

The Effect of Women's Education and Some Socio-Economic Variables on Fertility and Contraceptive Use in Bangladesh: A District Level Analysis

Abdul Goni

Hitotsubashi University, Kunitachi, Tokyo 186-8601, Japan

Abstract: It utilizes mainly the BMMS 2001 and Bangladesh District-Level Socio-Demographic and Health care Utilization Indicators that covers all geographic areas of the Country. Using some statistical techniques such as cross tabulation, correlation coefficients, important relationships between fertility and several demographic, socio-economic and spatial variables, are explored. In an attempt to understand fertility behavior of Bangladeshi women, a multiple regression analysis was utilized. It is found that woman's education and working status are apparently the most important determinants of fertility behavior and contraceptive use. It is also found that some variables, specifically child mortality, land ownership, household with TV, NGO involvement and the geographic region, are significant determinants of fertility and contraceptive use in Bangladeshi women. Finally, the study was able to present few suggestions and recommendations

Key words: Women's education, socio-economic, fertility, family planning, Bangladesh

INTRODUCTION

Bangladesh is a country as like many other developing countries has achieved a remarkable reduction in fertility despite little improvement in levels of living, education, women status, child survival and other factors frequently associated with the demographic transition. The family planning program is credited with being the main driving force behind this reduction, while the role of social and economic change is de-emphasized (Larson and Mitra 1992; Cleland *et al.*, 1994). Bangladesh is internationally considered a success story in family planning (Freedman, 1995), with an increase in contraceptive prevalence rising from 8-54 % and a decline in the total fertility rate from 6.3-3.3 in the three decades since independence. Success in meeting these population goals can be largely attributed to the commitment of the Government of Bangladesh (GOB) and the Ministry of Health and Family Welfare (MOHFW), which have effectively coordinated donor organizations, non-government organization NGOs to ensure that free or affordable contraceptives are available in both public and private health facilities throughout the country. The late 1980s has been a large increase in the number of couples using family planning method. Unfortunately, the use of family planning has decline to 50% in 2001 BMMS. The decline in overall use is due to a decline in the use of traditional methods (from 10-6%). Use of modern methods has little changed since 1999-2000.

As for social indicators women have gained in the development process. Levels of female labour force participation rose from the low level of 15.5% in 1995 to 23.9% in 1999-2000. The NGOs and the garment industry have absorbed a good of female labour force. Electricity is another important element of human life for developing countries like Bangladesh. Electricity generates employment. The impact on employment is both direct and indirect. Women in the electrified households are involved more in household level income-generation activities and depict better re-allocation of time for remunerative employment; unemployment rate is relatively low in the electrified households and relatively higher share of non-agricultural employment in the electrified households indicates modernization effect of electricity on occupation. The overall literacy rates for both male and female in the electrified households are higher, especially due to the household's access to electricity which has contributed much both in economic terms as well as in raising awareness about value of education (Barkat *et al.*, 2002).

Demographic and social-economic variations exist in Bangladesh across different regions. The total fertility rate is lowest in Khulna division (2.5) and highest in Sylhet division (4.3), which is 2 times higher than Khulna division. Women with no formal education have more children (3.8) than formal educated women (2.5) with at least secondary education. Like education, women in

poorer households have more children than women in wealthier households. With a TFR of 4.2, women in the poorest households are likely to have about two children more than women in the wealthiest households (TFR of 2.4). Proportion of women working for cash/kind is lowest in Sylhet division (22.3) and highest in Khulna division (31.8). There have also been significant changes in the fertility and women employment related variables, like infant mortality rate, CPR, female education etc.

Apart from being of intrinsic interest, these interregional and inter-temporal variations provide useful opportunities to study the determinants of demographic outcomes of different district in Bangladesh. This study examines some of the relevant relationships between TFR and contraceptive use based on a cross-sectional analysis of district-level data from the Bangladesh Maternal Health Services and Maternal Mortality Survey. This study also tried to determine the most important factors affecting reproduction behavior. Specifically, objectives of this paper are) to present the levels of fertility and contraceptive use in Bangladesh and) to determine the most important variables that explain the fertility behavior and contraceptive use.

From a fertility point of view the fertility determinants in population is a complex process. While fertility behaviour influences population growth, which has consequences towards pressure on resources, employment situations, health and other social facilities and savings and investment, in turn, such consequence have great bearing on the socio-economic variables that affects fertility behaviour. Socio-economic conditions of a population and differences in them affect the level of fertility in a population and create differences among the sub-groups or sub-regions. The demographic and the socio-economic variables considered for investigating the fertility and contraceptive use by various sub-regions of population are-education of women, work status of women, Child mortality and household condition of women.

In this study, samples consist of 64 districts for which detailed information is available. Under the study the demographic outcomes are total fertility rate, contraceptive use and some socio-economic variables-particular attention is paid to female literacy, female household conditions (electrified or not) and involve in NGO activities.

MATERIALS AND METHODS

The 2001 Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) create an opportunity to address this information need. This study utilized mainly and Bangladesh District-Level Socio-Demographic

and Health care Utilization Indications. The BMMS is the first national survey conducted in Bangladesh to serve as a source of maternal health and maternal death data for policy makers and the research community. The survey also collected other information such as household socio-economic conditions, education, reproductive and child health. In the past, most data on the country's socio-economic development, health and family planning were only available at the division level. Due to the large sample size of BMMS, it is possible to present this information at the district level. The survey was implemented under the authority of National Institute of Population Research and Training (NIPORT) in collaboration with ORC Macro, USA. The Johns Hopkins University, USA and ICDDR,B provided technical assistance. Associates for Community and Population Research (ACPR), Mitra and Associates, two Bangladeshi private research firms, collected the survey data of all sample points from November 2000-April 2001. Some other source like Bangladesh Demographic and Health Survey (BDHS) 2004 has been used.

Administratively, Bangladesh is divided into six divisions. Each division is divided into districts (Zilas), for a total of 64 districts and then thanas/upazilas. Each urban area in a Thana is divided into wards and each rural area in a Thana is divided into union parishads. In each division, the list of wards constituted the initial sample frame for urban areas and the list of union was the sample frame for rural areas. At the first stage, a total of 1.616 clusters from 808 (674 urban and 134 rural) primary sampling units were randomly selected. A second stage, a systematic sample of 104.323 households was selected to interview more than 100.000 ever-married women age 13-49.

Three types questionnaires were asked for the BMMS: a Household Questionnaire, a Women's Questionnaire (for ever married women age 13-49) and Verbal Autopsy Questionnaire (for deaths of women age 13-49). The survey collected basic information such as age, sex, marital status and education. Information was also collected on household characteristic such as type of housing, sources of water and availability of electricity. The information about female adult deaths identified deaths for which the Verbal Autopsy Questionnaire was used.

The ever-married women age 13-49 were asked questions on the following topics: Background Characteristics (age, education, religion, etc), reproductive history, use of family planning methods, information about siblings (to calculate the maternal mortality rate).

Table 1: Variable name, definitions and sample summary statistics

Variable	Definition	Mean	Standard deviation
TFR	Total fertility rate	3.2	0.71
Female labour force participation	Proportion of women aged 15-49 working for cash who are considered in the labour force	28.3	3.6
CPR	Contraceptive prevalence rate with modern method	44.0	10.88
Women education			
	Any schooling age 7-12	90.10	5.80
	Primary complete	58.15	9.90
	Secondary complete	42.9	11.2
Male education	Secondary complete	51.24	9.31
CMR	The probability of dying between the first and fifth birthdays	28.6	10.4
HH's w electricity	Households with electricity (%)	26.6	16.3
HH's with land	Ownership of land means that household owning less than 0.5 acres of land other than homestead (%)	66.8	7.8
HH's with poorest	Households with the lowest wealth scores (%)	24.9	11.0
HH's w TV	Household owning a television (%)	14.4	9.1
NGOs	Number women involve in NGO activities come from particular division/district and divided by total number of women of particular division/district expressed by percentage.	28.36	8.9
Region			
Rajshahi division	Dummy variable, with value 1 for district of Rajshahi division	0.25	0.44
Khulna division	Dummy variable, with value 1 for district of Khulna division	0.16	0.37
Chittagong division	Dummy variable, with value 1 for district of Chittagong division	0.17	0.38
Barishal division	Dummy variable, with value 1 for district of Barishal division	0.09	0.29
Sylhet division	Dummy variable, with value 1 for district of Sylhet division	0.06	0.24

Sources: NGO: Bangladesh Demographic and Health Survey and remaining all the information come from BMMS 2001

Fertility is measured by the Total Fertility Rate (TFR) and its component Age-Specific Fertility Rates (ASFRs). The TFR is defined as the number of children a women would have by the end of her childbearing years if she were to pass through those years bearing children at the currently observed age-specific rates. The child mortality is the probability of that a child will die before attaining the age of five years.

Another indicator is level of education of women. Proportion of women's age 15-24 with completed secondary education as included our analysis. Female labour force participation, where include is the percentage of women age 15-49 participating in labour force. I include two unconventional new variables NGOs and electricity, which are relating to women's employment and consumption of population.

Finally, region dummy variables are used to identify regional patterns. A list of the variables, their definition and sources are given in Table 1, which are the summary statistics of our data. Most of the information used in this analysis is derived from 2001 BMMS and another source is which are available in published survey reports (Table 1).

In this study two dependent variables are used: Total fertility rate and Use of contraception to the BMMS 2001 data. Two categories are used for each of the two dependent variables: For the contraceptive use variable-use of modern family planning method and for the total fertility rate. The independent variables included were the woman's participation in the labour force, access to mass media, women's educational attainment (schooling,

primary education and secondary education) and involvement in NGOs, landownership, electricity connection and geographic region. The relationship between fertility, CPR and its determinants has been examined using some statistical method such as Pearson correlation coefficient and multiple regressions for the district level data from. In district level data, cross-sectional analysis is standard based on the assumption that the error terms are independently and identically distributed. If there is a possibility of correlation between error term and explanatory variables the ordinary least squares estimates will be inconsistent and the estimated coefficients will not approach their true values even in very large samples (Murthi *et al.*, 1995). In order to test the consistency of our results two regression models were estimated; one with all independent variables (Model 1 and 3) and the other with only the significant ones (Model 2 and 4).

Several demographic, socioeconomic and geographic variables are used for the analytical purpose (Table 1). These variables represent some personal/household characteristics. Some of them are nominal in nature and included in the regression equations as dummy variables.

RESULTS

The Bangladesh Demographic and Health Survey (2001-2003) provide some interesting information on fertility differentials (as measured by total fertility rate and the mean number of children ever born) and current contraceptive use and educational attainment of women.

Table 2: Women educational attainment, fertility and use of contraception from Bangladesh Demographic and Health Survey (2001-2003)

Women's education	Fertility and use of contraception		
	Total fertility rate ¹	Total wanted fertility rate ²	Method of contraception (Any method)
No education	3.6	2.3	58.7
Primary education	3.1	2.1	57.9
Secondary incomplete	2.7	1.8	56.4
Secondary complete and higher	2.2	2.0	62.0
Total	3.0	2.0	58.1

Sources: Bangladesh Demographic and Health surveys 2004 about 10,000 ever-married women aged 10-49 years (p 51, 66, 113); Notes: ¹ see Table 1; ²Rates are based on births to women age 15-49 in the period 1-36 months preceding the survey

As expected, the educational attainment of women is strongly associated with fertility. Looking at the relationships between women's education and total fertility rate (Table 2); it appears that the TFR (2.2) of the women at least secondary completed education is less than one half that of the no educated women (TFR 3.6). The TFR decreases with rising levels of education. Table 2 also presents data on the same women's wanted (desired) fertility (TWFR). The table shows that all educational groups of women, except those with no education, want to have around replacement-level fertility (2.1) or lower. Women who have some primary school report that they want to have 2.1 children, whereas those with at least secondary wanted to have only 2.0 children. The wanted fertility for women with no education women still has a desire for an above-replacement level of fertility. For all educational groups, the total fertility rate exceeds the total wanted fertility rate. The difference is greatest for the group with no education-the TFR exceeds the TWFR by 1.3 children-and decreases with education to 0.2 children for the most educated group. If we can interpret this difference as unwanted fertility, we can conclude that enabling women to avoid unwanted fertility, e.g., through better family planning services, would lead to fertility rates around replacement level for all women except those with no education.

A quite similar picture emerges when one compares the contraceptive use by education levels of women; only those who have completed at least secondary education are more likely to report a higher use both the modern and traditional method than others women. It is mentioning here that TFR and mean ideal number of children are lower among the women who have completed at least secondary education. Generally contraceptive practice increases sharply with education. But here worst notable that the successive two BDHS suggested that contraceptive use has increased among women with little or no education (8%); while this figure only 2% among the women who

had at least secondary education. Those indicators in Table 2 suggest that educated women not only have different fertility goals but also have their aspiration on reality. Further indications of these different links between fertility, contraceptive use and education and some socio-demographic variables will be seen next section, is robust.

Fertility levels by spatial, demographic and socio-economic characteristics: Fertility behaviour is a complex phenomenon that results from the interplay of various social, psychological and cultural patterns related to employment, child mortality, contraceptive use, level of education and socio-economic development. It is not feasible to explain all the factors of fertility transition in Bangladesh together. Therefore, we need to classify the district into groups in such a way that they are highly heterogeneous between groups and homogeneous within groups to better understand the fertility behaviour. In this paper considered 64 district and 6 geographic broad regions/administrative divisions. It is very useful to present fertility levels by important woman's characteristics, familial attributes and geographic regions of the country.

First of all, the data clearly show that there is strong relationship between fertility, contraceptive use and others demographic and socio-economic variables (Table 3). The Chittagong and Sylhet division exhibit total fertility rate from 3-5, while the rates are lower-generally around 3 in the Rajshahi and Khulna divisions. The Dhaka division exhibits average fertility rates. The Barisal division is the third lowest fertility rate regions. The Rajshahi district under Rajshahi division shows lowest fertility rate (2.0). The Cox's bazaar (5.0) and Sunamganj (4.8) district shows relatively highest fertility rate at the same time. Generally, higher fertility rate there than in Chittagong division (3.74) and Sylhet division (4.27) and lower acceptance the family planning method especially among the women of Cox's bazaar district (20.70) and Sunamganj district (18.90). The fact that the women's of Rajshahi (29.43%) and Khulna (31.56%) divisions are more involve in NGO activities and more active in labour force (30.20 and 31.3% respectively) than remaining regions, may also provide them with greater reason to control fertility rate.

It may be mentioned that broad region-level comparisons and classifications may not be able to capture fully the extent of diversities among various indicators characterizing several facets of development. Considerable regional diversity in terms of social, economic and demographic characteristics prevails in Bangladesh. This is true not only among the broad region

Table 3: Differentials of demographic and some socio-economic variables of different regions in Bangladesh

Regions /divisions			Name of the variables		
	TFR	CPR	Education (Any schooling)	Women working for cash ¹	Child mortality ²
Rajshahi Division	2.85	56.4	90.7	30.2	24.0
Khulna Division	2.61	61.8	94.9	31.3	19.2
Barisal Division	3.32	47.8	90.5	25.6	36.6
Dhaka Division	3.22	52.2	89.3	29.7	31.5
Chittagong Division	3.74	37.7	88.5	22.8	36.8
Sylhet Division	4.47	28.1	83.3	27.4	38.4

Source: Bangladesh District level socio-Demographic and Health care Utilization Indicators 2001(p 4-9); Notes: ¹ %age of women aged 15-49 participating in labour force; ² Child mortality (deaths per 1,000 children surviving to the first birthday)

but also among the districts of the same broad region. In general, these striking variations among the region in the livelihood of the common people stem from various factors such as the level of literacy, female education, nutritional standards, child mortality, morbidity, employment, income distribution, etc. and their corresponding interactions. These differentials of demographic and socio-economic variables among the regions interest researcher to observe the cross-relationships between fertility, women's employment and with socio-economic variables in district levels except spatial region. Table 4 produces the results of Pearson correlation coefficient of TFR, CPR and with some socio-economic variables.

The correlation between female labour force and fertility is -0.54 and statistically significant which implies that greater female labour force participation rate tends to be more declines in fertility rate. Greater acceptance of family planning methods means that the greater control of fertility rate. The correlation between these two variables is -0.86 (not shown in table) and highly statistically significant. But the correlation between CPR and female employment is positive and statistically significant which implies that working women more likely to use family planning method than others.

Child death is also found to be strongly related to fertility and CPR among the Bangladeshi women. The correlation between child mortality and fertility shows a significant positive relation and with CPR in significant negative relation. It means that if increases of child mortality, fertility rate would be higher and CPR would be decreases and vice versa. This finding is largely supported by most macro and micro fertility studies in different developing countries.

The close relationship between education-especially female education and demographic change has clearly emerged in recent empirical studies. Education is found to be strongly related to fertility and CPR. Illiterate women

Table 4: Correlation Coefficients between dependents and independents variable

Independent variables	Correlation coefficient	
	With TFR	With CPR
Female labour force	-0.54**	0.64**
Any schooling	-0.70**	0.52**
Complete primary education	-0.68**	0.46**
Complete Secondary education	-0.33**	0.41**
Male secondary education	-0.32**	0.31*
CMR	0.75**	-0.66**
Household with land	0.05	-0.03
Poorest household	0.46**	-0.19
Household with electricity	-0.28*	0.06
Household with TV	-0.37**	0.28*
NGO involvement	-0.18	0.25*

***Correlation is significant at the 0.01 level, **Correlation is significant at the 0.05 level, (2-tailed)

tend to have larger number of children than those with higher level of education. As shown in Table 2, an illiterate woman was found to have four children on average, while a woman who obtained at least secondary education had two children. Similarly, the higher level of men's education is the smaller number of children. Based on the Pearson correlation coefficients, it seems that women's education is more strongly related to fertility and CPR than men's educational attainment. The importance of each of these two explanatory variables and their contribution in explaining fertility behavior and CPR will be examined in the next section.

The correlation between households (HH's) with electricity and fertility and HH's with electricity and CMR is negative and statistically significant except TFR. This implies that the electrified households are relatively lower fertility and child mortality rate. Again the correlation between households (HH's) with electricity and female labour force and households (HH's) with electricity and education is positive and statistically significant except FLPR. So, electricity has contribution on reducing fertility, child mortality and increase literacy rate and created employment opportunities.

The fertility seems to be related to landownership. The fertility rate is higher among the women of poorest household than household with land. The correlation between poorest household and fertility is positive and statistically significant. The correlation between household with land and fertility is positive but not significant. Both the landownership is negatively related to CPR but not statistical significant.

Mass media is strongly related to fertility and CPR. The correlation between TV and TFR shows a significant negative relation. The correlation between TV and CPR shows a significant positive relation.

The correlation between NGOs and fertility is negative but not shows statistically significant. May be it has an interaction effect with others variables. But the

correlation between NGOs and CPR shows a significant positive relation. It implies that NGOs has awareness ability among women regarding small family norm, health, education and created employment opportunities.

Some determinants of fertility behaviour and family planning method: Despite the importance of descriptive analysis in previous section, it is very important to determine the variables that explain fertility behavior and contraceptive use in Bangladesh. Utilizing multivariate analysis in which all independent variables are taken into consideration, our hypotheses can be tested. The results of multiple regression analysis show that most of the independent variables have significant effect on fertility and contraceptive use. Few regression coefficients of some variables such as male education, NGOs involvement and household with land are not statistically significant on fertility. In order to test the consistency of our results two regression models were estimated; one with all independent variables (Model 1) and the other with only the significant ones (Model 2) for TFR and Model 2 and Model 3 for CPR. Apart from indicating the signs of the coefficients and whether they are statistically significant, Table 5 and 6 makes it possible to assess the quantitative effects of different demographic and socio-economic variables on fertility and CPR by combining the given information with the mean values presented in Table 1.

The multiple regression results presented in Table 5 and 5 shows that the female education is of the most important variable. As education level increases, fertility decreases and raises contraceptive use significantly. The results of any schooling and higher education are expected in sign but the primary educations are not showed expected in sign. Data from the World Fertility Survey and the Demographic and Health Survey confirm the positive effect of education on reproductive behaviour (Schultz, 1997; World Bank, 1997). Clearly, those with schooling beyond the primary level have a higher contraceptive use and lower fertility than those without. We expected a strong negative relation between fertility and male education and positively with contraceptive use. The fact that male's education has been found not to have significant effect on fertility and contraceptive use. This is probably due to its interrelationship with both the female and male education.

Female labour force is another most important variable that explain fertility behaviors and contraceptive use. It has a negative and highly statistical significant effect on fertility and positively on contraceptive use in the country. Contraceptive use appears to be significant determinants of fertility and female labour force indicating

Table 5: Some determinants of fertility: the results of multiple regression analysis of cross-sectional data

Independent variables	Model 1	Model 2
Constant	31.35* (3.23)	35.38* (4.48)
Education		
Any schooling	-0.35* (-2.49)	-0.42* (-3.50)
Primary complete	0.14*** (1.82)	0.13** (2.27)
Secondary complete	-0.08*** (-1.71)	-0.10** (-2.03)
Secondary complete male	0.01 (0.55)	
Female labour force	-0.99* (-2.95)	-1.09* (-3.99)
Child mortality	-0.03* (3.73)	0.02* (4.15)
Household with land	-0.01 (-0.10)	
Household with poorest land	0.04* (3.22)	0.03* (3.64)
Household with electricity	-0.28*** (-1.64)	-0.20*** (1.66)
Household with TV	-0.03*** (-1.65)	-0.08** (-1.95)
NGO involvement	-0.02 (-0.341)	
Interaction effect		
Female labour force X Any schooling	0.02** (2.45)	0.02* (3.58)
Female labour force X Primary complete	-0.02*** (-1.74)	-0.01** (-2.40)
Female labour force X Secondary complete	0.03*** (1.63)	0.07** (2.02)
Geographic Region		
Rajshahi division	-0.06 (-0.052)	
Khulna division	-0.06 (-0.54)	
Barisal division	-0.51* (-2.72)	-0.44* (-2.88)
Chittagong division	-0.46*** (-1.77)	-0.64* (-3.43)
Sylhet division	0.26 (1.27)	
Adjusted R ²	0.81	0.82
F Statistics	14.82*	29.52*
Number of observation	64	64

Note: Values of 't' are shown in parentheses. *Significance at less than 1 %, **significance at less than 5 % and ***significance at less than 10 %. For definition of variables see Table 1

Table 6: Some determinants of contraceptive use: the results of multiple regression analysis of cross-sectional data

Independent Variables	Model 2	Model 3
Constant	-315.61** (-2.10)	-341.50* (-3.02)
Education		
Any schooling	4.59** (2.11)	5.02** (3.17)
Primary complete	-3.38** (-2.79)	-3.19** (-3.05)
Secondary complete	2.33* (2.90)	1.84* (3.03)
Secondary complete male	0.04 (0.24)	
Female labour force	13.02* (-2.49)	13.68* (3.46)
Child mortality	-0.26* (-2.58)	-0.23** (-2.65)
Household with land	0.09 (0.77)	
Household with poorest land	-0.26*** (-1.95)	-0.25*** (-1.96)
Household with electricity	0.02** (2.09)	0.01* (2.99)
Household with TV	0.43*** (-1.70)	0.40*** (1.75)
NGO involvement	0.03*** (1.87)	0.02*** (1.90)
Interaction effect		
Female labour force X Any schooling	-0.16** (-2.19)	-0.17* (-3.17)
Female labour force X Primary complete	0.12* (2.90)	0.12* (3.25)
Female labour force X Secondary complete	-0.09* (-3.25)	-0.07* (-3.49)
Geographic Region		
Rajshahi division	1.72 (0.67)	
Khulna division	0.68 (0.27)	
Barishal division	4.45*** (1.62)	4.49*** (1.75)
Chittagong division	0.39 (0.07)	
Sylhet division	-16.74* (-5.34)	-18.26* (-6.78)
Adjusted R ²	0.80	0.81
F statistics	14.44*	27.16*
Number of observation	64	64

Note: Values of 't' are shown in parentheses. *Significance at less than 1 %, **significance at less than 5 % and ***significance at less than 10 %. For definition of variables see Table 1

that are appropriate instruments. The sharp increase in contraceptive prevalence has led to an appreciable decline in fertility (Khuda *et al.*, 2000). Working women are more likely to use contraception and fewer children as compared to non-working women.

It is also found that child mortality significantly affect the fertility positively and contraceptive use in negatively. The infant deaths shorten the period before next pregnancy and consequently lead to more births. This result is expected since most, if not all, fertility studies found similar results in different parts of the world. It is worthy to note that Infant Mortality Rate (IMR) has sharply declined in Bangladesh during the last decade, which might suggest further decline in fertility.

As expected, higher levels of poverty are associated with higher levels of fertility and lower use of contraception. It is found that the women of household with poorest land are higher fertility than those women of households with land. There is a positive statistically significant relationship between HH's with poorest land and fertility and negatively with contraceptive use. There appears to be little or no effect of landownership status on fertility and contraceptive use.

Another important economic condition of household level is electricity. About one-third (32%) of the households in Bangladesh have electricity. HH's with electricity has a significant negative effect on fertility and positively on contraceptive use (this results is consistent with Khuda *et al.*, (2000) and Barakat *et al.*, (2002). Electricity not only contributes to declining over all TFR, but also contributes reduction in TFR among the poor. Electrification has contributed to the positive development on women's socio-economic status. Electricity has left a profound impact on women's mobility, participation in IGAs, decision-making, freedom in using income and savings, better utilization of credit, knowledge about gender inequality issues, household work plan according to convenience, changes in attitude in terms of reducing healthcare disparities, increase in overall years of schooling for both boys and girls, preference to send girls to schools, awareness of legal issues (as for example, marriage for girls at 18 and boys at 21) and awareness about negative impact of dowry. Although, women in the non-electrified households are working inside and outside home, they have less control over utilization of their earnings, decision-making and their level of awareness of fundamental rights is low (Barkat *et al.*, 2002).

The mass media like TV has a significant effect on fertility and contraceptive use. A woman's having access to mass media, especially TV with higher probability of contraceptive use and lower fertility and mean number of

children. It is found that the significantly negative effect on fertility and positively on contraceptive use.

Another important unconventional new variable is NGOs, which has a significant effect on contraceptive use. The regression coefficient corresponding to NGOs shows an expected sign and statistically significant. The fertility rate is lower among the women associated with the activities of NGOs. But the result is not statistical significant. This is probably due to the fact that the relationships between fertility and NGOs reflect the joint influence of some others; time varying variables (Goni, 2007). The NGO sector is currently playing an important role on informal education program (Table 1) and created employment opportunities, especially among rural poor women. Non-governmental Organizations (NGOs) in Bangladesh, especially the Bangladesh Rural Advancement Committee (BRAC), have been famous for their non-formal primary education programs that run low-cost schools for the poor. Because poor children help in household economic activities, school timing is set in such a way that the poor can participate in both school and household economic activities. Non-formal schools emphasize girls' education by enrolling more girls than boys. Involvement of women with NGOs required traveling among different places to attend meeting and training and deposit savings and credit installment to bank. All these factors exposed them to new ideas, knowledge and experiences through their interactions with the outside world consequently reducing fertility and increase contraceptive use among the Bangladeshi women (Goni, 2007).

In developing countries, especially Muslim majority country some researcher has found that no effect of work status on fertility (Noor, 1986). Weak relationship between work status and fertility in some developing countries is due to availability of child care through the help of relatives (Chaudhury, 1978; Zurayk, 1987). In addition, it is not necessary for participation in the labor force to always lead to reduction of number of children, because of the competition between bearing children and work for the time of mother and father (Easterlin, 1975). But in my study, there is relatively strong relationship between education level and woman's participation in the labor force. For this reason, an interaction term between education and female labour force was introduced into both the regression model. It is found that this term is statistically significant, indicating that the effect of education varies based on work status. As for example, the effect of at least secondary education is a little less for working woman compared to non-working woman ($-0.08 + 0.03 = -0.05$). This result emphasizes the weak impact of labour force upon fertility behavior.

The geographic variables are significant in explaining the variations of fertility and contraceptive use in the country. Some dummy variables have introduced to represent major geographic regions in Bangladesh, it is found that a woman living in Rajshahi and Khulna division have lower fertility rate and higher contraceptive use than those in the Central Dhaka division. In general, fertility rate is higher and Contraceptive Prevalence Rate (CPR) is lower among the women of Chittagong and Sylhet division. Our findings show that the fertility rate is decline and contraceptive use increases the entire region except Sylhet division. But the results are not significant for Rajshahi and Khulna division. It is worth noticeable that the Sylhet division fertility rate is increase and contraceptive use decreases. It is observed from the Table 5 and 6 that the fertility rate is decline significantly in high fertility regions that are Chittagong and Barisal division but the low fertility rate regions like Khulna and Rajshahi division fertility rate decline is not pleasing as like stall in recent decades. This result is also consistent with the findings of other study (Islam, 2003). It also seems that geographic variables capture the effects of some variables that are not in the model.

The overall explanatory power of the regression model is satisfactory ($R^2 = 0.81$ and 0.80). This indicates that the model was able to explain 81% of the variations in the dependent variable TFR and 80% CPR. In sum, it was shown that female education especially secondary completed is one of the most important variables in the model. This means that fertility and contraceptive use in Bangladesh is influenced by female education, rather than the impact of the landownership. In addition, some other variables are found to affect fertility and contraceptive use such as child mortality, female participation in the labour force, poverty, electricity and mass media.

CONCLUSION AND POLICY IMPLICATIONS

In many other developing countries, Bangladesh is one of the best examples of a country with a strong family planning programmed effort, which has brought a significant fertility decline. In an attempt to understanding the levels of fertility in Bangladesh in general and to determine the major factor affecting the fertility behavior and contraceptive use in particular, the data of a and Bangladesh District-Level Socio-Demographic and Health care Utilization Indications data were utilized and some statistical methods were used. The results of the analysis indicate that the important role played by women's education in fertility decline and increase contraceptive use in Bangladesh. The main findings can be summarized as follows:

Women's education has long been recognized as another crucial factor that influencing childbearing patterns. Women's education reduces her desired family size and increases contraceptive use. Total Fertility Rate (TFR) and Total Wanted Fertility Rate (TWFR) decrease with rising educational level.

Regression analysis revealed that women educational attainment and female labour force participation are the most important variables in explaining fertility behavior and contraceptive use in Bangladesh. Other variables were also found to be significant determinants of fertility and contraceptive use such as child mortality, landownership and household's asset like electricity and TV. The NGO involvement and geographic variables are also significant in the regression equation. We found that the fertility rate is decline significantly in high fertility regions that are Chittagong and Barisal divisions but the low fertility rate regions like Khulna and Rajshahi divisions fertility rate decline is not pleasing as like stall in recent decades.

Moreover, the findings of this study has important policy implications, especially in formulating national population policy and useful when addressing female's participation in the labor force. Our finding indicates that improvements in both education and family planning services should receive priorities in policies. Education is important for reducing fertility and (and also infant and child mortality), as well as in its own right for improving the human capital (and economic potential) of the population. There is need to give at least secondary education for all the women for further accelerate the fertility rate down in the country. Family planning services can help women avoid unintended pregnancies and the abortions that sometimes follow them (Rahman *et al.*, 2001). We find that there is a substantial amount of fertility that is excess of desired fertility. Excess fertility is higher among women with no or little education. Family planning programs can play a crucial role, especially among the women with no or little education, in reducing the gap between desired and actual fertility. Women's involvement in NGOs and participation in labour force are crucial factors for reducing fertility and using contraception. Therefore, the policy maker should carefully designed strategies with better counseling and supervision should lead to increases in contraceptive adoption and continuation and hence should further reduce fertility in the country.

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