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Editorial

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FROM THE EDITOR

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A paper from Iran looks at the effect of an Iranian herbal drug in the treatment of primary dysmenorrhoea. A randomised, double-blind, placebo-controlled pilot trial was carried out among 180 female students at Isfahan University dormitory aged 18-27 years, who suffered from primary dysmenorrhoea. The authors found statistically significant reductions in pain score and pain duration in SCA ($p<0.001$) and mefenemic acid ($p<0.01$) groups. The decrease in pain score was reflected by a significant reduction in another drug used among the treatment groups compared with placebo The magnitude of the reduction was significantly greater in the SCA group than in mefenamic acid and placebo. Both of the drugs effectively relieved menstrual pain as compared with the placebo. More clinical trials are needed for efficacy of this herbal drug

Dr. Md. Aminul Hoque writes that one of the important aspects of human development is education, both at the individual and the collective levels. Higher level of education means higher jobs, implying higher standards of living. In this paper attempts are made to analyze the educational characteristics of the female workers who work in different types of industries at and around Rajshahi city corporation area in Bangladesh. In all 891 workers are interviewed and the majority (20.20%) are found to work in sericulture industries followed by cottage industries (18.2%). Of the 891 women 52.1% are literate. Of the literate females 51.5% have primary level of education, 42.7% secondary level and only 5.8% above secondary level. The majority of literate females are found to work in sericulture industries (32.3%) followed by textile industries (19.6%). They find strong external effects of education on individual earnings.

A cross sectional study from Iran looked at International passengers as one of the most high risk groups to be exposed to AIDS that must have been aware about the dangers of this disease. The destination is not important but the passengers' knowledge is very important.

Objectives were to determine the knowledge of Non-Pilgrimage passengers, who are on the point of leaving for abroad, about the ways of AIDS transmission and its prevention in Tehran's International airport? Findings showed that passengers did not have sufficient knowledge about AIDs (transmission and prevention of AIDS). So, their health knowledge needs to be increased for health protection. Therefore training is one of the ways which can be used for increasing passengers' knowledge.

Kobra Rezaei, Yadollah Sahranavar and Maryam Nooritajer looked at the efficacy of Betadine and Decosept for surgical hand scrub on Bacterial Colony Count (BCC).

Nowadays in most operating rooms in developed countries, the surgical team, scrubs with an efficient agent for short time, while, in IRAN, the surgical team uses conventional and routine hand scrub (with Betadine more than 3 min). The aim of this study was to compare efficacy of Betadine and an alcoholic agent (Decosept) on BCC. Results: BCC frequency was different for immediate effect of Betadine and Decosept (38 & 25), and also for 2 h after scrub (72 & 40).

The mean of BCC reduction immediately after Betadine and Decosept scrub were significantly different ($P=0.011$). Conclusion: The results showed that the alcohol agent (Decosept) was more efficient on BCC reduction. They suggest more use of the alcohol agents for hand surgical scrub instead of others.

An article on Prevalence of Contraceptive Use in Naogaon District of Bangladesh assesses the knowledge and use of contraception of ever-married women of a district of Bangladesh namely Naogaon. The study uses data collected from some specific rural and urban areas of Naogaon district, Bangladesh. The information was collected from 800 ever-married women by interview method. Bivariate analysis and logistic regression analysis were adopted and the analysis revealed that although the knowledge of contraceptive has been conveyed to the majority of couples in Bangladesh, the current use rate of contraception is high enough (above ninety percent) and most of them currently use modern methods. The most prevalent method of contraception being the OCP. The level of current contraceptive use is higher in urban areas than in rural areas however, this gap is very narrow. Logistic analysis shows that, education of both respondent and husband, visit of family planning workers, place of residence, desire for additional children, talked to husband about family planning and number of living children have net significant effect on the current use of contraception.

Soad mahfoozpour , Maryam Jadid Milani, Maryam Nooritajer did a descriptive study which looked at one of the most vulnerable groups of the community, under 6 years old children, considered as a vital resource, in assuring a good future for the country. This study was conducted to assess the quality of provided care services for 0-6 years children, in Urban Health Centers (UHCs), of Shaheed Beheshti University of Medical Sciences & Health Services (SBUMS), in 2002-2003.

Conclusions regarding the importance of under 6 years old children's health, showed poor quality of care provided for them, more research is suggested to assess the impact of interventions on quality and quantity of children health care services.

CONGENITAL NASOLACRIMAL DUCT OBSTRUCTION AT PRINCE RASHED HOSPITAL, IRBID, JORDAN

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ABSTRACT

Objectives: To estimate the frequency of congenital nasolacrimal duct obstruction (CNLDO) and to assess the results of its management.

Material and Methods: A prospective study of 80 consecutive patients with congenital nasolacrimal duct obstruction, conducted from January 2005 to December 2005 at Prince Rashed Hospital. Only patients below the age of twelve months were included the study. Diagnosis was made by history of epiphora, beginning early in life with obstruction clinically confirmed on examination. Antibiotic drops and massage of the lacrimal sac was advised. Probing was carried out for the non-resolving cases at the age of one year, and balloon dilatation for the failed case.

Results: A total of 80 patients with CNLDO were included in the study. Thirty-six (45%) of these infants presented within the first two months of life. Out of these 80 patients, 8 patients were lost to follow-up. Out of the remaining 72 patients, 66 (82.5%) of the patients resolved spontaneously with conservative treatment using topical antibiotics within one year. Only 6 (7.5%) of the patients required probing. Five patients (83.3%) successfully but one who failed, was referred for intubation and balloon dilatation at King Hussein Medical Center, Amman.

Conclusion: Spontaneous improvement of CNLDO is the natural course in most patients and probing for unresponsive cases is recommended at one year of age.

Keywords: Congenital , Nasolacrimal, Probing

Introduction

Congenital nasolacrimal duct obstruction (CNLDO) is the most common abnormality of the lacrimal system in childhood[1]. The most common outcome is spontaneous resolution, but some children do require surgical treatment by probing[2].

Probing of the NLD is a standard therapeutic procedure in the management of CNLDO. Controversy however, exists regarding the outcome of probing in children older than 1 year[3].

The timing of probing for congenital nasolacrimal duct obstruction has been a matter of controversy in recent years[4] which is now advised up to the age of 5 years in Kashkouli et al[5].

Because most nasolacrimal duct obstructions resolve during the first year of life, urgent treatment of a congenital obstruction is usually unnecessary. Conservative management includes warm compresses, massage of the lacrimal sac, and intermittent use of topical antibiotic ointment or drops[6].

Repeated courses of topical and sometimes systemic antibiotics are widely used to treat the discharge associated with congenital lacrimal obstruction[7].

Materials and Methods

A prospective study of 80 consecutive patients with congenital nasolacrimal duct obstruction, conducted from January 2005 to December 2005 at Prince Rashed Hospital. Only patients below the age of twelve months were included in the study. Diagnosis was made by history of epiphora beginning early in life with obstruction clinically confirmed on examination. Antibiotic drops and massage of the lacrimal sac was advised. Probing was carried out for the non-resolving cases at the age of one year.

Results

A total of 80 patients with CNLDO were included in the study. Thirty-six (45%) of these infants presented within the first two months of life. Out of these 80 patients 8 patients were lost to follow up. Out of the remaining 72 patients, 66 (82.5%) resolved spontaneously with conservative treatment using topical antibiotics, within one year. Only 6 (7.5%) required probing; one of them was referred for intubation and balloon dilatation at King Hussein Medical Center, Amman. Table 1

Conclusion

Obstruction of the nasolacrimal drainage system is extremely common in the pediatric age group, occurring in as many as 30% of newborns[8].

Twenty percent of infants develop the symptoms of congenital lacrimal obstruction during their first month of life[7], compared to 45% in our review.

Disorders of the lacrimal drainage system manifest as epiphora and recurrent infections with muco-purulent discharge[9], which was the presenting symptom in all the reviewed cases.

The traditional approach has

been to combine massage of the nasolacrimal sac and duct with topical antibiotics[8], as advised in our cases.

Spontaneous resolution is the commonest outcome. Without treatment only 0.7% of infants will still be affected by their first birthday[7], which is higher in our cases.

Probing was done to six cases in our review, which was successful in five of them, 83.3% contrary to 79.59 in Maharashtra, India[10]. The remaining case was referred for balloon dilation which follows endo-nasal intubations that are effective procedures, and play an important role in the management of childhood epiphora[11].

Balloon dilation under fluoroscopic control is known to be a safe and effective technique for the treatment of congenital lacrimal system obstruction as a primary procedure and as an alternative procedure after failure of probing or silicone intubation[12].

Table 1. Natural History of (CNLDO)

Variable	No.	%
Spontaneous resolution	66	82.5%
Probing	06	07.5%
Lost follow up	08	10%
Total	80	100%

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FACTORS AFFECTING CHILDREN EVER BORN IN SLUM AREAS OF RAJSHAHI CITY CORPORATION, BANGLADESH

ABSTRACT

Children ever born is a major counteracting force to population attrition from mortality and therefore, has significant impact as an expansionary force in population dynamics. It is well known that increasing birth rates cause exposure to several social problems like crisis of minimum needs for survival and subsistence which includes scarcity of food and land, poverty, unemployment, illiteracy etc. Information on fertility is relevant to demographic assessment of the population. Keeping this in mind, the present study was conducted among slum areas of Rajshahi City Corporation (RCC). The data for the present study was collected by interviewing ever-married slum women aged 15-49 years from a sample of 250 households. It is found from the study that the mean age at marriage is 15.69 years. Slum women tend to marry early and there is still a fair amount of fertility at very younger ages. Their mean reproductive life span was found to be 33.47 years. Again, ever married slum women in the child bearing years have borne an average of 2.49 children. Education of both spouses, average monthly income and expenditure, ideal number of children, age at marriage, reproductive life span are found to have significant impact on children ever born to slum women in RCC.

Key Words: Children ever born, Mean age at marriage, Reproductive life span.

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Introduction

Human fertility is responsible for the biological replacement and maintenance of the human species. In fact, the fertility is a major counteracting force to population attrition from mortality and therefore, has a significant impact as an expansionary force in population dynamics. Fertility may be defined as the actual reproductive performance of a woman or group of women (Thompson and Lewis, 1965). However, the phase of actual reproductive performance is contented in terms of the physiological potential of a woman to conceive and bear children. This phase is termed as the fecund period, which has two extremes, viz., menarche and menopause. In demographic studies, the reproductive span i.e., the child-bearing period of women is usually taken as between 15 to 44 or 15 to 49 years of age. Thus, a fecund woman may or may not be fertile but a fertile woman must be fecund. The main events or phenomenon associated with fertility are age at menarche and age at menopause.

The relationship between age at marriage and fertility is well known (Maudlin and Berelson, 1978; Pandey and Talwar, 1987). As age at cohabitation (i.e., age at consummation of marriage) determines the reproductive life span of a woman and has a direct bearing on fertility, it is one of the important aspects with regards to fertility (Maudlin and Berelson, 1978; Nag, 1982; Chaudhury, 1984). It is found that a later age at marriage reduces fertility (Agarwala, 1967; Durch, 1980; Yadav and Badari, 1997). Educational level, economic status, religious attitudes, women's work participation etc. are other factors, affecting fertility (Basu et al., 1988; Bhasin, V., 1990; Elamin and Bhuyan, 1999; Pandey et al., 2000; Bhasin and Nag, 2002), in addition to, conception control practice and attitudes (Bhuyan and Ahmad, 1984).

The most striking demographic event in the past few decades has been the unprecedented increase in the population, particularly in the developing countries, such as Bangladesh, primarily due to the remarkable fall in mortality. There can be little doubt that the massive investment in health, sanitation, water supply, and other associated sectors have directly contributed to decline in the mortality rates (Preston, 1978; Kshatriya et al., 1997; Verma, 2002). Again over the past four decades the developed and developing nations have been witness to important changes in reproductive behavior among their female populations. Accompanied by higher level of schooling, better health care, increased urbanization, and greater exposure to modern forms of mass communication, fertility has dropped rapidly in many regions. However, wide variations in reproductive behavior persist at national and sub-national levels and across the social groups. While research and analysis have been conducted on the causes and consequences of such differential

behavior among women, they have received relatively little attention.

In the present paper an attempt has been made to assess fertility of slum women of Rajshahi city corporation, Bangladesh. It aims to estimate various fertility measures besides evaluating the reproductive profile of slum women.

Materials and Method

The present study was conducted among slums residing in Rajshahi city corporation, Bangladesh. Two slum predominated wards selected at random, were visited during June, 2007. The data was collected from ever-married slum women aged 15-49 years from a sample of 250 households using interview schedule. The interview schedule consisted of questions on household identification, age etc., besides questions related to reproductive profile. The data collected was statistically treated, using descriptive statistics. In some cases age could not be appropriately assessed due to misstatement of age especially by older women who tend to understate their true ages.

A look at the general characteristics of the respondents reflects that the majority (65.6%) of the respondents are illiterate, 26% have primary knowledge of education and only 8.4% have secondary education. Analysis of work status of the respondents reflects that almost three-quarters are not working and are engaged in household activities. All these reflect the present overall status of slum women in Rajshahi city corporation, Bangladesh.

Linear Logistic Regression Analysis

\When we examine each independent variable individually, it can only provide a preliminary idea of how important each variable is by itself. So the relative importance of all the variables has to be examined simultaneously by some multivariate methods. There are varieties of multivariate statistical techniques that can be used to predict a binary dependent variable from a set of independent variables. Multiple regression analysis and discriminant analysis are two related techniques but these techniques are applicable only when the dependent and independent variables are measured in interval scale under the assumption that they are normally distributed with equal variances. However, in most applications, the dependent variable may be a dichotomous one and one or more explanatory variables are qualitative or measured in nominal or ordinal scales and the assumption of normality is violated. To overcome this problem, a very interesting and appropriate technique is the linear logistic regression method developed by Cox (1970), which does not require any distributional assumption. This regression is useful when the dependent variable is dichotomous. Since it does not require any distributional assumptions, unlike many other multivariate techniques (i.e. the variables are normally distributed with equal variances), it can appropriately handle situations in which the independent variables are qualitative or measured in nominal and ordinal scale. The logistic regression model can be used not only to identify risk factors but also to predict the probability of success. This model expresses a qualitative dependent variable as a function of several independent variables, both qualitative and quantitative (Fox, 1984).

Let Yi denote the dependent variable for the ith observation and Yi = 1, if the ith individual is a success and Yi = 0, if the ith individual is a failure. Suppose that for each of the individuals k independent variables Xi1, Xi2, ……,Xik are measured. These variables can be either qualitative such as residence, religion, education etc. or quantitative such as age, number of living children etc. in logistic regression model, it is assumed that Yi's are normally distributed with mean Pi and variance s^2, and Pi is defined as the probability of success, that is,

$$Pi = Pr(Yi = 1) = \frac{\exp\left[\sum_{j-1}^{k} Xij\ \beta j\right]}{1+\exp\left[\sum_{j-1}^{k} Xij\ \beta j\right]}$$

And

$$Qi = 1 - Pi = \frac{1}{1+\exp\left[\sum_{j-1}^{k} Xij\ \beta j\right]}$$

Where, Xi0 = 1 and ßj's are unknown coefficients.

Estimation of the parameters of ßj's from equation (1) and (2) seems to be very complicated. However, the logit transformation of Pi turns out to be a linear function of Xij, that is

$$\text{Logit}(Pi) = \text{Log}_e \frac{Pi}{1 - Pi} = \sum_{j-1}^{k} Xij\ \beta j$$

which expresses the log odds of occurrence of an event (i.e. dependent variable) as a linear function of the independent variables. Thus logarithm of the value of "success" (P) to "failure" (1-P) are relating it to the independent variables, the logistic parameters can easily be interpreted in turns of odds ratios. Relative odds can be estimated for the categories of each independent categorical variable or combination of such variables.

In logistics regression the parameters of the models are estimated using maximum likelihood method. The contribution of individual variables in logistics regression depends on the other independent variables and the interpretation is difficult when they are highly correlated. A statistic that is used to look at the partial correlation between the dependent variable and each of the independent variable is the R statistic.

Results and Discussion

Age at marriage

There is a popular cultural proverb existing in Bangladesh "a girl at twenty is old", so most of the parents and guardians are motivated by this proverb and they arrange marriage for girls soon after their menarche and sometimes before menstruation in rural areas even nowadays. In the present study of pattern of age at marriage indicates that more than half of the women got married before they reached the age of 15 years and more than one-third got married between age 15-19 years while the proportion marrying after 20 years of age is very low (Table 1).

A shortening of the child-bearing period in a woman's life has become an important determinant of persistent below-replacement fertility. In fact although earlier menarche lengthens the fecund lifespan, postponement of first birth until age 30 and

beyond shortens the effectively used childbearing period. Figure 1 illustrates the reproductive life spans typical of developed and developing countries today and that for our study area (Figure 2).

The ages at which women start and stop childbearing are important demographic determinants of fertility. The higher median age at first birth and a lower median age at last birth are indicators of fertility.

From the following figure it is obviously clear that reproductive lifespan is one of the important factors that influence fertility. An average child ever born is decreasing with the decrease of reproductive lifespan. If we think of reproductive lifespan as land then we have too much land area to produce population. With a small economy and small land area of our country, it is impossible to drive such a vast population structure. In advanced and semi-advanced countries, the reproductive lifespan is half of the reproductive lifespan of the developing and underdeveloped counties. Figure 3 shows that with the increase of reproductive life span, average children ever born are also increasing significantly.

Children ever born

The number of children a woman has ever born is a cohort measure of fertility as compared to period measure of fertility like crude birth rate, age specific fertility rate, etc. as it reflects the experience of groups of women over a number of years rather than a specific calendar year (Weeks, 2002). The interaction of maternal age and parity (i.e. order of birth) is of interest as younger mothers are at risk of pregnancy wastage and babies of older mother are at risk of congenital malformations. Also, the frequency of mortality increases considerably with higher order of birth. From Table 3 we observe that 47.2 percent of the slum women have more than two children and 52.8 percent have less than or equal to two children. Again, ever married slum women in the child bearing years have borne an average of 2.49 children (Table 4).

The mean number of children ever born increases steadily with age, reaching a high of over three children per woman for the age group 35 and over. More than two thirds of the women in the age group of below 20 years have ever had a child reflecting the past pattern of relatively early marriage and teenage childbearing.

Factors Affecting Children Ever Born

In this section, we apply logistic regression technique to estimate the effects of selected socio-demographic and programmatic factors on children ever born which will help to identify the key factors for unwanted rapid growth in population and to take decisions and policy implications. The logistic model is fitted by considering children ever born as the dependent variable which we dichotomized by assessing 0 for less than or is equal to two children and 1 for more than two children.

From the results of logistic regression analysis, it appears that the respondent's education has a very strong and negative independent effect on children ever born with the likelihood of children ever born decreasing significantly for the women of primary, and secondary and higher education. From our data we found that, women with a primary level of education were 0.104 times less \likely to bear children as those who had no education and women of secondary education were found to be 0.014 times less likely to bear children than those who are illiterate.

Husband's education also exerts negative significant effect on children ever born. It is observed that the wives of primary educated husbands are 0.254 times as less likely to bear children as those wives of illiterate husbands and the wives of secondary educated husbands are 0.257 times less likely to bear children as those wives of illiterate husbands.

The regression co-efficient of respondent's expenditure is also positively affected on children ever born. From the results we also observe that children ever born is likely to be 8.330 times higher among those women, who have expenses above 4000Tk monthly than women who are expending less than 3000Tk, and children ever born is likely to be 2.149 times higher among those women, who are expending 3000-4000Tk monthly than women who are expending less than 3000Tk.

Children ever born is 2.657 times higher among those women, who have been identified as having more than two children as the ideal number of children than those who have identified less than or equal to two children as the ideal number of children.

From the above table it is obviously clear that age at marriage has a negative independent effect on children ever born. The women who have married at age group 15-20, are bearing children 0.237 times less than the women who have married at age group <15 and the women who have married at age group 20+, are also bearing children 0.139 times less than the women who have married at age group <15.

Reproductive lifespan is also an effective predictor for children ever born. The women, who have a long reproductive lifespan, are producing more children. The women with thirty and above reproductive lifespan are bearing children 2.637 times higher than the women with less than or equal to a thirty year reproductive lifespan.

Conclusion

Some findings of this study deserve consideration from the viewpoint of their policy implications. If has been found that education of the spouses has a significant negative impact on children ever born. Education may provide better employment opportunities outside the home and age at marriage can be raised by providing education to females, especially at the secondary and higher levels. Based on the findings of the study, it may be suggested that attention should be focused on the need for providing educational facilities for the women. Respondents' monthly income and average monthly expenditure of the family also have a significant influence on children ever born. It is also found from the study that female age at marriage has a significant negative impact on children ever born as well as on fertility. In support of this, reproductive life span also shows significant impact

on children ever born. The higher the reproductive life span, the higher the number of children ever born to the respondents. Thus, raising the age at marriage by implementing a minimum-age marriage law is likely to lower fertility in the study area as well as on a national scale. Ideal number of children also appears to have a significant impact on children ever born.

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Table 1 Percent distribution of age at marriage of women

Age at marriage	Number	Percent
<15	151	60.4
15-19	95	38.0
20+	4	1.6
Total	250	100.0

Table 2. Mean and std. deviation reproductive lifespan and age at marriage

	Minimum	Maximum	Mean	Std. Deviation
Reproductive life span	29	37	33.47	1.79
Age at marriage	12	20	15.69	1.829

Table 3. Percentage distribution of children ever born

Children ever born	Frequency	Percent
≤2	132	52.8
2+	118	47.2
Total	250	100.0

Table 4. Percentage distribution of women by children ever born, according to current age

Current age	Children ever born							Total	Number of Women	Mean number of children
	0	1	2	3	4	5	6			
<20	21.0	40.0	39.0	A	A	A	A	100.0	35	1.66
20-24	A	17.9	74.4	7.7	A	A	A	100.0	39	1.90
25-29	A	A	69.8	30.2	A	A	A	100.0	63	2.27
30-34	A	A	20.0	64.0	14.0	2.0	A	100.0	50	2.98
35+	A	A	11.1	36.5	30.2	20.6	1.6	100.0	63	3.65

Note: A= Absence.

Table 5. Logistic Regression of Children Ever Born on Some Selected Socio-Demographic Characteristics

Independent variables	Coefficient(β)	S.E (β).	Sig.	Exp(B)
Respondent education				
Illiterate (r.c)				1.000
Primary	-2.265	.536	.000	.104
Secondary	-4.240	1.219	.001	.014
Husband education				
Illiterate (r.c)		.		1.000
Primary	-1.369	507	.007	.254
Secondary	-1.360	.770	.008	.257
Income of respondents				
No earnings (r.c)				1.000
500-1000	3.023	.755	.000	20.543
1000+	2.073	.973	.033	7.948
Monthly average expenditure				
<3000 (r.c)				1.000
3000-4000	.765	.467	.003	2.149
4000+	2.120	.666	.001	8.330
Ideal number of children				
≤2 (r.c)				1.000
2+	.977	.567	.005	2.657
Age at marriage				
<15 (r.c)				1.000
15-19	-1.469	.445	.001	.230
20+	-1.974	1.171	.007	.139
Reproductive lifespan				
≤30 (r.c)				1.000
30+	.970	.422	.022	2.637
Constant	-.110	.456	.409	.496

r.c = reference category

Figure 1: Reproductive lifespan of women in developed and under-developed areas

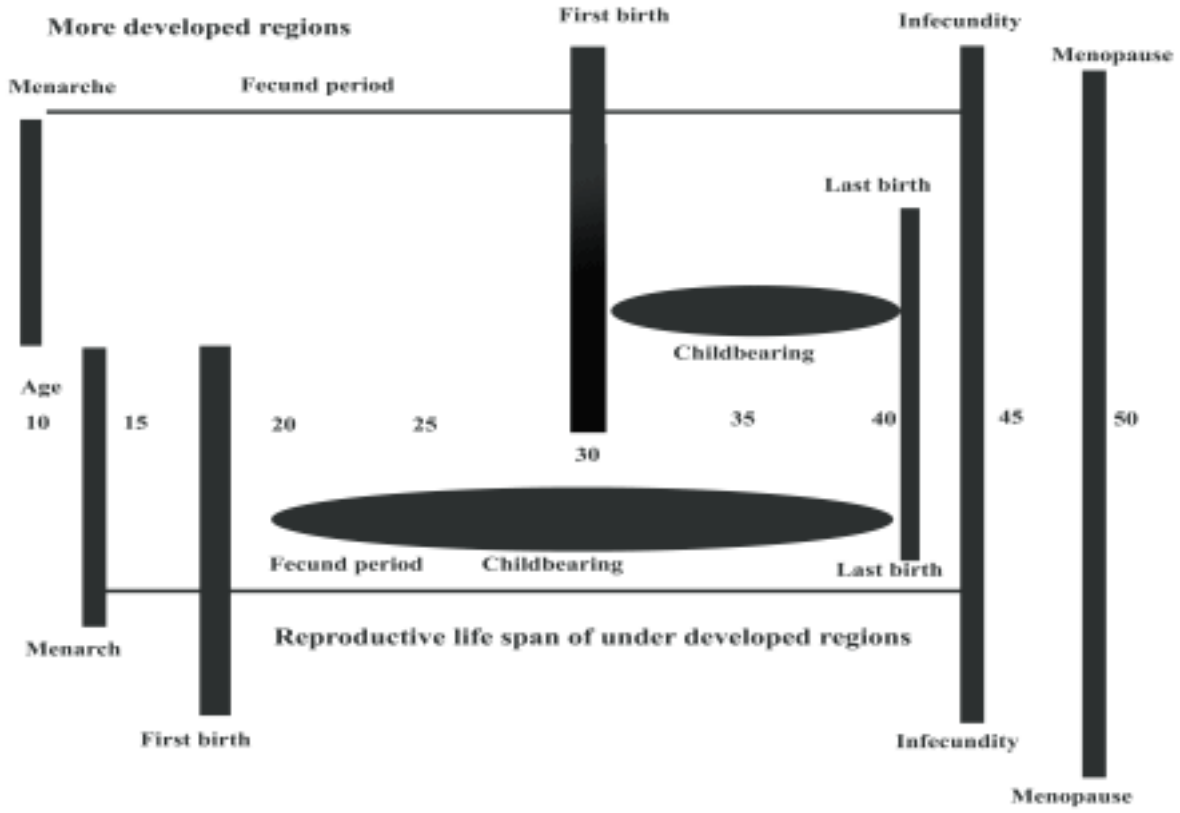


Figure 2. Reproductive lifespan of women in the study area

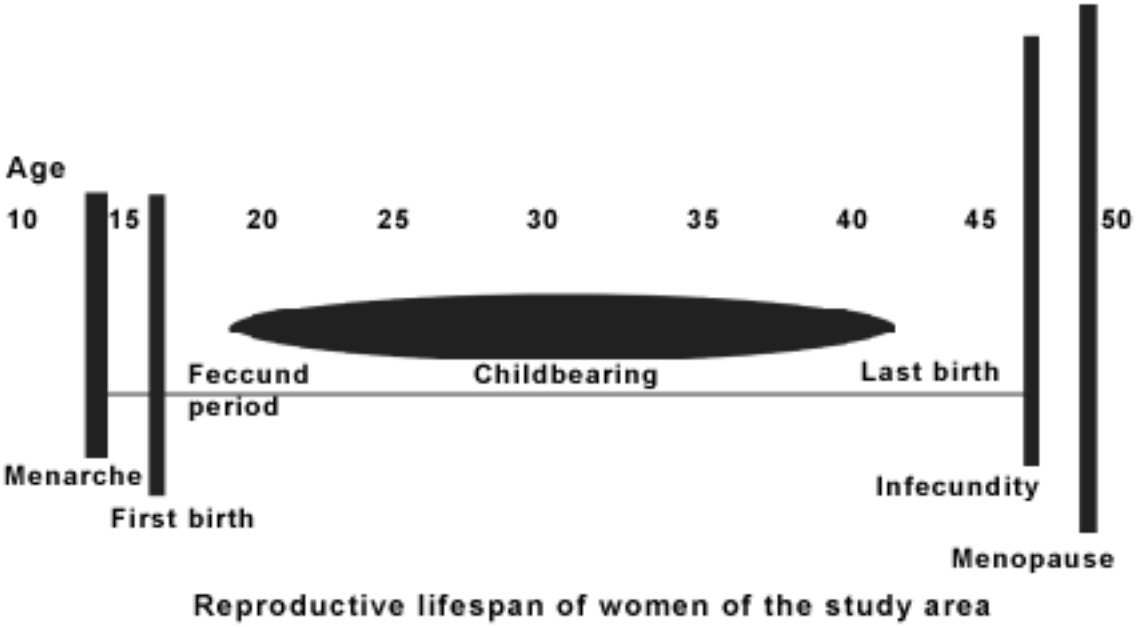
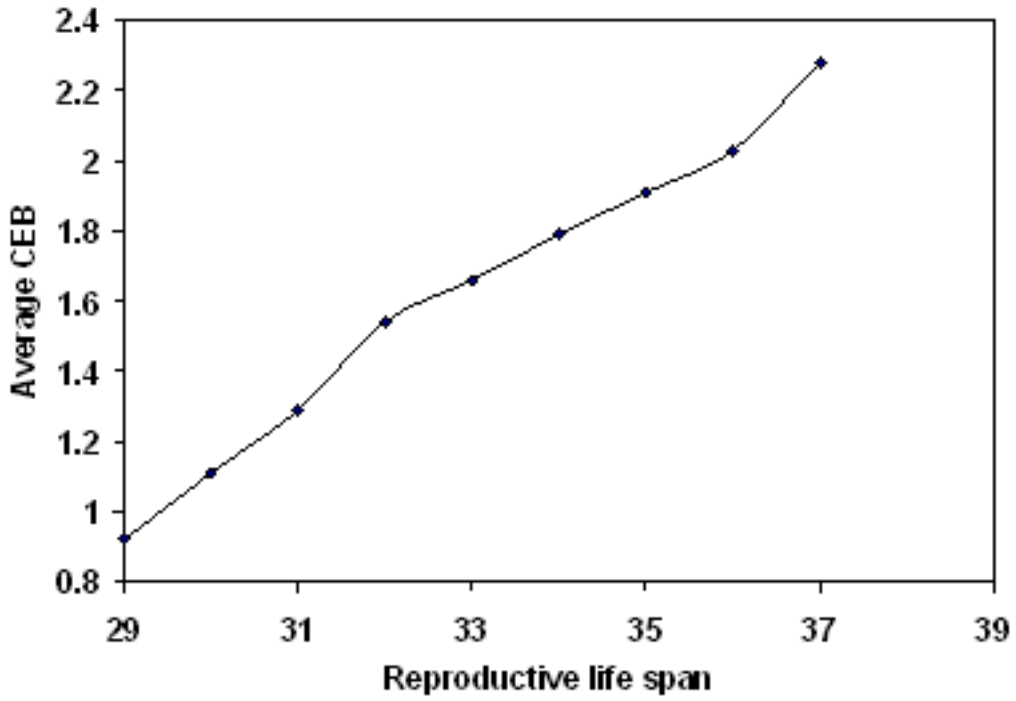


Figure 3- Average children ever born on reproductive life span



THE EFFECT OF WOMEN'S EDUCATION AND SOME SOCIO-ECONOMIC VARIABLES ON FERTILITY AND CONTRACEPTIVE USE IN BANGLADESH: A DISTRICT LEVEL ANALYSIS

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ABSTRACT

The purpose of this study is to present the fertility and contraceptives levels in different regions of Bangladesh and to determine the most important determinants of fertility and contraceptive use of Bangladeshi women. It utilizes mainly the BMMS 2001 and Bangladesh District-Level Socio-Demographic and Health care Utilization Indications that cover 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 a few suggestions and recommendations.

Key Words: Fertility, Contraceptive Use, Education, NGOs and District Level Data.

Introduction

Bangladesh is a country which like many other developing countries, has achieved a remarkable reduction in fertility despite little improvement in levels of living, education, women's 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 percent to 54 percent and a decline in the total fertility rate from 6.3 to 3.3 in the three decades since independence (BDHS 2000). 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 organizations (NGOs) to ensure that free or affordable contraceptives are available in both public and private health facilities throughout the country. The late 1980s has seen a large increase in the number of couples using family planning methods. Unfortunately, the use of family planning has declined to 50 percent in 2001 BMMS. The decline in overall use is due to a decline in the use of traditional methods (from 10 to 6 percent). 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 number of the 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 there is a relatively higher share of non-agricultural employment in the electrified households indicating a modernization effect of electricity on occupation. The overall literacy rates for both males and females 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) (BMMS, 2001). 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 districts in Bangladesh. This paper 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 (BMMS) 2001. This paper also tried to determine the most important factors affecting reproduction behavior. Specifically, objectives of this paper are: a) to present the levels of fertility and contraceptive use in Bangladesh; and b) to determine the most important variables that explain the fertility behavior and contraceptive use.

From a fertility point of view the fertility determinants in a population is a complex process. While fertility behaviour influences population growth, which has consequences for pressure on resources, employment situations, health and other social facilities, and savings and investment, in turn, such consequences have a great bearing on the socio-economic variables that affect 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 a 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 involvement in NGO activities.

This paper is organized as follows. In section 2 we discuss data and methodology, section 3 analyses the data regarding women's education and fertility; and presents the regression results, conclusion and finally offers policy implications in section 4.

Data and Methods

The 2001 Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) created an opportunity to address this information need. This study utilized mainly the BMMS 2001 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 to April 2001. Some other sources such as 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 of questionnaires were provided 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).

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 woman 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 that a child will die before attaining the age of five years.

Another indicator is level of education of women. Proportion of women aged 15-24 with completed secondary education was included in our analysis. Female labour force participation, included the percentage of women aged 15-49 participating in the labour force. I include two unconventional new variables, NGOs and electricity, which relate 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 BDHS 2000, which are available in published survey reports (see Table 1).

In this paper two dependent variables are used: (a) Total fertility rate, and (b) 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 methods such as Pearson correlation coefficient and multiple regressions for the district level data from BMMS 2001. 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 (see Murthi, Dreze and Guio 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).

Sources: NGO: Bangladesh Demographic and Health Survey (BDHS 2000); and remaining information came from BMMS 2001

Several demographic, socioeconomic, and geographic variables are used for the analytical purpose (Table1). These variables represent some personal/ household characteristics. Some of them are nominal in nature and included in the regression equations as dummy variables.

Results and Discussion

The Bangladesh Demographic and Health Survey (2001-2003) provides 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. 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 of 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 education 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, still have 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 of both the modern and traditional methods than other women. It is mentioned 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 (BDHS 2000). But here worth noting is that the successive two BDHS (1999-2000 and 2001-2003) suggested that contraceptive use has increased among women with little or no education (8%); while this figure is 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 aspirations based on reality. Further indications of these different links between fertility, contraceptive use and education and some socio-demographic variables will be seen on the next section.

3.1. 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 we considered 64 districts and six 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 shows that there is a strong relationship between fertility, contraceptive use and others demographic, and socio-economic variables (Appendix table A). The Chittagong and Sylhet division exhibit total fertility rate from 3 to 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, there are higher fertility rates there than in Chittagong division (3.74) and Sylhet division (4.27), and lower acceptance of 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 of Rajshahi (29.43%) and Khulna (31.56%) divisions are more involved in NGO activities and more active in the labour force (30.20% and 31.3% respectively) (BDHS 2000 and BMMS 2001) than remaining regions, may also provide them with greater reasons to control the 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 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 researchers to observe the cross-relationships between fertility, women's employment and with socio-economic variables in district levels except spatial region. Table 3 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 show more decline 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 is highly statistically significant. But the correlation between CPR and female employment is positive and statistically significant which implies that working women are more likely to use family planning methods than others.

Child death is also found to be strongly related to fertility and CPR among Bangladeshi women. The correlation between child mortality and fertility shows a significant positive relation and with CPR in a significant negative relationship. It means that if levels of child mortality, fertility rate would be higher and CPR would be decreased 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 tend to have a larger number of children than those with higher levels 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, with 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 in 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 a contribution to reducing fertility, child mortality and increases literacy rate and created employment opportunities.

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

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

The correlation between NGOs and fertility is negative but does not show statistical significance. Maybe it has an interaction effect with other variables. But the correlation between NGOs and CPR shows a significant positive relationship. It implies that NGOs have an awareness ability among women regarding small families as norm, with health, education and created employment opportunities.

3.2. Some Determinants of Fertility Behaviour and Family Planning Method

Despite the importance of descriptive analysis in the 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 a 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 4 and 5 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.

Source: Bangladesh District level socio-Demographic and Health care Utilization Indicators 2001(p 4-9).

Notes: 1 Percentage of women aged 15-49 participating in labour force; 2 Child mortality (deaths per 1,000 children surviving to the first birthday).

The multiple regression results presented in Table 4 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 primary education is not 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 1994; World Bank 1994). 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 is that male education has been found not to have a significant effect on fertility and contraceptive use. This is probably due to its interrelationship with both female and male education.

Female labour force is another most important variable that explains 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 a significant determinant of fertility and female labour force indicating they are appropriate instruments. The sharp increase in contraceptive prevalence has led to an appreciable decline in fertility (Khuda, B., et. al. 2000). Working women are more likely to use contraception and have fewer children as compared to non-working women (CPS 1991).

It is also found that child mortality significantly affects the fertility positively and contraceptive use 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 a 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 households with poorest land have 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 (BDHS 2000). HH's with electricity have a significant negative effect on fertility and positively on contraceptive use (this result is consistent with Khuda, et. al. 2000 and Barakat, et. al. 2002). Electricity not only contributes to declining overall TFR, but also contributes to a 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 the 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. Women's access to mass media, especially TV is associated with higher probability of contraceptive use, and lower fertility and mean number of children. It is found to have a 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 is statistically significant. The fertility rate is lower among the women associated with the activities of NGOs. But the result is not statistically 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 (see our earlier work, Goni, 2007). The NGO sector is currently playing an important role in informal education program (figures for any schooling, also see Table1) and created employment opportunities, especially among rural poor women (BDHS 2000). 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 meetings and training, and deposit savings and credit installments to bank. All these factors exposed them to new ideas, knowledge and experiences through their interactions with the outside world, consequently reducing

fertility and increasing contraceptive use among the Bangladeshi women (Goni, 2007).

In developing countries, especially Muslim majority countries some researchers have found that there is no effect of work status on fertility (Noor's, 1986). A 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 a 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 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 been introduced to represent major geographic regions in Bangladesh. It is found that a woman living in Rajshahi and Khulna division has 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 in decline and contraceptive use increases over the entire region except Sylhet division. But the results are not significant for Rajshahi and Khulna division. It is worth noticing that the Sylhet division fertility rate is increased and contraceptive use decreases. It is observed from Table 4 and 5 that the fertility rate is in decline significantly in high fertility regions, that are Chittagong and Barisal divisions, but the low fertility rate regions like Khulna and Rajshahi division fertility rate of decline is not pleasing and gas likely stalled in recent decades. This result is also consistent with the findings of other studies (SVRS 2001; 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 (R2 = 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 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 understand the levels of fertility in Bangladesh in general, and to determine the major factors affecting fertility behavior and contraceptive use, in particular, the data of a BMMS 2001 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 the important role played by women's education in fertility decline and increased contraceptive use in Bangladesh. The main findings can be summarized as follows:

Women's education has long been recognized as another crucial factor that influences 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 levels.

Regression analysis revealed that female 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 declines significantly in high fertility regions such as Chittagong and Barisal divisions but the low fertility rate regions like Khulna and Rajshahi divisions, fertility rate declines and is not pleasing as it has stalled in recent decades.

Moreover, the findings of this study have 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 women to further accelerate the lowering of the fertility rate in the country. Family planning services can help women avoid unintended pregnancies and the abortions that sometimes follow them (Rahman and others, 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 design strategies that 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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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 to be 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 of women involved in NGO activities from a particular division/district and divided by total number of women of particular division/district expressed as a 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 (BDHS 2000); and remaining information came from BMMS 2001

Table 2: Women's 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 rate1	Total wanted fertility rate2	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; 2 Rates are based on births to women age 15-49 in the period 1-36 months preceding the survey.*

Table 3: Correlation Coefficients between dependent and independent variables.

Independent Variables	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)*

Table 4: 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 R2	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 percent; ** significance at less than 5 percent and *** significance at less than 10 percent. For definition of variables see Table 1.*

Table 5: 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 R2	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 percent; ** significance at less than 5 percent and *** significance at less than 10 percent. For definition of variables see Table 1.*

Appendix Table A: 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 cash1	Child mortality2
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 Percentage of women aged 15-49 participating in labour force; 2 Child mortality (deaths per 1,000 children surviving to the first birthday).*

DEMAND FOR CHILDREN IN RAJSHAHI CITY, BANGLADESH: A MULTIVARIATE ANALYSIS

ABSTRACT

The main aim of the present study is to estimate the factors associated with demand of child in Rajshahi City of Bangladesh. In this regard the necessary data was collected in June 2004 under the project of UNFPA entitled "Strengthening the Department of Population Science and Human Resource Development", University of Rajshahi, Bangladesh. The numbers of reproductive aged couples who have at least one child were selected for interview during the study. By using some statistical tools such as contingency analysis with - test and logistic regression model shows that socio-demographic factors significantly associated with the demand of child. The result of the study open that after controlling other factors, the socio-demographic characteristics that statistically and significantly affect the probability of demand of child in the study location like current age of respondent, age at marriage, respondent education, husband occupation, number of male child, number of female child and visit of health worker. Here current age and numbers of male and female children are statistically highly significantly influencing the demand of children.

Key Words and Phrases: Demand for Child, Chi-square, Cross-tabulation, Logistic regression model, Odds ratios.

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Introduction

In a developing country like Bangladesh it is almost compulsory that every boys and girls must marry and parent hood is a common feature immediately after marriage. Bachelor hood and those married couple who cannot procreate child are socially disapproved. It is believed that those who do not have any children must have some sort of physical defect, and they treat as sterile couple. Thus social status is also an important reason for demand of children (A. Bhende and Kanitkar, 1997). Demand for a child is very much related to age, and it is also somewhat linked with health, the no. of times she has been giving birth and so on. Also in cases of dead baby, how many it can be, the demand cannot be stopped. Such many reasons may influence the demand (Hans Raj, 2000).

Education may affect fertility through rising age at marriage, giving alternative source of new normative orientations and expansion of vision, increasing women's knowledge and use of birth control as well as providing better opportunity for labour force participation (Ryder, 1967; Janowitz, 1976). Husband's education may have a significant effect on the children ever born to ever married women. Because in our society almost everything depends on the opinion of a husband. Now a days higher educated person are giving importance to the educated female for marriage, as a result a balance is prevailing upon the families, which play a negative role in fertility (Ali M. 2003). In many studies it is observed that education especially secondary or higher level is important for reducing fertility, infant and child mortality, improving the human capital of the population (S. K. Sarkar, 2004, P 146). Also education along with improved family planning services can help women avoid unintended pregnancies and the abortions that sometimes follow them. Therefore, social economic or other changes drastically affect the value or cost of children and reduce fertility rates within education groups.

In developing countries like Bangladesh, the husband's occupation is closely related to fertility. According to Prof. Donald J Bogu's view fertility is influenced by the occupation of the head of the family. The people with good education are likely to check fertility, where as those with manual occupation are likely to have more children. He has related this to income also. According to him where income is low, fertility goes up, but income is not very high, then the fertility is the lowest, but when income considerably increases with that fertility again goes up. According to opinion it is wrong to think that when the family is riches the number of children will be less

(Bogue, 1969).

Studies concerning the impact of labour force participation on fertility suggest that working women have lower fertility than their non-working counterparts (Devanzo, 1972; UN, 1973). It also argued that labour force participation would have a decreasing effect on fertility only if it is incompatible with child bearing. The direction is of causality between labour force participation and fertility is not certain, because labour force participation may be a consequence as well as a cause of lower fertility.

Bangladesh has undergone a remarkable demographic transition over the last two decades. The total fertility rate has declined from about 6.3 in 1975 to 3.3 in 1999-2000 (BDHS, 1999-2000). Striking change have been observed were asked how many children they would ideally like to have, the response was an average 4.1 children (Huq and Cleand,1990). The desire for additional children declined noticeably over the past few decades. For example the percentage of women with two children who want no more children has risen from only 48 percent in 1991 to 66 percent in 1999-2000. Also in 1991, 45% of married women with two children wanted to have another child in future in the 1999-2000 BDHS surveys (Mitra et al 2001). Data from the BDHS indicate that after almost a decade long stagnation, the Bangladesh fertility rate has declined slightly to 3.0 per women (BDHS, 2004).

After marriage every couple is to desire have children. It is an inner feeling and source of satisfaction to every married person to have children. Thus in every society it is very much essential to find out demand of children to couple, which influence the whole family structure on the one hand and the society on the other. Therefore the main objective in this paper is to focus the background characteristics of the respondent and also to isolate the factors which are influencing the demand for child.

Concept of Desire and Demand for Children

When parents expect the "baby" with their family decision as well as with the view of their surrounding economic and social constraints is termed as demand for a child (Schultz, 1972).When parents expect to have their own children according to their mental incitement and care for them emotionally ignoring the economic point of view of bearing and rearing them and without equating cost and benefits involved with children may be termed as desire for children.

Data and Analytical Methods

The data has been collected from a field survey conducted in the urban area of Rajshahi City. Three wards of Rajshahi City were selected as a representative part and collected information from 2250 women by preparing a pre-scheduled questionnaire during the month of June 2004 and conducted through in-depth interviews. Respondents in the study are reproductive aged couples. The Present Study needs those respondents who had at least one child. Again this study was concentrated only on the urban respondents. Thus we got 2064 respondent who were related to this characteristic through purposive sampling method.

Analytical Methodology

In our study we have mainly used the tabular form of data. To see the association between demand for a child and other cofactors we used the most common contingency analysis with - test procedure. We have also used the logistic regression model to identify the impact of some most influential variables on demand for a child.

χ^2 - Test

χ^2 - test is mainly used to test the hypothesis which specifics the nature of one or more distribution. We know the mathematical form of the distribution; hypothesis regarding the sample that has been drowning from the distribution is tested by χ^2 - statistic. For testing hypothesis, we used to compare observed set frequencies with a corresponding set of frequencies that are expected under null hypothesis. The test statistic χ^2 is defined as,

$$\chi^2 = \sum_{j-1}^{k} \frac{(O_i - E_i)^2}{E_i} = \sum_{j-1}^{k} \frac{O_i^2}{Ei} - n$$

Where

O_i= observed frequencies, i = 1, 2, 3 ....., k

E_i= expected frequencies, i = 1, 2, 3 ....., k

$n = \sum_{j-1}^{k} E_i \sum_{j-1}^{k} O_i$ which is distributed as χ^2 with (k-p) degree of freedom, where p is the number of independent restrictions imposed for the calculation of the set expected frequencies.

Logistic Regression Model

An interesting method that does not require any distributional assumptions concerning explanatory variables is Cox's linear logistic regression model (1970). That logistic regression model can be used not only to identify risk factors but also to predict the probability of success. The general logistic model express a qualitative dependent variable as a function of several independent variables, both qualitative and quantitative (Fox, 1984). The logistic regression model allows a categorical variable (dichotomous or polytomous variable) as dependent variable. Let Y is a dichotomous dependent variable, which takes values 0 and 1. i.e.

$$Yi = \begin{cases} 1, \text{ If the individual wants more child} \\ o, \text{ Otherwise} \end{cases}$$

, $i = 1,2,3, \Lambda\ \Lambda\ \Lambda, n$

Also let there is a collection of k independent variables, which will be denoted by the vector, $X^t = (X_1 X_2 X_3 \Lambda\ \Lambda\ X_k)$ and be a (k+1) 1 vector of unknown parameters.

For simplification, we can use the quantity $\pi(X) = P(Y = 1\ X)$ the probability that the event occurs conditional on the value of X. Hence

$$\pi(\chi_i) = P(Y = 1 \mid X) = \frac{e^{g(\chi i)}}{1 + e^{g(\chi i)}} = \frac{e^{\chi\beta}}{1 + e^{\chi\beta}}$$

and

$$1 - \pi(\chi_i) = P(Y = o \mid X) = \frac{1}{1 + e^{\chi\beta}}$$

Hence

$$\frac{\pi(\chi_i)}{1 - \pi(\chi_i)} = e^{\chi\beta}$$

The central part of logistic regression in a transformation of is known as logit transformation, which is defined in terms of , is as follows:

$$g(\chi_i) = \log it\ \pi(\chi_i) = \log\left[\frac{\pi(\chi_i)}{1 - \pi(\chi_i)}\right] = e^{\chi\beta}$$

$\Rightarrow g(\chi_i) = \beta_0 + \beta_1 \chi_{1i} + \Lambda \Lambda + \beta_k \chi_{ki}$

which is the logit of the multiple logistic regression models.

Results and Discussion

There are several factors which are responsible in determining demand for a child to couple. Some basic characteristics of the study population that are treated as background variables in our study have been incorporated in Table 1.

Age is an important characteristic of a respondent. Demand for a child is very much related with age and affected by the age variation of ever-married women. From Table 1 we observe that in our study area the highest number of respondent is aged less than 25 years, which is 27.2% and the lowest for ages 40 and above which is 13.4%.

We observed that age of the respondent is highly significantly associated with demand of child. Demand of child is highest position in age group less 25, medium position in age group 25-30 years and it is rapidly decreasing in the age groups 30-40 years and 35-40 years. It also shows that top lowest demand of child in the age group 40 years and above (Figure 1).

Age at the marriage is one of the important factors in demography as it is directly related to fertility in many societies. In Bangladesh the minimum age at first marriage is 18 but in our study area early marriage is most frequent. We observe that 55.3% women's first age at marriage is less than 15 years, 37.6% women's age at first marriage is between 15-20 years, and the most vulnerable sight is that only 7.1% women's age at first marriage is above 20 years.

Fertility may be affected and influenced by the preaching of religions. Those religions which do not put any bar on the number of marriage and children are likely to have more fertility than others. Because more the number of wives normally, there are, more the children. Islam is the predominant religion in Bangladesh as well as in our study area. From Table 1 we see that in this area 98.3% are Muslims and only 1.7% are non-Muslims.

Education is one of the most important factors of fertility. From Table 1 it shows that, in this area maximum respondent are with education level secondary (39.5%), but incase of their husband maximum is higher educated (29.8%). Females with education level illiterate, primary and higher it is 19.9%, 26.3% and 14.3% respectively. Incase of their husband the percentage for illiterate, primary and secondary education level is 14.8%, 19.4%, 36.0% and 29.8% respectively.

In many studies it is observed that demand for children is higher among non-working or house wives as compared to working women (S. K. Sarkar). From Table 1 it is observed that around 93.4% women are house keepers in this area, only 4.7% engaged in service and another 1.9% engaged in other occupation.

It is observed that maximum husbands of the respondent in this area are engaged in service (48.1%), 24.3% engaged in farming and 27.7% engaged in other category (Table1).

Total number of living children as well as number of male and female children of couples can influence the demand for a child and their aspiration to have another child.

From Table 1 it is observed that 19.1% have only one male child, and incase of two, three and more than four children their percentage is 32.1%, 43.6% and 5.2%. In case of female children their percentage is 23.1, 30.6, 36.5 and 9.7 respectively. The Figure 2 shows that few percent of the respondent have one child (both male and female), top most percent of the respondent have three children and lowest percent have four and more children. This means that maximum respondent prefer two-three children, if they satisfy getting according to their preference the demand of children tremendously decreases.

In a less developed country like Bangladesh, health workers are very important person for giving advice and increase knowledge about new methods of health as well as reproductive health. They visit every house and make aware specially women and their babies health as well. From table 1 it shows that in our study area 52% respondents' house regularly visited by health worker, 19.8% irregularly visited and 28.2% houses were out of visit by the health worker.

Access to mass media always plays a vital role to make awareness and consciousness of women. In Bangladesh television is a popular media, which has reached in maximum house of both in rural and urban area. From table 1 we see that in our study area 77.4% respondent watches television and 22.6% do not.

Chi-square Test

Pearson Chi-square test procedure for testing significance among demand for children and socio-demographic variables in Table 2 are as follows-

To see the association between demand for child and various background variables like age, religion, occupation, age at marriage, education, number of male and female children of couple, visit of health worker and watches television a well known procedure Pearson chi-square test is used. From Table 2 it is found that current age of respondent, age at marriage, education of respondent, number of male children, number of female children and visit of health worker is highly significant impact with the variable demand for children. While the variables religion, education of husband, occupation of respondent and her husband and watches television shows insignificant result, that is they have no impact on demand for child to couple.

Factors associated with demand for a child: A Logistic Regression Analysis

Logistic regression analysis shows that the significant variables are the respondents' current age, age at marriage, respondents' level of education, husbands' occupation, number of living male and female children and frequency of visits by health workers. The remaining explanatory variables, namely religion, husbands' education, respondents' occupation and watch television do not seem to have significant independent effects on the demand of child.

From Table 3 it shows that age of the respondent is highly significantly

related with demand for children to couple. Considering age group <25 years as a reference category we see that, demand for children is less likely as their age increases. All the co-efficient calculated for each age group is negative in sign. The result indicates that the women of age group (25-29), (30-34), (35-39) & 40+ have (1-0.300)*100=70.0%, (1-0.219)*100=78.10%, (1-0.169) =83.1% and (1-0.112)*100=88.80% lower risk to demand for additional children as compared to age groups <25 years.

From Table 3 we observe that the regression coefficient of females and their husband for different levels of education are not statistically significant even except secondary level education for the female and they have positive effect. It is a general convention that demand for a child reduces as level of education raises up (S K Sarkar, 2004). Data from the world fertility surveys and the demographic and health surveys in Bangladesh and worldwide confirm the positive effect of education on reproductive behavior (Schultz, 1994; World Bank, 1994).

Occupation both for females and their husband plays an important role determining demand for a child. From Table 3 we see that in our study area occupation of respondent shows insignificant results but for their husband it shows significant result. The regression co-efficient of husband occupation shows that the risk of demand for children is 73.50% and 74.50% lower for service and other category of occupation as compared to the husband whose current occupation is farming (Table-3).

From Table 3 we see that number of male and female children of couple shows highly significant result to wants more children that is demand for child is very much related with these variables. Considering number of male child for one as a reference category we see that the risk is 43.40%, 78.40% and 89.30% lower for the couple whose number of male children is 2, 3, & 4+ respectively. On the other hand by assuming number of female child for one as a reference category it shows that the risk for demand of more child is 58.2% & 52.70% lower for those couple whose number of present female children is 2 & 3. But for the couple whose number of female children is 4 and above the risk is 1.363 times higher. This may because; aspiration of having a male child for a couple is a common scenario.

From Table 3 it is observed that visit of health worker has significant impact on demand for a child. Considering irregular visit of health worker as a reference category we see that it is 1.59 times higher, where health worker do not at all visit couple's house and it is 22.90% lower where health workers visited regularly.

Concluding Remarks

The study of demand of children has received increasing attention in developing countries because of its identifying capacity of segment of population having high and low fertility. The constitutional law of Bangladesh strictly prohibits early marriage. However in our study area a large proportion of the respondent is less than 25 years of age and most of them get their first marriage before 15 years. Major respondent in this area are illiterate and engaged in household activities only. Demand of child is largely depend on age and age at marriage of women. The result also indicates that 43.6 percent and 36.5 percent of the respondent in the study area have three male and female children respectively.

The results of the inferential analysis show that all the explanatory variables are statistically and significantly affect the probability of demand for child except religion, husband education level, respondent occupation and watches television of women in the study location. The sex and number of children is also an important factor for demand of children. The couples who have female children continue to go on giving birth to children till a boy is born. In many cases the same is true for the couple who have female children. Visits of health worker can change a couple's opinion to have a child because they increase awareness of good health both about child and their mother.

The results of the study Suggests that in order to accelerate the process of fertility decline in the country greater priority is to development in the social sector including enhancement of women's status, especially through increased female education and employment opportunities and improved access to mass media. In order to increase age at marriage the legislating law of marriage should maintain strictly. The government of Bangladesh should be aimed at operational zing the delivery of the wider reproductive health service package in rural and urban areas of the country.

Acknowledgement

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Table 1Percent Distribution of the Background Variables

Characteristics	Frequency	Percentage (%)
Respondent age		
<25 years	562	27.2
25-29	471	22.8
30-34	450	21.8
35-39	304	14.7
40+	277	13.4
Respondent Age at Marriage		
Less 15 years	1141	55.3
15-19	776	37.6
20+	147	7.1
Religion		
Muslim	2028	98.3
Non-Muslim	36	1.7
Female education		
Illiterate	411	199
Primary	542	26.3
Secondary	816	39.5
Higher	295	14.3
Husband education		
Illiterate	305	14.8
Primary	400	19.4
Secondary	743	36.0
Higher	616	29.8
Female occupation		
Household	1928	93.4
Service	97	4.7
others	39	1.9
Husband occupation		
Service	992	48.1
Farmer	501	24.3
others	571	27.7
No. of Male Children		
1	394	19.1
2	663	32.1
3	900	43.6
4+	107	5.2
No. of Female Children		
1	477	23.1
2	632	30.6
3	753	36.5
4+	201	9.7
Missing	1	0.0
Visit of Health Worker		
No visit	408	282
Irregula	582	19.8
Regular	1074	52.0
Watch T.V		
No	466	22.6
Yes	1598	77.4

Table 2 Chi-square tests want more children with respect to Socio-demographic variables

Variable	Chi-square	d.f	Assymp. sig
RA * DC	314.891	4	Significant
RM * DC	16.758	2	Significant
RG* DC	1.108	1	Insignificant
RE* DC	38.282	3	Significant
HE* DC	5.137	3	Insignificant
ROC* DC	2.396	2	Insignificant
HOC* DC	.285	2	Insignificant
MC* DC	229.085	3	Significant
FC* DC	100.115	3	Significant
HW* DC	27.686	2	Significant
WT* DC	0.006	1	Insignificant

RA= Respondents' age	HOC= Husbands' occupation
RM= Respondents' age at marriage	MC= No. of male children
RG= Religion	FC= No. of female children
RE= Respondents' education	HW= Visits of health worker
HE= Husbands' education	WT = Watch television
ROC= Respondents' occupation	DC= demand for child

Table 3 Logistic regression estimates for the effect of socio-demographic variables with demand for children as the dependent variable Bangladesh 2005

Variables	Coefficient	Significance	Odds ratio
Respondent age			
<25 years	…	…	1.00
25-29	-1.204	0.000	0.300
30-34	-1.518	0.000	0.219
35-39	-1.779	0.000	0.169
40+	-2.190	0.000	0.112
Respondent Age at Marriage			
Less 15 years	…	…	1.00
15-19	0.194	0.143	1.214
20+	0.465	0.063	1.592
Religion			
Muslim	…	…	1.00
Non-Muslim	-0.329	0.488	0.720
Female education			
Illiterate	…	…	1.00
Primary	0.162	0.446	1.176
Secondary	0.397	0.070	1.487
Higher	0.237	0.394	1.267
Husband education			
Illiterate	…	…	1.000
Primary	0.298	0.176	1.348
Secondary	0.016	0.948	1.016
Higher	-0.044	0.883	0.957
Female occupation			
Household	…	…	1.000
Service	-0.182	0.536	0.834
others	-0.442	0.378	0.642
Husband occupation			
Service	…	…	1.000
Farmer	-0.265	0.164	0.767
others	-0.255	0.078	0.775
No. of Living Male Children			
1	…	…	1.000
2	-0.570	0.000	0.566
3	-1.531	0.000	0.216
4+	-2.239	0.000	0.107
No. of Living Female Children			
1	…	…	1.000
2	-0.872	0.000	0.418
3	-0.749	0.000	0.473
4+	0.310	0.141	1.363
Visit of Health Worker			
No visit	…	…	1.000
Irregula	0.468	0.005	1.597
Regular	-0.260	0.061	0.771

Watch T.V No Yes	… -0.019	… 0.906	1.000 0.981
Constant	1.144	0.001	3.139

Fig.no 1: Demand of children with respect to respondent age

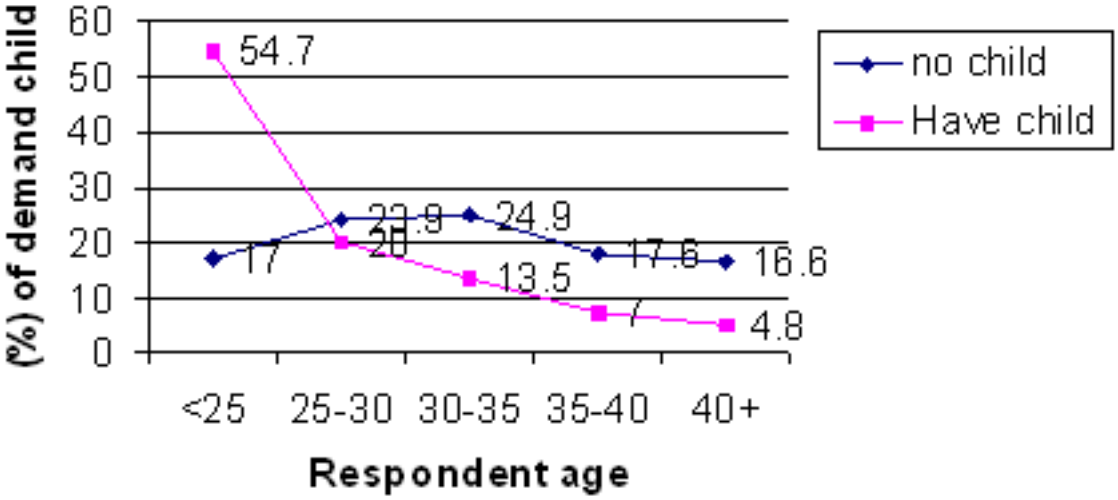
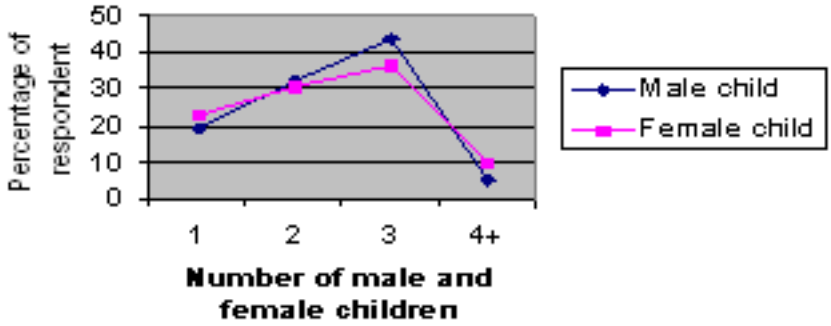


Figure 2: Number of children with respect to respondent



FACTORS AFFECTING AGE AT MARRIAGE IN TWO MAJOR DIVISIONS OF BANGLADESH: A MULTIPLE CLASSIFICATION ANALYSIS (MCA)

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ABSTRACT

The present study describes the factors affecting age at marriage in Bangladesh by examining the situation prevailing in two major divisions using data from the 2000 Bangladesh Demographic and Health survey (BDHS, 2000). The findings reveal that among all the variables considered, women's education is one of the most important correlates, which strongly affect for explaining the variability in age at marriage for these two major divisions. Although the average level of education is very low, education still has a strong positive relationship with age at first marriage. The husband's education has come out to be a strong determinant of age at marriage. Childhood residence is also quite important; affecting age at marriage through education and work participation, though the direct effect is not as high as it was for education

Key Words: Age at marriage, Multiple Classification Analysis (MCA) and BDHS

Introduction

Bangladesh, situated in South Asia, is a unitary, independent and sovereign Republic known as the People's Republic of Bangladesh and is the seventh most populous country in the world (PRB, 2007). Ethnically, Bangladesh is homogeneous, having only one major ethnic group (98.8%) known as Bangalees. There are some ethnically different tribal populations in the hilly regions of the country constituting 1.2%. Islam is the predominant religion with 88.30%, Hinduism 10.5%, Buddhism 0.6%, Christianity 0.3% and others 0.3% (BBS, 2003).

In Bangladesh, marriage means the prescribed legal union between a man and woman, establishing them in new social roles as husband and wife. Pre-marital cohabitation does not exist and it is looked upon as a social evil. Marriage is a desirable event and a universal phenomenon in Bangladesh. Early marriage for women in Bangladesh is widespread and most of them become married before reaching the age of 20 years. In rural Bangladesh, there is a common belief that a girl aged 20 years is too old to marry. Constraints on marriage that didn't exist before are, however, now making an appreciable change - shortage of land, unemployment, etc. Also marriage among the highly educated elite is becoming less desirable as they are capable of supporting themselves free from the contractualism of arranged marriages. As early as possible a girl must go to her husband's household. For parents a post puberty unmarried daughter is considered a danger because of the secret desire to indulge in illicit coitus that might be in their daughter's mind, which may result in social scandal and for which the parents may be socially condemned and have to face rancour and social boycott. If a daughter's marriage is delayed, the parents feel guilty and begin to think of her as a burden. Parents of girls who can arrange early marriage for their daughters feel very proud. 30% of women age 10-49 have never married, while 65% are currently married. At age 10-14, the proportion never married is 93% and by age 25-29, marriage is nearly universal for females only 4% have never married. The proportion divorced, separated or deserted is small in Bangladesh and widowhood is quite limited until older ages. 12% of women age 40-44 and 16% of those 45-49 are widowed. The proportion divorced or deserted is relatively even across most age groups (to 4 percent).

Islam and Abedin (1996) show that fertility takes place in the country over time and is contributed much by the change in marital fertility, marriage pattern and increasing use of contraception. Shaikh (1997) considered the age at marriage and other aspects of nuptiality in Bangladesh in the context of opportunities to accelerate national development. It suggests that concerted efforts to increase the female age at marriage could produce a number of beneficial effects ranging

from reduction in the incidence of divorce and widowhood to a lowering of fertility. Islam and Ahmed (1998) investigate marriage patterns and their determinants in Bangladesh and believed that, whatever is the impact of the differentials that could be discerned from the analysis, a lower age at marriage (a) among rural women, (b) among those who are Muslims and (c) among those without pre-marital exposure to work is associated with a low level of education. Bittles and Hussain (2000) show that the consanguineous marriage is widely favored in a large majority of the world's Islamic populations. Fowers et al. (2001) shows that the common tendency to describe one's marriage in unrealistic terms has been conceptualized as a positive illusion about marriage. Kiecolt-Glaser et al. (2003) shows that Neuroendocrine function, assessed in 90 couples during their first year of marriage (Time 1), was related to marital dissolution and satisfaction 10 years later. Compared to those who remained married, epinephrine levels of divorced couples were 34% higher during a Time 1 conflict discussion, 22% higher throughout the day, and both epinephrine and nor epinephrine were 16% higher at night.

Marriage policies can be directed to a variety of objectives, such as the social condition of unmarried women, the welfare of the unmarried elderly population, the effect of migration on the marriage market and the social and legal aspects of illegitimate children. The implications deal primarily with demographic aspects and more specifically, with the fertility implication of marriage in countries where the current level of fertility is not deemed satisfactory. This is why, the main aim and objective of this article is to identify the direct and indirect effects of socio-economic and demographic factors on marriage.

Data and Materials

The data of the present study are taken from Bangladesh Demographic and Health Survey (BDHS) of 1999-2000. Survey collected data on marital status classifying the status as Single (never married), Married, Divorce and Widow Categories addressing female population. The 1999-2000 BDHS is a nationally representative survey of 10,544 ever-married women aged 10-49 and 2,817 currently married men aged 15-49. The marriage patterns are analyzed by means of a statistical measure of arithmetic mean. A multivariate technique-Multiple Classification Analysis (MCA) has been used for the analysis of the determinants of age at marriage (Yates, 1934 and Anderson Bancraft, 1952). In 1963, the computerized MCA program was prepared by a group of researchers at the survey Research Center of the University of Michigan. Since then, the MCA program has been widely used in social science research.

Results and Discussion

The variables that are considered to look at the extent of effect on the marriage pattern of the women are education of wife, childhood residence, religion of wife, work status of woman before first marriage, husband's education and husband's occupation. In this case, age at first marriage is taken to be the dependent variable and the stated socio-economic variables as explanatory variables. Table 1 shows that the mean age at first marriage both unadjusted and adjusted by different socio-economic characteristics with the values of h2 and b2 for Dhaka and Rajshahi divisions of Bangladesh.

For Dhaka division, the proportion of variance in age at marriage explained by female education is the highest (unadjusted value of h2 =0.492 and adjusted value of b2=0.426) among all other variables while the proportion of variance explained by work status of women is the lowest (h2 =0.019 and b2=0.006). For Rajshahi division, the proportion of variance in age at marriage explained by female education is the highest (unadjusted value of h2 =0.418 and adjusted value of b2=0.372) among all other variables while the proportion of variance explained by work status of women is the lowest (h2 =0.002 and b2=0.017).

The proportion of variance in age at marriage explained by childhood residence is h2 =0.204 and b2=0.052 for Dhaka division and h2 =0.156 and b2=0.064 for Rajshahi division. Among the included variables, it is observed that the effect of childhood residential differential has been found to be the third strongest differential for explaining the variation on age at first marriage for both the divisions.

The proportion of variance explained by pre-marital work status (unadjusted) is h2 =0.019 and b2=0.006 for Dhaka division and h2 =0.002 and b2=0.017 for Rajshahi division. For instance, Dhaka division has a density population, so the land people ratio is very small. Rajshahi division is sparsely populated, but has a relatively higher labor demand than the other areas (Ahmed, 1982).

Religion of women has also shown a significant contribution on age at marriage. The strength in explaining the variability by this variable is (unadjusted) h2 =0.160 and b2=0.152 for Dhaka division and h2 =0.023 and b2=0.026 for Rajshahi division. Husband's education has a significant effect on the variation of age at marriage of women for these two divisions. The proportion of variance explained by husband's education (unadjusted) is h2 =0.361 and b2=0.073 for Dhaka division and h2 =0.295 and b2=0.082 for Rajshahi division.

Husband's occupation has also shown a positive association with age at first marriage and has a significant effect on the variation of age at first marriage for Dhaka and Rajshahi divisions. The strength of explaining variability (unadjusted) is h2 =0.174 and b2=0.007 for Dhaka division and h2 =0.120 and b2=0.026 for Rajshahi division.

Tables 2 and Table 3 corresponding to the divisions Dhaka and Rajshahi produce the results of zero order correlation coefficient of age at marriage with various socio-economic variables. Using the values of the coefficient b2 with the values of Tables 1, it is possible to posit a causal model of socio-economic structural influences on age at first marriage.

Conclusion and Recommendation

Among the selected socio-economic variables as childhood residence of

women, education of both wife and husband, work status of women before first marriage, religion of women and husband's occupation suggest that all the variables considered, women's education is, by far, one of the most important correlates which effects is the strongest for explaining the variability in age at marriage for these two divisions. Although the average level of education is very low, education still has a strong positive relationship with age at first marriage. The husband's education has come out to be a strong determinant of age at marriage. Childhood residence is also quite important; affecting age at marriage through education and work participation, though the direct effect is not as high as it was for education. In this regard, the following policy recommendations are to be considered:

- The early marriage of women (before age 18) should be discouraged by creating its effect on reproductive health and fertility. To do this, the law relating to it should be uniformly enforced all over the country.
- The government can deliberately manipulate economic incentives and disincentives to achieve the national goals in education and fertility by involving civil societies and various NGO's.

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Table 1: Result of MCA of age at marriage with indicated socio-economic characteristics as explanatory variables and the coefficients of h2 and b2, Dhaka and Rajshahi divisions, BDHS (1999-2000).

Dhaka Division					**Rajshahi Division**			
Explanatory Variable	**Unadjusted**	**Adjusted**	**h^2**	**b^2**	**Unadjusted**	**Adjusted**	**h^2**	**b^2**
Childhood residence								
Urban	15.88	15.30			15.19	14.70		
Rural	14.62	14.98	0.204	0.052	14.12	14.26	0.156	0.064
Education of women								
No education	14.23	14.31			13.79	13.86		
Primary	14.76	14.81			14.18	14.02		
Secondary	16.24	15.97			15.26	15.13		
Higher	20.05	19.54	0.492	0.426	19.59	19.06	0.416	0.372
Work status of women								
Did not worked	15.00	15.07			14.26	14.33		
Worked	15.13	15.11	0.019	0.006	14.41	14.44	0.002	0.017
Religion								
Muslim	14.95	14.96			14.26	14.33		
Non-Muslim	16.57	16.50	0.160	0.152	14.57	14.57	0.023	0.026
Husband education								
No education	14.14	14.83			13.77	14.18		
Primary	14.57	14.93			13.98	14.27		
Secondary	15.55	15.29			14.42	14.45		
Higher	17.22	15.46	0.361	0.073	16.43	14.90	0.295	0.082
Husband occupation								
Non-manual	15.90	15.09			14.92	14.24		
Manual	14.76	15.13	0.174	0.007	14.14	14.41	0.120	0.026
Proportion of variance explained		0.271				0.184		

Table 2: Zero order correlation coefficient of socio-economic variables of marriage pattern for Dhaka division (1999-2000).

	X_2	X_3	X_4	X_5	X_6	X_7
X_3	1.000	-0.304**	0.012	-0.013	-0.337**	0.229**

X_3		1.000	-0.084**	0.127**	0.644**	-0.302**
X_4			1.000	0.032*	-0.59**	0.008
X_5				1.000	0.125**	0.010
X_6					1.000	-0.325**
X_7						1.000

*** Correlation is significant at the 0.01 level.*

** Correlation is significant at the 0.05 level.*

Table 3: Zero order correlation coefficient of socio-economic variables of marriage pattern for Rajshahi division (1999-2000).

	X_2	X_3	X_4	X_5	X_6	X_7
X_2	1.000	-0.215**	0.018	-0.017	-0.213**	0.199**
X_3		1.000	-0.169**	0.093**	0.600**	-0.305**
X_4			1.000	0.101**	-0.136**	0.028
X_5				1.000	0.038*	0.002
X_6					1.000	-0.302**
X_7						1.000

*** Correlation is significant at the 0.01 level.*

** Correlation is significant at the 0.05 level.*

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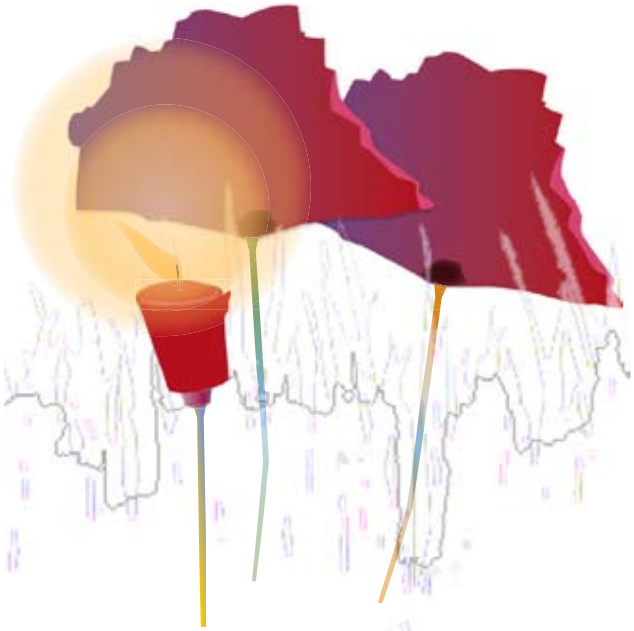

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