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A STATISTICAL ANALYSIS TO IDENTIFY POTENTIAL FACTORS OF FERTILITY IN BANGLADESH

MASHFIQUL HUQ CHOWDHURY[1*] and DELUAR J. MOLOY[1]

[1]Department of Statistics, Mawlana Bhashani Science and Technology University, Santosh, Tangail-1902, Bangladesh

Abstract

Bangladesh is now experiencing a demographic transition. Between the 2007 and 2011 BDHS there has been almost a 15% decline in the total fertility rate, from 2.7 to 2.3 births per woman. Bangladesh aims to achieve replacement level fertility by 2015 (MOHFW, 2009). The aim of this study is to identify some potential determinants that affect womens fertility in Bangladesh and provide recommendations to accelerate fertility decline to achieve replacement level within shortest time period. This study used the secondary data from the Bangladesh Demographic and Health Survey (BDHS), 2011. First bivariate analysis was applied to examine the association between children ever born (CEB) and women's demographic, socio-economic and cultural characteristics. Then generalized linear modeling (GLM) approach (Binary logit link function) has been performed to quantify the simultaneous effect of key socio-economic and demographic factors. Binary logit approach efficiently determined few key covariates namely mother's age group, age at first birth and first marriage, highest educational attainment, media exposure, religion, experience of child death, employment status and residential places of women that are significantly associated with fertility. Therefore, in order to achieve replacement level fertility by 2015 Bangladesh government should focus on these identified factors and continue its effort to ensure higher education for females, to discourage early marriage, to decrease infant mortality and to promote to delay age at first birth.

Keywords: Binary logit, Fertility, Generalized linear model, Hosmer and lemeshow test

Introduction

The world population has experienced continuous growth since the mid of last century and raises concern about whether earth is facing overpopulation. The population of the world will soon reach at a level where there will not be enough resources to sustain life, even though, the growth rate declined from 2.2% to 1.1% by 2009 since mid of the last century. Under the current rate, different projections show a steady decline in the population growth, with the expected population to reach between 8 and 10.5 billion between the year 2040 and 2050. The scientific consensus is that the current population expansion and accompanying increase in usage of resources are linked to threats to the ecosystem, such as rising levels of atmospheric carbon dioxide, global warming, and pollution (UNFPA, 2009).

* Author for Correspondence: mashfiq3026@gmail.com

Among the Continents, Asia alone accounts for over 60% of the world population among which China and India together have about 40% of the world population. Bangladesh is a small country in South Asia with area 144,000 km^2. It has the highest population density in the world except few smaller countries. Population of Bangladesh is about more than 162 million in 2009 and contributes 2.36% of the world population and made it seventh most populous country in the world with growth rate 1.29% (WDI, 2010).

According to the results of the 2011 Population and Housing Census PHC, the population of the country stood at about 149.8 million, with a population density of 1,015 persons per square kilometer (BBS, 2012b). During the past century, the population of Bangladesh has increased exponentially. Between 2001 and 2011, about 19.8 million people were added to the population, which represents a 15% increase and a 1.37% annual growth rate. The country is now experiencing a demographic transition. The continuous decline of the natural growth rate is expected to lead to a smaller population increase in the coming decades. In comparison with other countries in the region, this population growth rate places Bangladesh in an intermediate position between low-growth countries, such as Thailand, Sri Lanka, and Myanmar, and medium-growth countries, such as India and Malaysia (BBS, 2011).

Fertility is one of the elements in population dynamics that has a significant contribution towards changing population size and structure over time. Fertility may be defined as the actual reproductive performance of a woman. Fertility rate is the number of children born per couple, person or population. Serious concerns have been expressed regarding population growth and its impact on human welfare. It is estimated that, unless there is reduction in fertility rate, the world population will cross seven billion by the year 2020 (Samson and Mulugeta 2009).

There was an impressive decline in fertility in Bangladesh until 1980s. Unfortunately, it began to plateau during the 1990s and then resumed its nominal decline during the early 2000s. After a decade-long plateau in fertility (1993-1994 to 2000) at around 3.3 children per woman, there has been a steady and encouraging decline in each subsequent BDHS. Between the 2007 and 2011 BDHS there has been almost a 15% decline in the total fertility rate, from 2.7 to 2.3 births per woman. The extent and rapidity of decrease in fertility have been very impressive by international standards, continued fertility decline is desirable, as population crowding, environmental deterioration, massive migration from rural areas to unplanned urban settings and rapid depletion of resources are becoming acute.

According to the National Population Policy, Bangladesh aims to achieve replacement level fertility by 2015 (MOHFW, 2009). Additionally, the Health Population Nutrition Sector Development Program (HPNSDP) plans to reduce the Total Fertility Rate (TFR) to 2.0 children per woman by 2016 (MOHFW, 2011). In order to achieve a stable population, the current decline in fertility rate is impressive but not enough to reach at a replacement level fertility. So further research should be needed to isolate the risk factors or determinants of fertility and effective steps should be taken to eliminate or minimize those factors.

The purpose of this study is to understand the Binary logit model that uses maximum likelihood estimator and its application on children ever born (CEB) and identify perfectly the determinants those are significantly responsible for the extra desire for children among the respondents. The goal of this article is to make recommendations to revise the policy of national family planning programs and its strategies to ensure that Bangladesh will reach at replacement level fertility within shortest time period.

It is hoped that the findings from this research could be useful in many ways. The findings are believed to be useful for policy making, monitoring and evaluation activities of the government and different concerned agencies. Since the study is an attempt to identify socio-demographic factors that affect fertility, the end user governmental and non-governmental organizations could take intervention measures and set appropriate plans to tackle fertility problems.

Literature Review

Fertility is the natural capability of giving life. Fertility is one of the three major components of population dynamics that determine the size and structure of the population of a country (Ramesh 2010). The various causal factors affecting fertility have been reviewed from various literatures.

According to Bongaarts (1978), factors affecting fertility are broadly classified into proximate (direct) and distant (indirect) factors. The proximal factors are behavioral factors, like being sexually active, use of contraceptive, duration of postpartum infecundability, abortion and sterilizing which affect fertility directly, whereas, distal determinant are socio-cultural factors which affect fertility indirectly through affecting the bio-behavioral factors. It is found that a later age at marriage reduces fertility. Educational level, economic status, religious attitudes, women’s work participation etc. are other factors affecting fertility in addition to contraception control practice and attitudes (Samson and Mulugeta 2009).

Mokshed (2000) examined the effects of selected socio-demographic characteristics on desire for additional children among couples in Bangladesh. The study was based on the Bangladesh Demographic and Health Survey, 1996-1997. The dependent variable is desire for additional children. The explanatory variables of this study are respondent’s residence, religion, education and occupation of husband and wife, media exposure, membership of social organization, sex composition of existing children and number of children. Multiple logistic regression has been employed to predict relationship among the dependent and independent variables.

Bearing more children is a common phenomenon among the women in the least developed countries like Bangladesh. The women in Bangladesh become mother at their very early ages with the large majority of women started bearing children before they reach at the age twenty (Singh, 1998). For the lack of education and awareness, poverty, marriage at early ages they used to bear children year after year. Consequently their family size increases and population grows rapidly. Childbearing at the young ages consequences a greater risk to the maternal mortality and child mortality to the mother and the child respectively (Manken *et al*., 2003). It also inclines to restrict the educational and economic opportunities for all.

Toefiqua (2009) examined the effects of some selected socio-economic and demographic variables on fertility using a well-known multivariate technique called path model analysis (BDHS). The study argues that for both cohorts (i.e., aged 15-30 years and aged 30+ years) women's education, age at first marriage and length of breast feeding are found to have significant direct negative effects, while the place of residence and number of dead children have significant direct positive effects on the number of CEB. Fetal loss appears to have a significant direct positive effect on fertility in Bangladesh.

Materials and Methods

Data Source

This study used the secondary data from the Bangladesh Demographic and Health Survey (BDHS), 2011. This survey provides information on fertility, childhood mortality and causes of death, fertility preferences and fertility regulation, maternal and child health, nutritional status of mothers and children, awareness and attitudes towards HIV/AIDS, and prevalence of non-communicable diseases. Thus, the analysis presented in this study on the impact of socio-demographic factor on fertility is based on 15,808 ever-married women who have at least one child and whose age ranges from 15 to 49 years.

Dependent and Independent Variables

The dependent variable used in this analysis is children ever born (CEB) as it is the specific measure of fertility. CEB comprises information on the number of all children born alive (lifetime fertility) up to the survey date. The following variables have been considered as the independent variables: age, age at first marriage, age at first birth, ideal number of children, previous child death, ever use of contraception, respondents current working status, education, place of residence, religion, division and mass media exposure.

Methodology

The analysis is confined to 15,808 ever-married women Odds ratios, confidence intervals and a Chi-square test were used to assess the associations between independent variables with the outcome variable. The choice of explanatory variables was guided by review of the available literature. To identify fertility differential we at first use bi-variate analysis (Chi-square test) to discover the initial factors those affect fertility. Our null hypothesis was that there was no association between fertility and the specific factor. Once we have identified the factors (p-value<0.05) from the bivariate analysis, GLM with Binary logit link function has been carried out to assess the factors. Logistic regression has proven to be one of the most versatile techniques in the class of generalized linear models (GLM).

Linear regression models equate the expected value of the dependent variable to a linear combination of independent variables and their corresponding parameters, whereas generalized linear models (GLM) equate the linear component to some function of the probability of a given outcome on the dependent variable. In logistic regression, that function is the logit transform: the natural logarithm of the odds that some event will occur. The data are analyzed using the Statistical Package for social Sciences (SPSS) version 20.

Model

Consider a collection of p independent variables denoted by the vector $X^{/} = (X_1, X_2, \ldots X_P)$. Let the conditional probability that the outcome is present be denoted by $P(Y = 1/X) = \pi$. Then the logit or log-odds of having Y=1 is modeled as a linear function of the explanatory variables. That is

$$\log it(\pi_i) = \ln(\frac{\pi_i}{1-\pi_i}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_P X_P\,;\; 0 \le \pi_i \le 1$$

Where the function

$$\pi_i = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_P X_P)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_P X_P)}$$

is known as logistic function. The most commonly used method of estimating the parameters of a logistic regression model is the method of Maximum Likelihood (ML).

Parameter Estimation

Maximum likelihood estimation is the most popular technique for estimating the parameters of the logistic regression model. For a binary random variable **Y** assuming values either 0 or 1, the probability, $P(Y = 1)$ is given as

$$P(Y = 1) = p = \frac{1}{1 + e^{-X^{/}\beta}}$$

$$\log it(p) = \log\left(\frac{p}{1-p}\right) = X'\beta$$

where β is a vector of coefficients and is the vector of independent variables including a vector X_0 (which is a vector of 1's) since the value of the outcome variable are not available, we can't estimate the parameters directly, however, the likelihood provides a solution.

Each observation can be considered as an outcome of a Bernoulli trial, and hence for the i^{th}

Observation $P(Y = y_i) = p_i (1 - p_i)^{1-y_i}$.

Assuming the n observations are independent, the likelihood function is

$$L = \prod_{i=1}^{n} p_i (1 - p_i)^{1-y_i} = \prod_{i=1}^{n} (\frac{1}{1+e^{-X'\beta}})^{y_i} (\frac{e^{-X'\beta}}{1+e^{-X'\beta}})^{1-y_i}$$

and the log likelihood function given as

$$LogL = \sum_{i=1}^{n} y_i \log(\frac{1}{1+e^{-X'\beta}}) + \sum_{i=1}^{n} (1 - y_i) \log(\frac{e^{-X'\beta}}{1+e^{-X'\beta}}) \ldots \qquad \ldots \qquad (*)$$

Hence, by maximizing (*) we can theoretically estimate the parameter vector β and β will be obtained by maximizing (*) using numerical iterative techniques. However, the resulting equation obtained by taking the first order derivatives does not have an analytical solution. Finally, Wald test statistic has been performed for estimated parameters.

Results and Discussion

Background Characteristics of the Respondents

Table 1 shows the distribution of CEB by various background characteristics of the respondents. Bi-variate association between CEB and different independent variables are analyzed using χ^2 test also presented in table 1 along with P-value. The dependent variable is a dichotomous random variable – at least 3 children and at most 2 children ("case"-coded as 1 and "control"-coded as 0). Ever use of contraception have been dropped from further analysis since this variable appeared insignificant in bi-variate analysis (P > 0.05). For all other variable P-value were P < 0.05.

Table 1. Distribution of the respondent's total number of CEB by Socio-demographic characteristics

Predictors	Category	Total Children Ever born		χ^2 Value	P-Value
		2 or fewer children	3 or more children		
Age Group	15-24	3627 (91%)	359 (9%)	4115.88	0.000
	25-39	3752 (47%)	4238 (43%)		
	40-49	781 (20%)	3051 (80%)		
Place of Residence	Rural	4985 (48%)	5352 (52%)	143.724	0.000
	Urban	3175 (58%)	2296 (42%)		
Religion	Muslim	7096 (51%)	6915 (49%)	49.739	0.000
	Hindu	1024 (60%)	696 (41%)		
	Other	40 (52%)	37 (48%)		

Continued

Respondents Highest Educational Level	No Education	1195 (28%)	3147 (72%)	2416.295	0.000
	Primary	2149 (44%)	2706 (56%)		
	Secondary	3855 (71%)	1599 (29%)		
	Higher	961 (83%)	196 (17%)		
Age at First Marriage	10-18	6761 (49%)	7125 (41%)	416.768	0.000
	19-24	1217 (71%)	496 (29%)		
	25-49	182 (87%)	27 (13%)		
Age at First Birth	10-18	4667 (46%)	5573 (54%)	491.307	0.000
	19-24	2935 (61%)	1903 (39%)		
	25-49	558 (76%)	172 (24%)		
Mass Media Exposure	No	2085 (38%)	3396 (62%)	647.107	0.000
	Yes	6075 (59%)	4252 (41%)		
Ideal Number of Children	≤ 2	7473 (59%)	5242 (41%)	1336.101	0.000
	≥ 3	687 (22%)	2406 (78%)		
Division	Dhaka	1413 (52%)	1304 (48%)	215.844	0.000
	Chittagong	931 (51%)	903 (49%)		
	Barisal	1193 (47%)	1369 (53%)		
	Khulna	1398 (59%)	971 (41%)		
	Rajshahi	1321 (57%)	1003 (43%)		
	Rangpur	1186 (53%)	1045 (47%)		
	Sylhet	718 (41%)	1053 (60%)		
Child Death Experience	No	7746(62.3%)	4696(37.7%)	2690.03	0.000
	Yes	414 (12%)	2952 (88%)		
Ever use of Contraceptive	No	1163 (52%)	1068 (48%)	0.067	0.406
	Yes	6997 (52%)	6580 (48%)		
Respondents Currently Working	No	6944 (51%)	6731 (49%)	31.82	0.000
	Yes	1216 (57%)	917 (43%)		
Wealth Status	Poor/Poorest	2560 (44%)	3217 (56%)	249.557	0.000
	Middle	1526 (50%)	1500 (50%)		
	Rich/Richest	4074 (58%)	2931 (42%)		
Partners Highest Educational Level	No Education	1762 (37%)	3039 (63%)	910.331	0.000
	Primary	2141(49%)	2185 (51%)		
	Secondary	2664(60%)	1785 (40%)		
	Higher	1593(71%)	639 (29%)		

Analysis of Binary Logistic Regression Analysis

Binary logistic regression analysis has been carried out as multivariate techniques to assess the net effects of independent variables on CEB of the ever-married women in Bangladesh. The results of the fitted model are presented in table 2. Odds ratio (OR) has been used to compare different groups with 95% confidence interval (CI) presented in table 2. The results of the binary logistic regression analysis revealed that women's education, age, first age at marriage, age at first birth, division, place of residence, religion, mass media exposure, partners education, child death experience, current working status and perceived ideal number of children as having statistically significant relationships ($p < 0.05$) with CEB of the respondents.

Education is an event of human life that carried out a significant role in determining his/her social status. From table 2, it is found that CEB drastically varies by the educational levels of the mothers. The estimated coefficient shows declining trend with the level of education to the women, which reveals those who become more educated, bearing less children. The regression coefficient for the highly educated ever-married women is – 0.867 and the corresponding OR is 0.420, which implies highly educated women bearing fewer children than those who do not completed primary education. So, lack of higher education is one of the important factors of high rate of childbearing on Bangladesh. The regression coefficient for the highly educated husbands of ever-married women is – 0.219 and the corresponding odds ratio is 0.803, which implies that the likelihood of having three or more children is higher among women whose husbands do not completed primary education compared to women married to a husband completed higher level of education. So education plays a vital role on fertility in Bangladesh.

The place of residence is also found to be significant on CEB. The coefficient of the category urban has a negative value. This implies that place of residence in urban areas has a negative impact (OR = – 0.143) on CEB rather than that of rural areas. It occurs because in Bangladesh, urban areas are more developed than rural areas in terms of socio-economic factors. The analysis also demonstrates that Division has significant relation on fertility. The coefficient of Khulna, Rajshahi and Rangpur division are negative. Analysis reveals that total number of CEB in Rajshahi, Khulna and Rangpur division is lower than Dhaka division. Coefficient of Khulna is the lowest among all of the divisions. The coefficient of Chittagong division is not significant at 5% level of significance. Sylhet division has the highest rate of childbearing among all divisions. From BDHS 2011, it has been already found that Khulna has the lowest level of fertility, whereas the highest level of fertility and lowest level of contraceptive use is found in Sylhet division. These results might be the cause of fertility differential by division.

The study also finds out that women's religion as an important factor in her fertility. For example, Hindu women were less likely to have more children ($\beta = -$ 0.389) than Muslim women. It is notable that women who had a child death experience were more likely to have more children than women who did not experience child death ($\beta = 2.184$). Furthermore, those women who are exposed to both mass media (Radio or TV) were likely to have fewer children ($\beta = -$ 0.327) than those who were not exposed to any media.

Another significant factor, which is considered as an important determinant of fertility, is the age at first marriage. The earlier age at first marriage consequences, bearing more children to the women in their whole life. Low age at first marriage significantly and negatively affect her fertility. The coefficient estimated to be negative implies that rate of childbearing decreased with the age at first marriage. To be more precise, increase in women's age at first marriage tended to decrease the number of children ever born, while other variables in the model were controlled (β = – 0.211 and β = – 0.725 for women aged 19-24 and 25-49).

Table 2. Analysis of Maximum Likelihood Estimates

Parameter	β	Std. Error	Hypothesis Test			Exp (β)	95% Wald Confidence Interval for Exp(β)	
			Wald Chi-Square	df	Significance		Lower	Upper
(Intercept)	-1.997	0.0978	417.041	1	0.000	0.136	0.112	0.164
Respondents Education								
Higher	-0.867	0.1294	44.883	1	0.000	0.420	0.326	0.542
Secondary	-0.655	0.0709	85.478	1	0.000	0.519	0.452	0.597
Primary	-0.126	0.0610	4.277	1	0.039	0.882	0.782	0.993
No Education (Ref)								
Ideal No. of Children								
3 or More Children	1.227	0.0620	391.807	1	0.000	3.411	3.021	3.852
Up to 2 Children (Ref)								
Place of Residence								
Urban	-0.143	0.0526	7.374	1	0.007	0.867	0.782	0.961
Rural (Ref)								
Division								
Sylhet	0.662	0.0876	57.107	1	0.000	1.938	1.632	2.301
Rangpur	-0.215	0.0813	7.016	1	0.008	0.806	0.687	0.946
Rajshahi	-0.523	0.0781	44.842	1	0.000	0.593	0.509	0.691
Khulna	-0.529	0.0785	45.380	1	0.000	0.589	0.505	0.687
Barisal	0.413	0.0786	27.556	1	0.000	1.511	1.295	1.763
Chittagong	0.025	0.0853	0.085	1	0.770	1.025	0.867	1.212
Dhaka (Ref)								
Wealth Status								
Rich/Richest	-0.031	0.0679	.202	1	0.653	0.970	0.849	1.108
Middle	-0.073	0.0662	1.225	1	0.268	0.929	0.816	1.058
Poor/ Poorest (Ref)								
Religion								
Other	-0.019	0.3051	0.004	1	0.951	0.982	0.540	1.785
Hindu	-0.389	0.0711	29.976	1	0.000	0.677	0.589	0.779
Muslim (Ref)								
Child Death Experience								
Yes	2.184	.0705	959.375	1	.000	8.886	7.738	10.203
No (Ref)								
Mass Media Exposure								
Yes	-0.327	0.0553	35.024	1	0.000	0.721	0.647	0.803
No (Ref)								
Age at First Marriage								
25-49	-0.725	0.2827	6.579	1	0.010	0.484	0.278	0.843
19-24	-0.211	0.0831	6.432	1	0.011	0.810	0.688	0.953
10-18								
Age at First Birth								
25-49	-2.073	0.1327	243.912	1	0.000	0.126	0.097	0.163
19-24	-0.959	0.0553	300.944	1	0.000	0.383	0.344	0.427
10-18 (Ref)								
Age Group								
40-49	4.101	0.0879	2176.360	1	0.000	60.421	50.858	71.783
25-39	2.895	0.0715	1640.145	1	0.000	18.083	15.719	20.803
15-24 (Ref)								
Partners Education								
Higher	-0.219	0.0959	5.200	1	0.023	0.803	0.666	0.970
Secondary	-0.115	0.0682	2.828	1	0.093	0.892	0.780	1.019
Primary	-0.019	0.0613	0.092	1	0.762	0.982	0.871	1.107
No Education (Ref)								
Current Working Status								
Yes	-0.418	0.0645	41.893	1	0.000	0.659	0.580	0.747
No (Ref)								

Our analysis showed that age at first birth is the notable key indicator of fertility. It is found that fertility drastically varies by the age at first birth of the mothers. As the age at first birth increases women were likely to have fewer children than women who take their first child at early age 10-18. The estimated coefficients show declining trend with the increase of age at first birth of a woman (β = –0.959 and β = –2.073 for women aged 19-24 and 25-49). The coefficients of age groups (15-24, 25-39 and 40-49) show a declining trend, indicates that as the age increases, a woman are more likely to have more children in Bangladesh.

The regression coefficient of perceived ideal number of children ($\beta = 1.227$) showed a significant positive effect on fertility. Women, who consider at least three children as ideal, have more number of CEB than those who perceived a low number of children as ideal. Ever-married who are currently working were likely to have two or fewer children than women who are currently unemployed. So it is clear that working status of women play a positive role in having fewer children. Analysis reveals that Rich/Richest women were likely to have fewer children than middle and poorer/poorest class women. But these results are not statistically significant.

Goodness of fit of the Binary Response Model

Table 3 gives results of "Omnibus Test." "Omnibus" means "overall," and so this output tells whether the model with all explanatory variables predicts the response better than the intercept only model. The results show that the model with explanatory variables does better at predicting the response variable, and is statistically significant at $p < .05$. The Omnibus Test gives a Chi-Square of 9139.858 with 27 d.f., significant beyond 0.005. Since the omnibus test is significant we can conclude that adding the explanatory variables to the model has significantly increased our ability to predict total number of CEB made by our subjects.

Table 4 gives result of "Model Summary," which are summary statistics for the model at "Step 1" which is the model with 13 predictors. The Cox & Snell R^2 and Nagelkerke R^2 value is 0.439 and 0.586 respectively. The values of R^2 and $\bar{R}^2$ are presented in table 4 those indicate that the data fit the model at an acceptable level

The "Hosmer and Lemeshow Test" is a measure of fit which evaluates the goodness of fit between predicted and observed probabilities in classifying the response variable (Table 5). Similar to the –2 log likelihood test, we want this chi-squared value ($\chi^2_{(8,0.05)}$ = 15.039) to be low and non-statistically significant (P-value = 0.058) if the predicted and observed probabilities match up nicely. In this case we see that the test is statistically insignificant ($p > 0.05$), suggesting that the probabilities of predicted versus observed values of the response variable match up as nicely as we would like. Therefore, our fitted logistic regression model is good fit. A classification table is a 2×2 table in the logistic regression output for a dichotomous response and reports correct and incorrect estimates obtained by the logistic regression model. Overall 80.9 percentages are correctly classified (Table 6).

Table 3. Omnibus Tests of Model Coefficients

		Chi-square	df	sig.
Step 1	Step	9139.858	27	0.000
	Block	9139.858	27	0.000
	Model	9139.858	27	0.000

Table 4. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square $\left(\overset{-2}{R}\right)$
1	12758.098[a]	0.439	0.586

Table 5. Hosmer and Lemeshow Test

Step	Chi-square	df	sig.
1	15.039	8	0.058

Table 6. Classification Table[a]

	Observed		Predicted		
			Total Children Ever Born		Percentage Correct
Step 1			≤ 2 Children	≥ 3 Children	
	Total Children Ever Born	≤ 2 Children	6674	1486	81.8
		≥ 3 Children	1541	6107	79.9

Findings and Interpretations

From both bivariate and multivariate techniques, the study has identified the accountable factors of respondents and their husbands education, exposure to mass media, age at first marriage, age at first birth, place of residence, employment status, ideal number of children, child death experience and religion are significantly associated with the current level of fertility in Bangladesh.

The finding of this study shows that total CEB significantly is higher among women who do not complete primary education. This result is similar to that of Ramesh (2010). Education exposes women to information, empowers women, makes them more likely to be employed outside their home environment, and makes them more aware of their own health and the health of their children. Educated women are more likely to postpone marriage, have smaller family size, and use contraception than are uneducated women (Ramesh, 2010).

The finding of this study shows that residential differences had a significant impact on total CEB. Women who lived in rural areas were more likely to have more children than urban women. This finding corresponds with the result of a study by Sharma (1998) where they show that rural women desire to have more children than urban women. The difference in desire for additional children among rural and urban women could be due to the parents' perceived costs and benefits of children. Rural women perceive greater benefit from children and see lots of advantages in having large families. They also anticipate support from their children in old age.

Age at first marriage is another important variable affecting total CEB. This study shows that women married before reaching 18 years of age are more likely to have more children in their life time in comparison with women married after eighteen years. Ramesh (2010) shows that older age at first marriage play an important role in minimizing fertility. Higher age at first marriage has an adverse effect on high fertility. Early marriage not only marks a woman's entry into a sexual union and the beginning of exposure to childbearing but may also be an important gauge of women's status, since the higher the age of a women at first marriage, the greater the likelihood that she attends school or gets employed, and the greater her chances of having a more equal relationship with her husband.

The result of this study shows that women married to husbands with illiterate, primary and secondary education are likely to have three or more CEB than those married to husbands with higher education. A similar study by Mokshed (2000) also shows that husbands who had secondary or higher education were less likely to desire for additional children than those who had no education. The study also found that Muslim women were more likely to have more children than were to Non-Muslim women. It could be that religion has an immense social, economic, and political significance in most societies and thus plays an important role in sanctioning or promoting acceptance or creating resistance to family planning.

The employment status of a woman is another important variable affecting total CEB. The finding of this study shows that women who are working are less likely to have three or more CEB than women who are not employed. Throughout the world, mass media have influenced knowledge, attitudes and behaviors regarding the use of contraception. Our study also found that mass media exposure has an important effect on reproductive behavior. Those women who were exposed to radio or TV had fewer children than those who were not exposed. It could be because radio and television programs and the values they disseminate are transmitted directly into the home. Media have the potential to directly affect every member of the household, even those with little or no schooling. The role of mass media in changing both patterns of contraceptive use and notions of ideal family size could be another reason for low fertility among those exposed to mass media.

Conclusions

The above discussion leads to the conclusion that programs should aim to reduce fertility by focusing on all these identified predictors. Our study reveals that well educated and urban women have less desire for more children than lower educated and rural women. Also effective population control cannot be achieved until there is a change in the society's attitude toward desired family size. In this respect, the Government of Bangladesh should highlight to the rural women that limiting family size has positive effects on the mother's health, domestic peace, happiness and wellbeing. The policymaker should pay their attention ensuring female educational programs. The government should seek ways to empower women economically by producing income-generating schemes and increasing employment opportunities. This strategy also delaying age at marriage as well as age at first birth which is important for fertility decline. Finally, it is important for the Government of Bangladesh, instead of propagating the two-child norm across the board, emphasize those policies that actively enhance women's status through education as well as involving them in the workforce and change their attitudes toward family size.

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