and Potter 1983). Due to the short average of marital duration, the marital fertility rates for women aged 15 - 19 years; do not represent the potential fertility of the whole age group. In this case Bongaarts recommends that the marital fertility rate for women aged 15 - 19 be taken as 0.75 of the rate for women aged 20-24 (Bongaarts and Potter 1983). In this simulation, Bongaarts multiplier is not considered to investigate the impact of adolescents' marriage on fertility. Instead of Bongaarts multiplier, the adjusted ASMFR, TMFR, *Cm* and model TFR are 264, 3.28, 0.701 and 2.20 respectfully; while prior estimated ASMFR, TMFR, *Cm* and model TFR were 137, 2.64, 0.871 and 2.73 respectfully (Table 4). The results of the simulated ASMFR, TMFR, *Cm* and model TFR for various level of proportion married at age 15-19 are summarized in Table 4.

Table 4. Simulation for proportion married at age 15-19 and its impact on fertility of Bangladesh (BDHS 2011).

Proportion married at 15-19	ASMFR	TMFR	C_m	Model TFR
0.447	264	3.28	0.701	2.20
0.44	268	3.295	0.698	2.19
0.43	274	3.325	0.692	2.17
0.42	281	3.36	0.685	2.15
0.41	288	3.4	0.676	2.12
0.40	295	3.43	0.671	2.11
0.39	303	3.47	0.66	2.07
0.38	319	3.505	0.65	2.04
0.37	319	3.55	0.645	2.02
0.36	328	3.6	0.64	2.01
0.35	337	3.64	0.632	1.98
0.34	347	3.69	0.62	1.95
0.33	358	3.745	0.61	1.92
0.32	369	3.8	0.605	1.90
0.31	380	3.85	0.597	1.87
0.30	393	3.92	0.587	1.84

Simulated model TFR is estimated using (1). Considering all other proximate determinants fixed, simulated C_m is multiplied with observed C_c, C_i, C_c and *TF* (from Table 1).

The simulation showed that, aggregate fertility level will decline with decrease in level of adolescent's marriage. The fall in ASMFR, TMFR, Cm and model TFR almost followed a linear trend with fall in proportion married at age 15 - 19. The simulation shows that decline in the proportion married of adolescents from 0.447 to 0.4 will help Bangladesh to achieve replacement level of fertility, while decline to 0.3 will help Bangladesh to archive third phase of fertility transition (UN 2011).

Discussion and Conclusion

The objective of this study was to analyze recent fertility level in Bangladesh and examine the role of proximate determinants in determining fertility levels. Impact of nuptiality pattern in aggregate fertility level is not in expected direction in Bangladesh. Slight increase is observed for age at first marriage in the last two decades, but the alarming one is the high proportion married at age 15 - 19. Another important finding of the study is the change in age-specific fertility patterns, which indicate that childbearing is taking place at an early age currently than it had been in the past. As the desired level of fertility is declining and age at marriage is rising very slowly, couples tend to reach their desired number of children in quick succession immediately after marriage and then regulate fertility at older ages. Compared to neighboring South Asian countries, proportion married, ASFR, ASMFR are highest in Bangladesh for age group 15 - 19 (BDHS 2011). Simulation for various lower proportion of married at 15 - 19 age group significantly suggest new policy implication regarding increasing age of marriage for Bangladeshi women. The prevailing cultural and social norms in Bangladesh are unlikely to permit a change in the proportion of non-married beyond a certain limit and the prospect for an immediate rise in the age at marriage for females does not seem to be very bright (Islam *et al.* 1998). BDHS (2011) indicates that, age of marriage is slightly higher for educated women than illiterate or primary completed women. Emphasizing women's education and creating job opportunity may increase age at first marriage for Bangladesh. However, as a cross-sectional study, BDHS (2011) contains only current status of married women, so further research on nuptiality pattern may give more insight on this.

Nevertheless, the extent to which Bangladeshi women are making their own decisions, the mechanisms of decision making among the couples, the institutional framework by which the government implemented its policies, and the question of sustainability of low fertility in Bangladesh are among the question remain unreciprocated.

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