FERTILITY TRANSITION IN BANGLADESH: THE ROLE OF EDUCATION

Sabina Islam and Mossamet Kamrun Nesa

Department of Statistics, Shahjalal University of Science and Technology, Sylhet, Bangladesh

Abstract: This paper focuses on fertility transition in Bangladesh through educational differentials in fertility levels and trends using the nationwide data of 2004 Bangladesh Demographic and Health Survey. It has also been attempted to detect the relative contribution of several factors on the number of children ever born. The results show that fertility declined considerably with women's education. This relationship also held even after controlling the other factors such as place of residence, region and household wealth status. All of the factors included in the study showed significant effect on the children ever born. Total fertility rate (TFR) and total marital fertility rate (TMFR) were found higher among the rural women than in urban women, irrespective of education. The TFR found over five births per illiterate woman in Sylhet and Chittagong Divisions, which is far above the national average. The illiterate and poor women had the highest TFR (4.1), whereas a secondary educated rich woman had the lowest TFR in Khulna and Rajshahi Divisions. The TFR was close to replacement level for those who had secondary education, came from rich household and lived in urban areas. These findings suggest that compulsory higher free education (Government of Bangladesh educational policy) is necessary to bring further reduction of fertility in Bangladesh.

Introduction

Researchers have anticipated that many developing countries have experienced large fertility declines in recent decades [1]. United Nations [2] has projected that most countries would completed their fertility transitions before 2050. Bongaarts [3] has shown that steady decline in fertility occurred in most part of Asia, North Africa and Latin America. Bangladesh still remains as outliers among these regions. It has been passing through a crucial phase of fertility transition. Fertility rate in the past was not homogeneous in this country. The level of fertility started to decline since mid-seventies. The decline occurred at a rapid rate during the period 1975 to 1993/94. The total fertility rate (TFR) was 6.3 in 1975 and decreased to 3.4 in 1993/94 [4]. However, the fertility level stalled at 3.3, during 1996/97 to 1999/2000 and then fell to 3.0 in 2004 [5]. Although the level of fertility stalled, the contraceptive prevalence rate (CPR) rose from 45 percent in 1993 to 58 percent

e-mail:drsabinaus@yahoo.com
Si1c08@soton.ac.uk
Sabina-sta@sust.edu

in 2004. Several researchers have argued that the fertility decline in Bangladesh was achieved primarily due to successful family planning programme [6-8].

Fertility transition in many developing countries has been associated with socioeconomic factors. Educational differentials have been the best established and most widely studied socioeconomic differentials of fertility [9-15]. The effect of education on fertility was also attributable to other factors such as family wealth status, rural-urban residence and region. Higher fertility level was found among illiterate women in rural areas and in poor households [16,17]. It is widely accepted that educational level contributes to differences in fertility level, and it is expected that it plays vital role in fertility transition. In developed countries it was observed that schooling enrolments and educational composition typically improved from the start of fertility transition [18]. The female stipend program compelled adolescent girls in secondary schools to delay their marriage and motherhood [19]. Jeffery and Basu [13] have shown that 10 percent increase in the female

literacy is associated with a 0.5 percent decline in total fertility rate. Akman [20] has found that 80 percent female literacy is needed for achieving the replacement level fertility in developing countries such as Bangladesh.

Mother's education has been identified as a more powerful indicator of child survival than economic characteristics of the family e.g., father's occupation [21,10]. Schooling of women seems to play greater impact on reproduction than the education of men. Based on the data from 57 less developed countries from DHS, Bongaarts [1] found that educational differentials in wanted fertility tend to decline and unwanted fertility tend to rise during the period of transition. Educational composition of the population is a key predictor to reduce overall fertility in late transitional countries, while low level of schooling has been found to be a cause of stalling fertility [1].

Cleland [18] has studied the effect of education on fertility and its' trends in the mid-transitional countries and identified that the educational composition of populations for the future course of fertility ranged from 3-4 births per woman. A clear strong positive association was found between schooling at individual and transition stage of fertility. Caldwell and Caldwell [22] examined the characteristics of 12 Asian administrative cities with very low fertility at various stages of their fertility decline and then compared their findings with the situation in three Asian countries - Sri Lanka, India and Bangladesh. The study made predictions on the replacement level fertility of the South Asian countries considering two variables: the percentage of girls in secondary school and infant mortality rate. According to the study, below replacement fertility would probably be in Sri Lanka in the immediate future, whereas India and Bangladesh would attain it within a quarter of this century.

In Bangladesh, girls' education has increased remarkably for those who were born in the recent decades since 1970. The proportion of girls who have one or more years of education has increased by 10 per cent every five years [23]. Recent studies found a significant, linear and inverse relationship between women's education and fertility in Bangladesh [24-27], whereas a curvilinear relationship was reported by Chowdhury [28].

The main objective of the paper was to examine the role of education on fertility reduction in Bangladesh and to identify the explanatory factors associated with fertility. The study also attempted to explain the status of fertility transition according to various educational groups of women in Bangladesh (see Bongaarts [1]). This study is expected to contribute a better understanding of the role of education in explaining variables of fertility. The detailed description of the various dimensions of the fertility transition will also be helpful in explaining the nature of the transition, and identifying population policy.

Materials and Methods

The data for this study were taken from the "2004 Bangladesh Demographic and Health Survey (BDHS)". The sample of this survey was drawn from the Integrated Multipurpose Master Sample (IMPS) created by Bangladesh Bureau of Statistics (BBS). The design of the survey has been described in detail elsewhere [5]. The survey includes information on fertility levels, fertility preferences, family planning methods, socioeconomic and many others background characteristics collected from 11,440 ever-married women of whom 92.5 percent were currently married. In this study, women's education was grouped into four categories: illiterate (no formal education), primary incomplete (year 1-4), primary complete (year 5), secondary and higher (year 6 and above). The study considered women's education, area of residence, region (division) and household wealth status as background characteristics of women. The fertility transition

stages recommended by Bongaarts [1] according to the level of TFR are shown in Table 1.

Table. 1. Fertility transition stages after Bongaarts [1].

Transition stage	Pre	Early	Early-Mid	Mid	Mid-late	Late	Post
TFR range	7+	6-6.9	5-5.9	4-4.9	3-3.9	2.1-2.9	0-2.0

The Poisson regression was selected as an appropriate procedure to estimate children ever born (CEB). The Poisson regression model can be written as:

$$\mu_i = e^{a + X_{1i}b_1 + X_{2i}b_2 + \ldots\ldots\ldots + X_{ki}b_k}$$

where μ_i is the mean of the distribution (estimated from observed characteristics of the independent variables), 'a' is the constant, b_i represents deviation from mean of the reference category of each group. The X variables are related to μ nonlinearly. In this study μ_i is the expected number of children born to a respondent based on various characteristics.

Results and Discussion

Trends and Transition Stages in Fertility

The trends and transition stages of Bangladesh national level fertility over the period 1975 to 2004 are shown in Figure 1. According to the fertility transition stages [1], the average TFR was found in the early stage of transition in 1975 (6.3) and then early mid stage of transition in 1989 (5.1). Now it
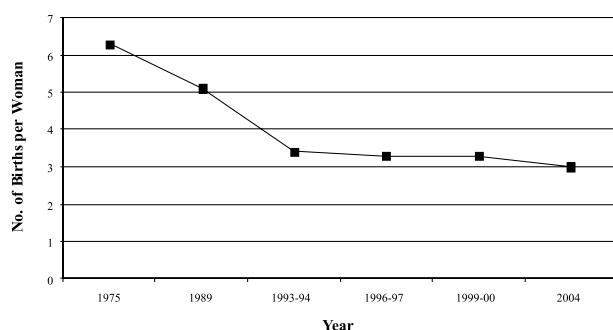

Figure 1. Trends and Transition Stage of TFR in Bangladesh, 1975-2004.

fell in mid-late stage ranging from 3.4 in 1993/94 to 3.0 in 2004.
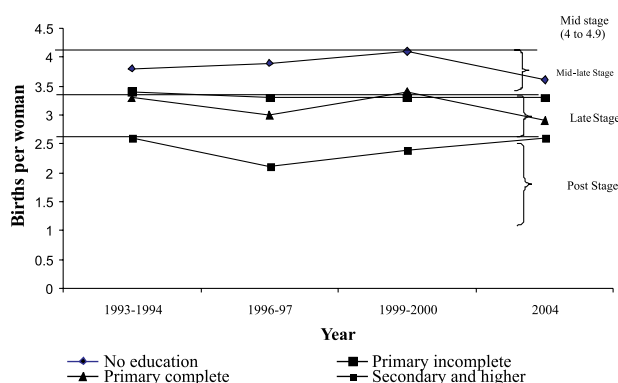
Role of Education in Fertility

Education is one of the most important socio-economic factors, which have great influence on fertility. It has been separately used by demographers among all the indicators of socio-economic variables. Education of adults is the single most powerful predictor of their reproductive behavior and thus length of education has been associated with the start of reproductive life (age at marriage and motherhood), child bearing, use of birth control and overall reproductive well being [18] .Women who received better education have shown lower fertility compared to illiterate women as is evident from the data obtained through all DHS and WFS surveys, though the relationship between level of fertility and level of education was not always linear or monotonic [12]. This relationship may be influenced by other factors such as urban-rural residence, regional settings and household wealth index.

Fertility Level by Women's Education

From Table 2 (last row) it is observed that the level of fertility steadily declined with increased level of education. For the women who did not receive any formal education and attended incomplete primary education, the level of total fertility rate was 3.6 and 3.3, respectively, which is above the national level (3.0), whereas the fertility levels were below the national level for those having primary (2.9) and secondary and higher education (2.6). The findings indicate that illiterate women given one birth greater than did the highly educated (secondary and higher) women. The results of the study show an inverse relationship between women's education and fertility in Bangladesh, which is similar to earlier studies in Bangladesh [25-27]. This suggests that by increasing women's education (at least post-primary level), fertility may

Table 2. TFR and TMFR by education and background characteristics of women in Bangladesh, 2004 BDHS.

Background characteristics	TFR by Education				Row TFR	TMFR by Education				Row TMFR
	Illiterate	Primary incomplete	Primary complete	Secondary & higher		Illiterate	Primary incomplete	Primary complete	Secondary & higher	
Residence										
Urban	3.0	3.0	2.6	2.2	2.5	3.5	3.6	3.3	3.1	3.3
Rural	3.9	3.5	3.2	2.9	3.2	4.4	3.9	3.7	3.6	3.9
Division										
Barisal	4.2	3.1	3.2	3.3	2.9	4.3	3.5	3.4	2.9	3.4
Chittagong	5.4	3.9	4.0	3.3	3.7	5.4	4.3	4.3	4.1	4.6
Sylhet	5.1	4.9	3.9	3.9	4.2	5.9	5.5	4.5	4.0	5.2
Khulna	3.1	3.1	2.9	2.3	2.6	3.3	3.1	2.9	3.3	3.2
Rajshahi	3.2	2.8	2.6	2.4	2.8	3.4	2.9	2.7	3.0	3.1
Dhaka	3.7	3.6	3.0	2.3	2.9	4.1	4.1	3.4	3.1	3.6
Wealth index										
Poor	4.1	3.7	3.8	3.5	3.8	4.6	4.2	4.3	4.3	4.7
Middle	4.0	3.6	3.5	3.2	3.3	4.5	4.1	3.9	3.8	3.9
Rich	2.5	2.8	2.5	2.4	2.4	3.2	3.3	3.3	3.2	3.9
Column Total	3.6	3.3	2.9	2.6	3.0	4.3	3.9	3.7	3.4	4.2

Figure 2. Trends and Transition Stage in TFR by Women's Education in Bangladesh, 1993-2004.

reach the replacement level quickly. As expected, total marital fertility rate (TMFR) was higher for all groups studied compared to TFR because births outside marriage are prohibited in Bangladesh. An inverse relationship was held between TMFR and women's educational level. Figure 2 illustrates that secondary and higher educated women belonged to post stage of transition, whereas illiterate women belonged to mid-late stage but other categories remained in late stage since 1993/94. After controlling the effect of other explanatory variables, women's education had a significant negative impact on ever born children compared to the illiterate women (Table 3).

Role of Education on Fertility by Women's Background Characteristics

To examine the effect of education on fertility, TFR and TMFR were also obtained for the various level of women's education according to their several background characteristics. Residence, region, and household wealth status were considered as the background characteristics of women for this study.

Residence

In each level of education TFR and TMFR were higher for rural area than for urban area (Table 2). In urban area, TFR ranged from 2.2 (for Secondary and higher) to 3.0 (for illiterate), whereas in rural area TFR ranged from 2.9 (for Secondary and higher) to 3.9 (for illiterate). Other studies have also found that fertility rate in rural areas is higher compared to urban areas [20,29]. The analysis of TFR by residence and educational status of woman showed that the level of fertility was the highest among illiterate women living in rural area and the lowest among highly educated women of the urban area. In urban area, women with illiterate and primary incomplete education had TFR 3.0, which is equal to the national level, while women having secondary and higher education attained near replacement level of fertility. On the other hand, the fertility level in rural area also decreased with increased educational level, but it remained far from the replacement level (2.1). This difference may be due to the fact that the educated women are more likely to live in urban areas and

have lower fertility due to greater access of family planning services and other modernization effects. Poisson regression revealed that urban area has a significant negative association with the number of ever born children after controlling the effect of other variables (Table 3).

Region

Fertility level varied widely in the six administrative divisions of Bangladesh according to level of women's education. The highest TFR was for Sylhet (4.2), followed by Chittagong (3.7), whereas the lowest TFR was for Khulna (2.6) followed by Rajshahi (2.8) (Table 2, column 6). Illiterate women of Chittagong Division had the highest TFR (5.4) followed by Sylhet (5.1). Secondary and higher educated women of Khulna and Dhaka Divisions had the lowest TFR (2.3) followed by Rajshahi (2.4). It was found that education is inversely related with fertility. The highest TMFR was found for Sylhet Division (5.9) for illiterate women followed by Chittagong Division (5.4). For the secondary and higher educated women, TMFR was 4.1 and 4.0 births for Chittagong and Sylhet Divisions, whereas it was around 3 for the rest of the regions. Table 2 reveals that Sylhet, Chittagong and Barisal had a significant positive impact on ever born children compared to Dhaka Division, which is the capital of Bangladesh, whereas Khulna and Rajshahi Divisions had a significant negative impact after controlling the other socio- economic variables. It may be concluded that Sylhet and Chittagong Divisions lag behind other regions of Bangladesh in terms of socioeconomic development and reproductive health.

Household Wealth Status

The study shows a negative relationship between TFR and educational status of women for each economic group (Table 2)(see also [23] for

similarity of results). The present study showed a decreasing trend of fertility according to increasing education level and status of wealth index. It was the highest for poor illiterate women (for TFR 4.1 and TMFR 4.6) and the lowest for rich secondary and higher educated women (TFR 2.4 and TMFR 3.2). For any level of education, it was observed that poor household contained a high TFR ranging from 3.5 to 4.1 and rich household had low TFR ranging from 2.4 to 2.8 (Table 2).The study also revealed that the richness of households correlates with lower level of TFR and TMFR, irrespective of the educational status. This may be due to the fact that the rich households are occupied by educated women who can easily grasp the benefits of the fertility transition programme. Moreover, the present analysis also found lower TFR among the women with higher wealth index compared to the other economic groups, and women's education is likely to be an effective social intervention for fertility decline. Poisson regression analysis also showed a negative significant association between wealth index and fertility compared to the poor group after controlling the effect of other variables (Table 3).

Table 3. Poisson Regression analysis of children ever born on socio-demographic characteristics of women.

Variables	β	95% Wald Confidence Interval	
		Lower	Upper
Education			
Illiterate	Ref.		
Primary Incomplete	-.405***	-.430	-.381
Primary complete	-.323***	-.360	-.286
Secondary & higher	-.863***	-1.111	-.615
Residence			
Urban	-.075***	-.099	-.050
Rural	Ref		
Region			
Barisal	.127***	.089	.165
Chittagong	.125***	.092	.158
Dhaka	Ref		
Khulna	-.078***	-.116	-.041
Rajshahi	-.078***	-.111	-.046
Sylhet	.148***	.109	.187
Wealth Index			
Poor	Ref		
Middle	-.027	-.057	.003
Rich	-.062***	-.088	-.036
Intercept	1.204***	1.160	1.248

Note: Ref. refers to reference category,
*p<0.05,**p<.01,***p<.001

Conclusion and Recommendations

The study demonstrates that according to Bongaarts classification, Bangladesh currently borders the late transition stage. As expected at all levels of education, TFR and TMFR are higher for rural areas than for urban areas. TFR is the highest for Sylhet, followed by Chittagong. The lowest TFR is for Khulna followed by Rajshahi. According to educational status of women, illiterate women of Chittagong Division have higher TFR than the illiterate women of Sylhet. Education has great impact among women belonging to all economic groups. According to Poisson regression analysis, higher education of women, residence in urban areas, and higher wealth status of households has significant negative impact on fertility. The Government of Bangladesh should strengthen the existing programmed on girl's free education up to secondary level. Higher educated women should be able to implement their fertility preferences including their higher degree of autonomy in reproductive decision-making, better access and information about contraception as well as cooperation from their husbands. As the educated women are more likely to live in urban areas and they may have lower fertility due to greater access of having family planning services and other modernization effects, the Government of Bangladesh should take necessary steps to improve the family planning services in the rural areas. Moreover, special attention should be given to Sylhet and Chittagong Divisions which lag behind other regions of Bangladesh in terms of socioeconomic development and reproductive well being of women.

References

1. **Bongaarts, J**. 2003. Completing the Fertility Transition in the Developing World: The Role of Educational Differences and Fertility Preferences. *Popul. Stud.* 57:321-336.

2. **United Nations 2001. United Nations Prospects:** **The 2000 Revision,** Department for Economic and Social Information and Policy Analysis. Population Division. New York: United Nations.

3. **Bongaarts, J**. 2008. Fertility Transitions in Developing countries: Progress or Stagnation? *Stud. Fam. Plann.* 39:105-110.

4. **Mitra, S.N., Ali, M.N., Islam, S., Cross, A.R., and Saha, T.** 1994. Bangladesh Demographic and Health Survey 1993-94, Calverton, Maryland: National Institute of Population Research & Training (NIPORT), Mitra and Associates, and Macro International Inc.

5. **NIPORT (National Institute of Population Research and Training) [Bangladesh], Mitra and Associates, and ORC Macro** 2005. *Bangladesh Demographic and Health Survey 2004*. Calverton, Maryland: National Institute of Population Research and training (NIPORT), Mitra and Associates, and ORC Macro.

6. **Caldwell, J. C., Khuda, B.E., Caldwell, I.P. and Caldwell, P.** 1999. The Bangladesh fertility decline: an interpretation. *Popul. Dev. Rev*. 25:67-84.

7. **Cleland, J., Phillips, J. F., Amin S. and Kamal, G.M.** 1994. *The determinants of reproductive change in Bangladesh: Success in a challenging environment.* Washington, DC, World Bank.

8. **Islam, M.M., Mamun, A.A. and Bairagi, R.** 1998. Fertility and its proximate determinants in Bangladesh: evidence from the 1993/94 Demographic and Health Survey. *Asia Pac. Popul. J.* 13:3-22.

9. **Caldwell, J.C.** 1982. Theory of Fertility Decline. *J. Marriage Family* 45:238-239.

10. **Cochrane, S. H** 1979. Fertility andeEducation: What do we really know? *J. Dev. Econ*. 7:591-591.

11. **Cleland, J. and Rodriguez, G.** 1988. The effect of parental education on marital fertility in developing countries. *Popul. Stud.* 42:419-442.

12. **Jejeebhoy, S. J.** 1995. *Women's education, autonomy, and reproduction behaviour: Experience from developing countries.* Oxford: Clarendon Press.

13. **Jeffery, R. and Basu, A.M.** 1996. *Schooling as contraception?* In: *Girl's Schooling, Autonomy and Fertility Change in South Asia*. Eds. Jeffery, R. and Basu, A.M., pp. 15-47. Thousand Oaks, C.A.: Sage Publications.

14. **NRC (National Research Council).** 1999. *Critical Perspectives on Schooling and Fertility in the Developing World.* Eds. Caroline H.B., Casterline, J.B., Jennifer A., Johnson-Kuhn and John G. H. Washington, DC: National Academy Press.

15. **United Nations.** 1995. *Women's Education and Fertility Behaviour, Department for Economic and Social Information and Policy Analysis.* Population Division. New York: United Nations.

16. **Merrick, T.** 2001. *Population and Poverty: A review*

of reviews. In: *Population Matters: Demographic Change, Economic Growth and poverty in the Developing World.* Eds. Nancy, B., Allen, C. Kelley, Allen, C. and Sinding, S. pp.201-212. New York: Oxford University Press.

17. **United Nations.** 1987. *Fertility Behavior in the context of development: Evidence from the World Fertility Surveys***.** *Population Studies***.** New York: United Nations.

18. **Cleland, J.** 2002. Education and future fertility trends, with special reference to mid-transitional countries. In: *Proceedings of expert Group Meeting on Completing the Fertility Transition. Population Division. United Nations (also forthcoming in UN Population Bulletin).*

19. **Raynor, J. and Wesson, K.** 2006**.** The girls' stipend program in Bangladesh. *J. Edu. Int. dev*. 2:2.

20. **Akmam, W.** 2002. Women's education and fertility rates in developing countries, with special reference to Bangladesh. *Eubios J. Asian Int. Bioeth***.** 12:138-143.

21. **Caldwell, J.** 1979. Education as a factor in mortality decline: an examination of Nigerian data. *Popul. Stud.* 3: 395-413.

22. **Caldwell, B. K and Caldwell, J. C.** 2003. Below-replacement fertility: Determinants and prospects in South Asia. *J. Popu.l Res*. 20:19-32.

23. **Rahman, M., DaVanzo, J. and Razzaque, A.** 2004. *When will Bangladesh reach replacement – level fertility? The role of education and family planning services.* United Nations, Department of Economic and Social Affairs, Population Division. New York. 343-357.

24. **CIA WorldFactBook.** 2008. *Bangladesh Demographics Profile 2008***.** http://www.cia.gov/library/publications/the-world-factbook/geos/bg.html.

25. **Amin, R. and Faruquee, R.** 1980. *Fertility and Its Regulation in Bangladesh***.** Washington D.C.: World Bank Working Paper No: 383.

26. **Khuda, B. and Howlader, S.R.** 1990. Demand Aspects of Fertility and Family Planning. In: *South Asia Study of Population in Bangladesh, Dhaka: United Nations Population Fund.*

27. **Miah, M. and Rahman, M.** 1993. Determinants of High Fertility in Bangladesh: Their Implications for Social Development. *Int. Rev. Mod. Sociol.* 23:75-89.

28. **Chaudhury, R. H.** 1977. Education and Fertility in Bangladesh. *Bangladesh Dev. Stud.* 5; 81-110.

29. **Alam I. and Casterline, J.B.** 1984. *Socio-economic differentials in recent fertility*. World Fertility Survey Comparative Study.33. Cross National Summaries.