PATTERNS AND DETERMINANTS OF AGE AT FIRST BIRTH IN BANGLADESH

BANGLADEŞ'TE İLK DOĞUM YAŞININ ÖRÜNTÜSÜ VE BELİRLEYİCİLERİ

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ABSTRACT

This paper focuses on determining the patterns and socio-economic, cultural and demographic factors of age at first birth for ever-married Bangladeshi women. This study utilized data from the 2011 Bangladesh Demographic and Health Survey (BDHS). The age pattern of women at first birth is estimated using the life table technique and the impact of covariates on age at first birth is determined using the Cox's proportional hazard model. The trimean of age at first birth of Bangladeshi women is found to be 18 years. The pace of having first birth is faster among women who are Muslims, rural residents, illiterates or primary school graduates with below secondary level of education and those from households categorized as economically poor or middle. Age at first marriage, ever use of any contraception, spousal age difference, religion, respondent's working status and husband's occupation showed significant association with age at first birth.

KEYWORDS: Age at first birth, life table analysis, censored data, pace of having first birth, Cox proportional hazards model

ÖZET

Bu çalışma en az bir kez evlenmiş Bangladeşli kadınların ilk doğumdaki yaş örüntülerini ve bu yaşa etki eden sosyo-ekonomik, kültürel ve demografik faktörleri belirlemeye odaklanmaktadır. Kullanılan veri 2011 Bangladeş Nüfus ve Sağlık Araştırması'ndan elde edilmiştir. Kadınların ilk doğum yaşının örüntüsü yaşam tablosu yöntemiyle, orta değişkenlerin ilk doğum yaşına etkisi ise Cox orantılı

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tehlike modeliyle belirlenmiştir. Bangladeşli kadınların ilk evlenme yaşının trimean ortalaması 18 yaş olarak belirlenmiştir. İlk doğuma geçiş hızı Müslüman, kırsal alanlarda ikamet eden, okuma yazma bilmeyen, ilkokul mezunu olup ortaokuldan az eğitim almış veya ekonomik olarak orta veya yoksul olarak nitelendirilen hanehalklarında yaşayan kadınlar arasında daha yüksektir. İlk evlenme yaşı, gebeliği önleyici yöntem kullanmış olma, eşler arasındaki yaş farkı, din, cevaplayıcının çalışma durumu ve eşin işi de ilk evlenme yaşıyla istatistiksel olarak anlamlı bir ilişki sergilemiştir.

ANAHTAR KELIMELER: İlk doğum yaşı, yaşam tablosu analizi, sansürlü veri, ilk doğuma geçiş hızı, Cox orantılı tehlike modeli

INTRODUCTION

Having the first birth is one of the most significant events in a woman's life. It indicates the beginning of intensive responsibilities of motherhood and childcare. Early initiation of first birth reduces the quality of life due to responsibilities of motherhood and childcare. Early entry into motherhood lengthens the reproductive period and subsequently increases fertility. It is a major determinant of large family size and rapid population growth, especially in countries where the use of contraception is low (Islam, 1999). Several studies emphasized that lower age at first birth results in higher completed fertility (Presser, 1971; Marini and Hodsdon, 1981; Kohler et al. 2001). In addition, population growth is more rapid when women give their first birth during adolescent ages (Senderowitz and Paxman, 1985; Mazur, 1997; Singh, 1998).

Bangladesh is often characterized by early marriage (Huq and Cleland, 1990; Islam and Islam, 1993; Zahangir and Kamal, 2011) and early first pregnancy. In the country, 90% of pregnancies end in a live birth and the remaining 10% in miscarriage/abortion, stillbirth and/or menstrual regulations (MR) (BMMS, 2001). Several studies emphasized that the onset of motherhood of Bangladeshi women is at early ages and the proportion of first births peaks at the age of 19 years (Singh, 1998; Anawar 2005). According to Reynolds et al. (2006), the percentage of adolescent mothers or currently pregnant adolescents is the highest (about 35%) in Bangladesh among the Asian countries. Previous studies (Knox, 1971; McAnarney, 1978, Magraband Danielson-Murphy, 1979; Zabin and Kiragu, 1998; Phipps and Sowers, 2002; Lee et al. 1998) claimed that early pregnancy is associated with various complexities, including increased risk of anaemia, toxaemia, urinary tract infection, uterine dysfunction, cephalo-pelvic disproportion, abruption placentae in the mother, and preterm delivery and low birth weight of child together with high rates of fetal, perinatal, and maternal mortality. Additionally, early first birth is considered a risk category of child survival (BMMS, 2001). Complications during pregnancy and childbirth are the

leading causes of death for young women between the ages of 15 and 19 years in developing countries (Save the Children, 2004).

The above discussion emphasizes the consequences of early first birth, at the individual and social levels. This study aims to determine the age patterns of first birth and the socioeconomic, cultural and demographic factors affecting age at first birth of ever-married Bangladeshi women.

METHODOLOGY

The Data

This study is based on data obtained from a nationwide cross-sectional survey, namely the 2011 Bangladesh Demographic and Health Survey (BDHS). The survey was designed to provide detailed information on reproductive history, marriage, fertility preferences, family planning methods, breastfeeding practices, nutritional status of women and young children, maternal and child health, infant and child mortality, knowledge and attitudes regarding HIV/AIDS, etc. The survey sample was obtained using a multistage cluster sampling approach to achieve a nationally representative sample of ever-married women. There were 17,842 ever-married women of reproductive ages in the survey. Among them, 112 women are excluded from the study; as 109 women gave their first birth before getting married which made the interval from marriage to first birth negative (which also contradicts with the social norms of Bangladesh), and the remaining 3 women were primary sterile at the date of interview.

The Dependent Variable

The dependent variable 'age at first birth' is measured in completed years and the beginning of exposure to first birth is measured from the women's date of birth. Therefore, the dependent variable represents age at first birth of the respondents who gave their first birth. For those who were childless at the date of interview, the variable represents their ages at the date of interview.

The Covariates (Independent Variables)

The covariates in the study are selected based on the literature, mainly on age at first birth, childbearing and similar issues (Ngalinda, 1998; Teachman and Schollaert, 1989; Rindfuss and John, 1983; Khatun and Rahman, 2008; Gurmu and Etana, 2014; Kamal and Pervaiz, 2013; Haque and Sayem, 2009). Literature showed that the timing of first birth depends on various socioeconomic, cultural and demographic factors. We selected covariates from each group in order to analyze them altogether with different combinations. The covariates with their categories and number of cases are shown in Table 1.

Table 1 Name of independent variables with their categories and number of cases

Variables	Categories	No. of cases
Socio-economic variables		
Type of place of residence	Urban	6,154
	Rural	11,576
Administrative division	Barisal	2,059
	Chittagong	2,849
	Dhaka	3,069
	Khulna	2,647
	Rajshahi	2,582
	Rangpur	2,456
	Sylhet	2,068
Respondent's education	No education	4,598
	Primary	5,297
	Secondary and above	7,835
Respondent's working status	Not working	15,062
	Working	2,668
Husband's education	No education	5,163
	Primary	4,804
	Secondary and above	7,763
Husband's occupation	Agriculture	2,992
	Business	3,958
	Service	1,160
	Other	9,620
Wealth index	Poor	9,803
	Middle	3,754
	Rich	4,173
Cultural variables		
Religion	Muslim	15,745
	Other	1,985
Access to mass media[1]	No	6,019
	Yes	11,711
Demographic variables		
Body mass index[2](BMI)	Thin	3,980
	Normal	10,271
	Obese	3,045
Age at first marriage	≤ 13	4,384
	14-15	5,308
	16-19	6,398
	≥ 20	1,640
Spousal age difference[3]	≤ 5	4,209
	6-8	4,308
	9-11	3,583
	≥ 12	4,434
Ever use of any contraception	No	3,230
	Yes	14,500

[1]Access to mass media is the combination of three variables: frequencies of listening to radio, watching TV and reading newspapers.

[2]The BMI is used to measure thinness (<18.5 kg/m^2) or obesity (≥ 25 kg/m^2) of a woman. In this model, it is a proxy indicator of body fatness at survey date. It is assumed that women who are thin or obese at the date of interview were thin or obese at the date of having their first child.

[3]Spousal age difference is obtained by subtracting wife's age from husband's age.

For convenience, some of the covariates which were continuous originally were recoded into categorical variables and utilized as such.

Statistical Analysis

Life table technique is the most suitable analytic procedure for censored data (Ngalinda, 1998), so the age pattern of first birth and its determinants are examined through this technique. Chi-square test of independence is used to check for associations between the dependent variable and each of the independent variables. To examine the effect of covariates on age at first birth, Cox proportional hazards model is applied.

RESULTS AND DISCUSSION

Percentages of women by their observed and estimated ages at first birth are presented in Figure 1. Life table method is utilized to fit the estimated curve. The observed curve shows that women start having their first births at a very early age (11 years), but its level is negligible (about 0.10%). Subsequently, having the first birth sharply increases with age up to 15 years (14.40%) and then decreases with a slightly slower rate. It is notable that over 82% of women give their first birth during adolescent ages (up to 19 years), having the first birth is more prevalent (about 64%) among women aged 14-18 years, and the mean age at first birth is 17.92 years.

Analysis of first birth through the life table technique shows that the age at first birth has its peak (about 13% each) in two consecutive ages of 15 and 16 years, and almost 77% of first births occur within adolescent ages. In addition, most of the first births (about 60%) occurred between the ages of 14 and 18 years. According to trimean, first birth is concentrated at the age of 18 years.

Looking closer at the probabilities of having first birth (q_x) (estimated through the life table technique) presented in Figure 2, it appears the highest risks are found at the three consecutive ages of 19, 20 and 21 years with a probability of 0.25. Before the peak, the probability of having the first birth increases rapidly with age. A probable explanation is that women who got married early have a pressure to become mothers soon, especially if they are poor. After the peak, the probability of having the first birth initially declines rather sharply due to adolescent sterility or contraceptive use, and then declines slowly.

Cumulative probabilities of having the first birth, at various ages by background characteristics are studied by the life table technique and it is relevant to the assessment of time variable. Then we can state that for a continuous random variable T with a probability density function (pdf) $f(t)$, the probability that a first birth occurred by duration t or cumulative probability of occurring first birth by duration t is $F(t) = P(T < t)$. As descriptive statistics, the mean, median and trimean are also calculated based

on the survival analysis. For testing the significance of the explanatory variables incorporated in the analysis, the dependent variable 'age at first birth' is classified into four groups (in years): ≤ 15, 16-17, 18-19 and ≥ 20.

Results of survival analysis of age at first birth in relation to the background characteristics of women are presented in Table 2. It clearly shows that the trimean lies between the mean and median age at first birth, and thus trimean is a better estimate of age at first birth for the current status reporting data. Tukey (1977) and Islam and Islam (1993) provided a similar statement about trimean especially for open-ended and censored data. Moreover, Rodriguez and Hobcraft (1980) propose trimean as a more sensitive measure of location and its very nature as containing some information about the distribution. Trimean is also popularly used in recent studies (Aryal, 2007; Aaryal, 2005; Ngalinda, 2001). Thus, trimean of age at first birth is used to examine differentials of age at first birth in respect to the background characteristics of women.

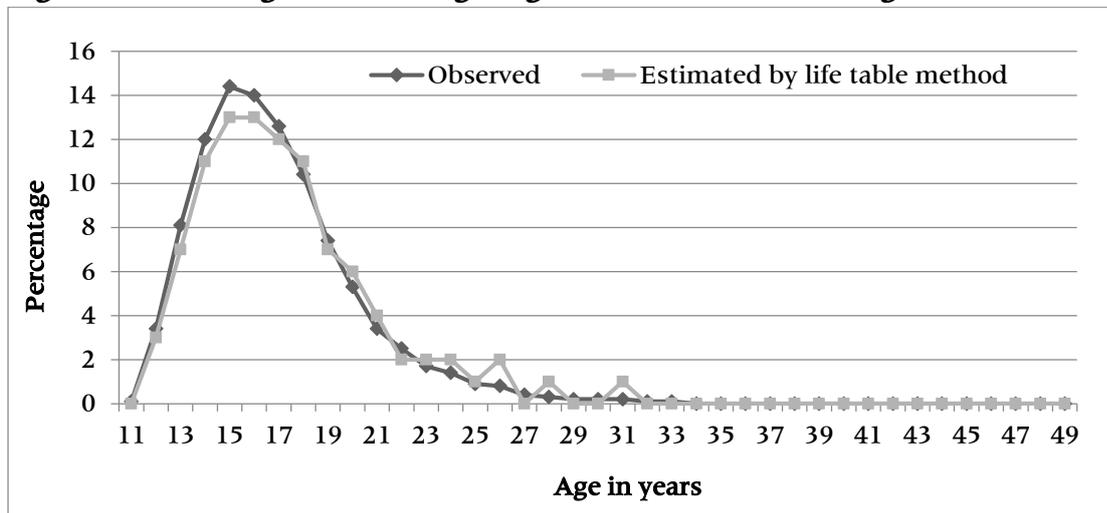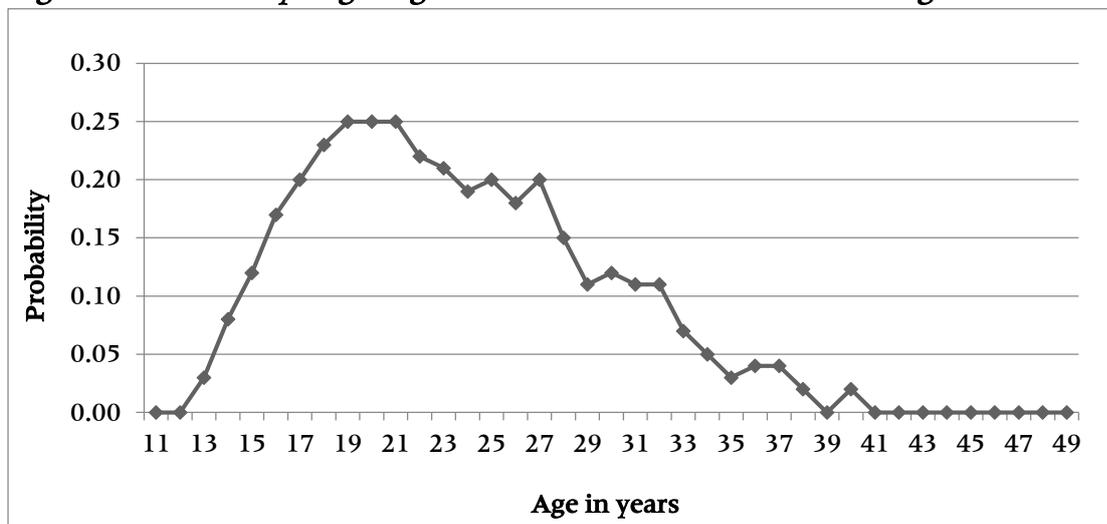**Figure 1 Percentage of women giving first birth at different ages**

Figure 2 Probability of giving first birth of women at different ages

The differential based on the type of place of residence reveals significant and gradually widened variation until 19 years of age in the pace of having first birth, but considerably slower pace of having first birth in urban areas. Trimean of age at first birth is 0.3 years higher among women in urban areas compared to women in rural areas. NIPORT et al. (2013) also found that the median age at first birth was higher in urban than rural areas among the women of ages 20-49 years. In fact, rural women are disadvantaged compared to their urban counterparts in terms of social, cultural and economic perspectives. Among regions, the slowest pace of having first birth is observed in Sylhet and the fastest in Rangpur. Consequently, the trimean of age at first birth is highest in Sylhet and the lowest in Rangpur. The findings are consistent with the median age at first birth reported by NIPORT et al. (2013). Barisal and Chittagong divisions, as well as Khulna and Rajshahi divisions, have the same trimean, but the pace of having first birth slightly differs among them. These regional disparities are partially attributed to the non-uniform distribution of industrialization, urbanization and modernization across regions.

Increasing education appears to notably lower the pace of having first birth, thus increasing the trimean of age at first birth. Customarily, young women with higher levels of education are more likely to take part in the workforce that imposes delayed marriage, subsequently to delayed first birth. Husband's education provides analogous results, but its impact on age at first birth is not as strong as female's education. Kamal (2009) noted the same effects.

According to religious affiliation, variation in the pace of having first birth is evident and also rises with age until 17 years. The pace of having first birth is faster among Muslim women, and trimean of age at first birth is 1 year higher among Muslim than non-Muslim women. Kamal (2012) also found that Muslim women have their first births earlier than non-Muslim women. The normative pressure and traditional cultures of Muslims influence women to have earlier first birth. Variation due to exposure to mass media shows that women with no mass media exposure are more likely to have their first birth earlier compared to their counterparts. For women who are not exposed to any mass media, the probability of having first birth is 0.04 at age 13 years, which sharply rises to 0.76 at age 19 years. Among women exposed to mass media, the level is 0.66 at the age of 19 and attained from 0.03 at age 13 years. These findings signify that mass media increases awareness about the consequences of early motherhood.

Table 2 Cumulative probabilities of first birth at specific ages by background characteristics of ever-married women along with their mean ($\overline{X}$), median (Me) and trimean (TM) age at first birth

Background Characteristics	Age in years							$\overline{X}$	Me	TM	χ^2
	13	15	17	19	20	24	28				
Type of place of residence											
Urban	0.03	0.19	0.43	0.63	0.71	0.88	0.95	19.6	18.0	18.3	166.9
Rural	0.03	0.22	0.50	0.73	0.80	0.93	0.97	18.6	18.0	18.0	p=0.00
Administrative division											
Barisal	0.03	0.19	0.47	0.69	0.78	0.93	0.97	18.8	18.0	18.0	
Chittagong	0.02	0.17	0.43	0.69	0.78	0.94	0.97	19.0	18.0	18.0	
Dhaka	0.03	0.22	0.47	0.67	0.74	0.90	0.96	19.2	18.0	18.3	215.7
Khulna	0.03	0.23	0.51	0.73	0.80	0.92	0.96	18.7	17.0	17.5	p=0.00
Rajshahi	0.04	0.25	0.52	0.72	0.79	0.91	0.96	18.7	17.0	17.5	
Rangpur	0.05	0.27	0.56	0.77	0.83	0.93	0.96	18.3	17.0	17.0	
Sylhet	0.03	0.14	0.34	0.58	0.68	0.87	0.95	20.2	19.0	19.0	
Respondent's education											
No education	0.05	0.29	0.57	0.77	0.82	0.94	0.97	18.3	17.0	17.0	891.6
Primary	0.04	0.28	0.58	0.79	0.85	0.95	0.98	18.0	17.0	17.0	p=0.00
Secondary and above	0.01	0.12	0.35	0.59	0.68	0.88	0.95	19.9	19.0	19.3	
Religion											
Muslim	0.03	0.22	0.49	0.71	0.78	0.92	0.96	18.8	18.0	18.0	104.0
Other	0.02	0.14	0.36	0.58	0.68	0.89	0.95	20.0	19.0	19.0	p=0.00
Access to mass media											
No	0.04	0.25	0.54	0.76	0.83	0.94	0.97	18.3	17.0	17.0	227.6
Yes	0.03	0.19	0.44	0.66	0.74	0.90	0.96	19.3	18.0	18.3	p=0.00
Wealth index											
Poor	0.04	0.25	0.55	0.76	0.83	0.94	0.97	18.3	17.0	17.0	656.0
Middle	0.03	0.21	0.45	0.70	0.78	0.92	0.97	19.0	18.0	18.0	p=0.00
Rich	0.02	0.13	0.33	0.55	0.64	0.85	0.94	20.5	19.0	19.3	
Respondent's working status											
Not working	0.03	0.21	0.48	0.71	0.79	0.93	0.97	18.8	18.0	18.0	89.9
Working	0.04	0.22	0.44	0.63	0.70	0.85	0.93	19.9	18.0	18.3	p=0.02
Age at first marriage											
≤13	0.13	0.58	0.82	0.91	0.93	0.97	0.98	16.2	15.0	15.3	
14-15	0.00	0.20	0.70	0.90	0.91	0.97	0.98	17.4	16.0	16.5	7000.5
16-19	0.00	0.00	0.20	0.60	0.76	0.95	0.97	20.0	19.0	19.3	p=0.00
≥20	0.00	0.00	0.00	0.00	0.04	0.53	0.81	26.4	24.0	24.3	
Husband's education											
No education	0.05	0.28	0.58	0.78	0.84	0.94	0.97	18.2	17.0	17.0	
Primary	0.04	0.25	0.54	0.77	0.84	0.95	0.97	18.2	17.0	17.0	734.9
Secondary and above	0.02	0.14	0.36	0.60	0.69	0.88	0.95	19.9	19.0	19.0	p=0.00

Table 2 (continued) Cumulative probabilities of first birth at specific ages by background characteristics of ever-married women along with their mean ($\bar{X}$), median (Me) and trimean (TM) age at first birth

Background Characteristics	Age in years							$\bar{X}$	Me	TM	χ^2
	13	15	17	19	20	24	28				
Husband's occupation											
Agriculture	0.03	0.24	0.54	0.77	0.84	0.95	0.97	18.2	17.0	17.3	
Business	0.03	0.19	0.45	0.67	0.76	0.92	0.96	19.0	18.0	18.0	464.1
Service	0.01	0.08	0.21	0.40	0.50	0.75	0.91	21.8	21.0	21.3	p=0.00
Other	0.03	0.23	0.50	0.72	0.79	0.92	0.96	18.8	18.0	18.0	
Ever use of any contraception											
No	0.02	0.15	0.34	0.52	0.59	0.76	0.83	23.3	19.0	19.8	970.8
Yes	0.03	0.23	0.50	0.73	0.81	0.94	0.98	18.2	17.0	17.5	p=0.00
Spousal age difference											
≤5	0.02	0.14	0.37	0.61	0.69	0.86	0.94	20.0	19.0	18.8	
6-8	0.03	0.21	0.48	0.71	0.79	0.93	0.98	18.5	18.0	18.0	372.0
9-11	0.03	0.23	0.50	0.73	0.80	0.94	0.98	18.5	17.0	17.5	p=0.00
≥12	0.05	0.28	0.55	0.76	0.83	0.95	0.97	18.1	17.0	17.0	
Body mass index											
Thin	0.04	0.24	0.51	0.73	0.8	0.93	0.97	18.6	17.0	17.5	
Normal	0.03	0.22	0.49	0.71	0.79	0.92	0.97	18.8	18.0	18.0	78.8
Obese	0.02	0.18	0.40	0.62	0.70	0.88	0.95	19.8	18.0	18.3	p=0.00
Total	0.03	0.21	0.47	0.70	0.77	0.91	0.96	19.0	18.0	18.0	

The age pattern of first birth in relation to wealth index shows that higher wealth status is associated with a slower pace of having first birth. The trimean of age at first birth of poor women is 17 years and that of the women of middle and rich classes are 1 and 2.3 years higher, respectively. A probable explanation of this fact is that women from rich families have wider access to mass media, and therefore they are more likely to enter later into motherhood compared to women from poor and middle economic classes. Working status of women makes a relatively less difference (0.3 years) in the trimean of age at first birth. The difference in the pace of having first birth during adolescent ages within two groups, women who are in or not in the workforce, is also less. Pace of having first birth is faster among working women. This is due in part to low workforce participation rate of higher educated women. Husbands' occupation demonstrates that the slowest pace of having first birth among women is observed for those with service holder husbands and the highest for those whose husbands are in the agriculture sector. Women with businessman and other professional husbands have the same trimean of age at first birth, while the pace of having first birth is different until the age of 20 years.

The relationship between the age at first birth and age at first marriage exposes that the age at first birth gradually increases with increasing age at first marriage. This finding is in line with the study conducted by Nahar and Min (2008). The cumulative probability of having first birth during adolescent

ages is 0.91 for women who got married at age 13 years or earlier, whereas it is 0.60 for women who got married between the ages of 16-19 years. The probabilities of having first birth at different ages differ markedly by ever use of any contraception. Compared to ever users, no users have much lower probabilities at different ages and have 2.3 years higher trimean of age at first birth. Age at first birth increases with decreasing spousal age differences (SAD). Trimean of age at birth of the first child is about 2 years lower for those with SAD less than 6 years than those with SAD 12 years or more. Women with better health have higher age at first birth. Age at first birth is delayed the most among overweight women, and is earliest for underweight women.

Covariates of age at first birth

To examine the covariates of age at first birth, the Cox proportional hazards model is used due to this method's capability of handling right censored data. The proportional hazards model, which allows inferences about the underlying risk of observations on the timing of events, is expressed by the equation (Norusis, 2007):

$$h(t) = h_0(t)e^{\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k} = h_0(t)e^{\beta X}$$

Where $h(t)$ is the instantaneous rate of giving a first birth at time t, given that there is no previous birth for a woman with a vector of covariates X, and $h_0(t)$ is an arbitrary nonnegative unspecified baseline hazard function independent of the covariate. $X = X_1, X_2, \ldots, X_k$ is a vector of the covariates and $\beta = \beta_1, \beta_2, \ldots, \beta_k$ is a vector of unknown parameters to be estimated. In this study, the unit of analysis is the first birth experience of women during the time elapsed between women's birth and the birth of first child or the time of interview. The dependent variable is, therefore, whether or not the first birth is occurred during the interval. The case is coded 0 if the event (i.e. first birth) does not occur and 1 if it occurs. The hazard function provides estimates of the relative risks of the other groups in relation to specific baseline groups by the exponent of the regression coefficient $exp(\beta)$. Each exponent of the coefficients $exp(\beta)$ represents the effect of the covariates on the hazard functions for the reference group. When there is no covariate present in the model, the $exp(\beta)$ term reduces to unity. Values greater than unity indicate that the relative risk of giving a first birth is greater for this group compared to the reference group, whereas values less than unity indicate a decrease in the risk.

     The results of the analysis bring forward an insignificant contribution of type of place of residence on age at first birth. In all the models except Model 3, rural women have a slightly higher risk of having first birth earlier than urban women. In Model 1, the relative risks corresponding to administrative divisions show that the risk of having early first birth is highest in Rangpur, followed by Khulna, Rajshahi, Barisal, Chittagong and Dhaka compared to Sylhet. Similar patterns are observed in Model 3 yet they are almost

insignificant, but in Model 4 and 5 they are statistically significant and contradict with Model 1.That is, women in any region have a lower risk of having first birth earlier than women in Sylhet.

Table 3 Relative risks of Cox proportional hazards model for the age at first birth of ever-married women by background characteristics

Background Characteristics	Model-1	Model-2	Model-3	Model-4	Model-5
Type of place of residence					
Urban (RC)	1		1	1	1
Rural	1.005		0.992	1.014	1.024
Administrative division					
Barisal	1.310[a]		0.969	0.835[a]	0.830[a]
Chittagong	1.285[a]		1.086[b]	1.006	0.994
Dhaka	1.268[a]		0.997	0.868[a]	0.868[a]
Khulna	1.424[a]		1.023	0.879[a]	0.871[a]
Rajshahi	1.354[a]		1.005	0.852[a]	0.873[a]
Rangpur	1.501[a]		1.063[d]	0.928[a]	0.940[d]
Sylhet (RC)	1		1	1	1
Respondent's education					
No education	1.250[a]		0.876[a]	0.917[b]	0.883[a]
Primary	1.363[a]		1.079[a]	1.082[a]	1.078[b]
Secondary and above (RC)	1		1	1	1
Religion					
Muslim	1.220[a]		1.043[d]	1.057[c]	1.073[b]
Other (RC)	1		1	1	1
Access to mass media					
No	0.984		0.972	0.988	0.968
Yes (RC)	1		1	1	1
Wealth index					
Poor	1.194[a]		1.094[b]	1.084[b]	1.111[a]
Middle	1.158[a]		1.069[c]	1.081[b]	1.103[a]
Rich (RC)	1		1	1	1
Respondent's working status					
Not working	1.193[a]		1.139[a]	1.109[a]	1.073[b]
Working (RC)	1		1	1	1
Husband's education					
No education	1.153[a]		1.047[d]	1.066[c]	1.091[b]
Primary	1.179[a]		1.120[a]	1.119[a]	1.125[a]
Secondary and above (RC)	1		1	1	1
Husband's occupation					
Agriculture	1.352[a]		1.013	1.082[d]	1.073[d]
Business	1.360[a]		1.063[d]	1.089[c]	1.107[d]
Service (RC)	1		1	1	1
Other	1.305[a]		1.020	1.100[b]	1.116[d]
Age at first marriage					
≤ 13		7.909[a]	7.101[a]	7.599[a]	7.516[a]
14-15		5.343[a]	4.871[a]	5.069[a]	5.031[a]
16-19		2.568[a]	2.408[a]	2.454[a]	2.422[a]
≥ 20 (RC)		1	1	1	1

Table 3 (continued) Relative risks of Cox proportional hazards model for the age at first birth of ever-married women by background characteristics

Background Characteristics	Model-1	Model-2	Model-3	Model-4	Model-5
Ever use of any contraception					
No (RC)		1		1	1
Yes		2.204[a]		2.216[a]	2.284[a]
Spousal age difference					
≤5 (RC)		1			1
6-8		1.176[a]			1.176[a]
9-11		1.247[a]			1.259[a]
≥12		1.276[a]			1.284[a]
Body mass index					
Thin		1.147[a]			1.070[c]
Normal		1.082[a]			1.036
Obese (RC)		1			1
Chi-square	1362.441	6553.495	5982.568	7089.918	6795.831
df	19	9	22	23	28
Sig.	0.000	0.000	0.000	0.000	0.000

RC = Reference category, [a]=$p<0.001$, [b]=$p<0.01$, [c]=$p<0.05$ and [d]=$p<0.10$

The relative risks in Model 1, corresponding to respondent's education depict that women with higher levels of education have a lower risk of having early first birth. In all other models, an inverted U pattern is found between the risk of early first birth and education. Compared to non-Muslim women, Muslim women have a significantly higher risk of earlier first births. The effect of mass media on age at first birth is statistically insignificant. According to the analysis, if the wealth status is higher, the relative risk of early first birth is lower. Women who participate in the workforce have a lower risk of having early first birth. The relative risks for husband's education represent an inverted U shape, where the risk is lowest among women with secondary and higher educated husbands. According to husband's occupation, women with service holder husbands have the lowest risk. However, the risk is highest among women with businessmen husbands in Models 1 and 3 respectively. In other models, the highest risk corresponds to women with husbands of other professions.

Analysis of the effect of age at first marriage on age at first birth indicates a sharp decline in the relative risk of having early first birth due to the gradual increase in the age at first marriage. For example, the risk is more than 2 times higher for women who got married between the ages of 16-19 years, and more than 7 times higher for women who got married during the earliest age category (≤13 years) compared to the women who got married at a mature age (≥20 years) which is the reference category. The relative risk is also higher among women who delayed or avoided getting pregnant. The risk of having early first birth increases with increasing age gaps between couples. Women with lower BMI have a higher risk of having early first births than women with higher BMI.

CONCLUSIONS AND POLICY IMPLICATIONS

The findings of the study reflect that having first birth for Bangladeshi women starts at early ages, with more than eighty percent of first birth occurring during adolescent ages, and first births are concentrated between the ages of 14-18 years. Early of first births are prevalent among all women; regardless of their demographic, socio-economic or cultural status, except for those who got married at age 16 years or later. However, pace of having first birth is slower among women who are non-Muslims, reside in urban areas, who are from households with higher economic status, and have secondary or higher level of education.

Additionally, higher rate of first birth during adolescent ages was observed due to the high frequency of early marriages, low rate of contraceptive use until first birth, low economic status of the household and none or primary school educational attainments. Considering the fact that educational attainment helps improving individual well-being and social development especially for girls, the government in Bangladesh has taken initiatives to improve the educational attainment of women. For example, female students are exempt from tuition fees up to higher secondary level education. However, due to economic burden, girls from poor families cannot avail the benefits of the programs. In order to reduce early marriages, consequently early initiation of childbearing, regulations may be introduced to make education up to higher secondary level as compulsory for all girls. Moreover, planners and policy makers may introduce plans to alleviate poverty at the household level, especially in the Rajshahi, Khulna and Barisal divisions. In addition, proper actions should be taken in order to implement the legislative age at first marriage. By highlighting the adverse effects of early marriage and early first birth on the health of young mothers and their children, integrated social awareness programs, including the campaigns from the parts of social, electronic and print media may prove effective in reducing the rate of teenage fertility for the Bangladeshi women.

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