

Marriage to First Birth Interval and its Associated Factors in Bangladesh

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ABSTRACT

The purpose of this study is to examine the marriage to first birth interval and also to identify the socio-economic, demographic and cultural factors influencing the first birth interval among married women in Bangladesh. The study utilizes the data extracted from the 2011 Bangladesh Demographic and Health Survey (BDHS). In this analysis, the average marriage to first birth interval of the respondents' is observed to be 28.86 months. Cox Proportional Hazard model is used for identification of significant factors contributing towards marriage to first birth interval in Bangladesh. The findings from the Cox proportional hazard model indicate that age at first marriage, division, religion, respondents' education, partners' education, respondents' currently working, Partners' occupation, ever use of any method, socio-economic status, respondents' age at first birth are the most important significant covariates of 'Marriage to first birth interval' in Bangladesh.

Keywords: First birth interval, Cox Proportional Hazard model, Kaplan Meier survival estimate

INTRODUCTION

The gap between marriage and first live birth is termed as 'first birth interval'. It is one of the most significant events in a woman's life. First birth interval not only affects the length of rest of birth intervals but also affect reproductive pattern of women (Millman and Hendershott, 1980; Trussel and Menken, 1978; Yamaguchi and Ferguson, 1995). Past findings evidenced that the first childbirth has relationship with many socio-demographic and cultural factors. Specifically, couple's educational level, occupational status, age at marriage etc. are of paramount importance on the dynamics of first birth interval. Incomplete conceptions occurring prior to the first live birth also have a significant impact on the first birth interval (Brien and Lilliard, 1994).

Birth intervals are generally long in Bangladesh, with a median interval of 47 months (BDHS Report, 2011). Lengthy breastfeeding and a long period of postpartum amenorrhea are likely to contribute to the relatively high percentage of births occurring after an interval of 24 months or more in Bangladesh. A comparison with earlier BDHS surveys shows that the median birth interval has increased markedly, rising from 35 months in 1993-1994 to 39 months in 2004, 44 months in 2007, and 47 months in 2011. Between 1993 and 2011, the median birth interval increased by 34 percent. The analysis of the waiting marriage to first birth signifies couple's fertility at earlier stage of married life and as the first birth is the most welcome event for almost all families in Bangladesh, there is a little chance of memory lapse in reporting the date of first marriage and also the date of first birth. In addition, marriage to first birth interval is obviously free from the lactation amenorrhea, a prime factor for the prolonged birth intervals. Thus, in the present study a detailed examination is made to

estimate the marriage to first birth interval and its associated factors influencing the marriage to first birth interval in Bangladesh.

LITERATURE REVIEW

Researchers are interested in finding the reasons for short first birth interval in developed countries. First birth interval is associated with couple's personal characteristics like age at first marriage, education, occupation, and type place of residence but with the influence of social norms. Age of women at first birth is important determinant and it effects the growth of population. Early child bearing increases the women's reproductive span as compared to those similarly fecund women who bear child later. It also reduces age gap between the two generations (Kumar and Danabalan, 2006). Important reason for the analysis of marriage to first birth interval is to find the impact of delayed marriages on it (Woldemicael, 2008). Khan and Raeside (1998) and Rindfuss and John (1983) have also documented the importance of first birth interval analysis. They consider it important incidence in the life of women with increasing responsibilities. Rao and Balakrishnan (1989) found that early birth interval increases the chances of second, third intervals etc.

The women age at first birth in developing countries has important consequences on the demographic characters of the population. Thus, women's ages at effective marriage and age at first childbirth are proximate determinants of fertility behavior (Singh et al. 2007, Singh et al. 2013). Marriage to first birth interval was significantly different for age of women at marriage, region, education of women, and marriage cohort in Ethiopia. Difference among the spouse's age and occupation had not affected the marriage to first birth interval (Gurmu and Etana, 2005). Islam (2009) had also investigated the determinants of first birth interval in Rural Bangladesh. Respondent's age, age of women at marriage, family income and quality of care at clinic were found as significant determinants.

A study by Chowdhury and Bairagi (1990) furnished that fertility could be reduced by 4-8% if there were no son preference in Matlab, a rural of Bangladesh. Majumder (1991) observed that children born after a longer birth interval had a lower mortality rate than those born within a short interval. Analyzing the number of children ever born in Matlab, Bangladesh, Rahman and Vanzo (1993) found that among mothers with four surviving children the probability of having a subsequent birth was lowest among those who had three sons and one daughter. In a study on Matlab area in Bangladesh, Salway *et al.* (1993) have found that the median birth interval increases in all education groups, with better-educated women having consistently longer birth interval.

DATA, VARIABLES AND METHODOLOGY

Secondary data extracted from the Bangladesh Demographic and Health Survey conducted in 2011 under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare has been used for this study. BDHS-2011 covered a nationally representative sample of 17842 married women of reproductive age. Various socio-economic, behavioral, cultural and demographic factors are accounted to be explanatory or variables.

As the dependent variable is first birth interval, clearly, throughout an interval women may either have a birth or be right censored at the time of the survey. Thus, censored cases require special treatment in estimating exposure time, so, ordinary regression procedures are not appropriate.

Therefore, a continuous time event history analysis technique, in particular, the general proportional hazards (Cox, 1972) model is used to determine the covariates on the timing of

birth intervals. The Cox proportional hazards regression model is the most frequently used regression model in survival analysis because this model is semi-parametric and can be used for both censored and uncensored data. The analysis is carried out using survey option in SPSS 20.0.

Kaplan Meier Product Limit Survivorship Function

The Product Limit estimate of the Survival Function (Kaplan and Meier, 1958) is defined as

$$S(t_i) = \prod_{j=1} \left(1 - \frac{d_j}{n_j} \right)$$

Where,

d_j = number of women having births at time t_j

n_j = number of women just prior to t_j exposed to the risk of having birth

t_j = time since the previous birth of a child to that woman

STATISTICAL ANALYSIS OF MARRIAGE TO FIRST BIRTH INTERVAL

Covariates used for analysis of first birth interval are age at first marriage, type of place of residence, division, religion, respondents' education, partners' education, respondents' currently working, Partners' occupation, ever use of any method, socio-economic status, respondents age at first birth. The independent variable spousal age difference is created by using the variables husband's age & Women's age in years from household report as husband's age - women's age in years. Histogram for length of marriage to first birth interval is represented in Figure 1:

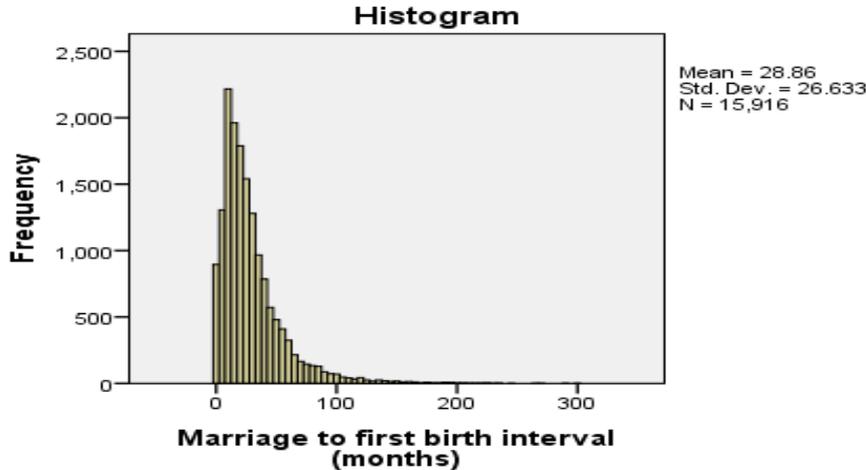


Figure 1. Histogram for length of marriage to first birth interval

The pattern of distribution shows uni-modality with positive Skewness (Figure 1). Marriage to first birth interval of majority of the respondents is above two years. The decline becomes sharper after three years. Maximum number of birth occurs within three years after marriage. The average value of marriage to first birth interval is approximately 29 months or 2.41 years. In Ethiopian society, first birth interval was found long (3 years) in spite of low contraceptive prevalence rate (Gurmu and Etana, 2005). Marriage to first birth interval in Nepal was found long due to late start of sexual relation after marriage. The length of interval was found to be 3.9 years because Nepalese women are shy by nature (Suwal, 2001).

Average birth interval for Taiwanese women was short i.e. approximately 15 months (Stokes and Hsieh, 1983). Youssef (2005) had also found short birth interval (18 months) for Jordan.

Kaplan Meier Estimates for Marriage to First Birth Interval

Survival functions are plotted from Figures 2-13 for all background characteristics.

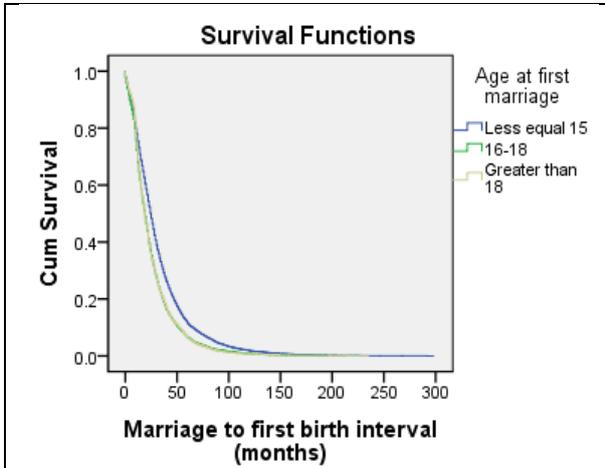


Figure 2. Survival Function for age of women at first marriage

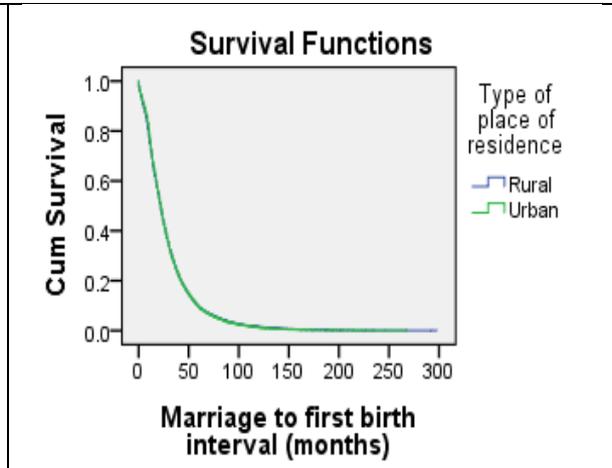


Figure 3. Survival Function for type of place of residence

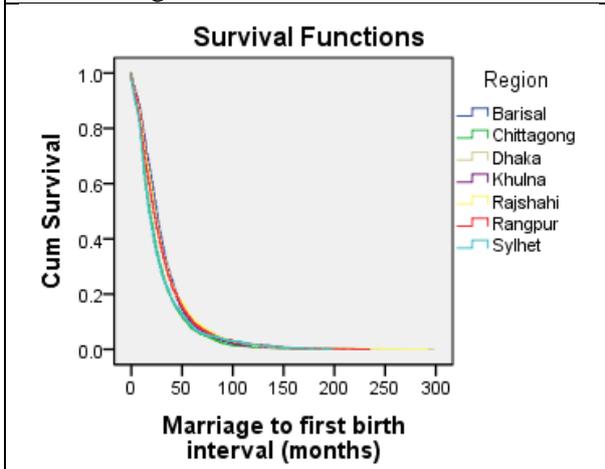


Figure 4. Survival Function for division

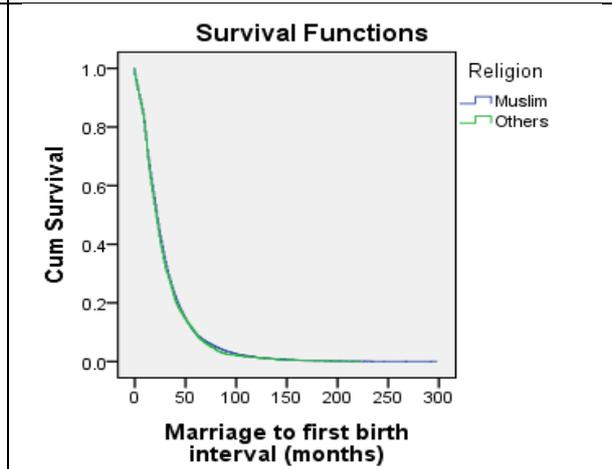


Figure 5. Survival Function for religion

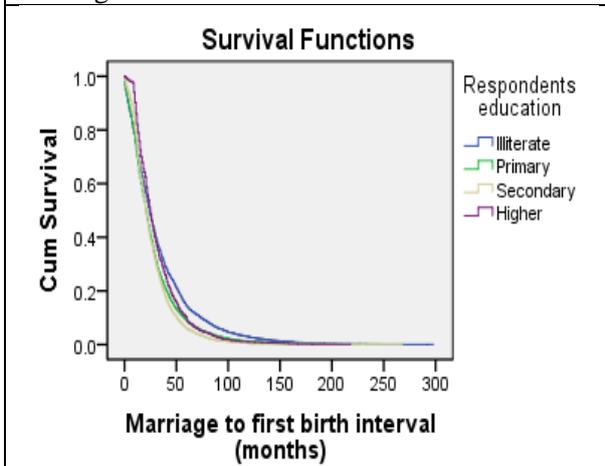


Figure 6. Survival Function for respondents' education

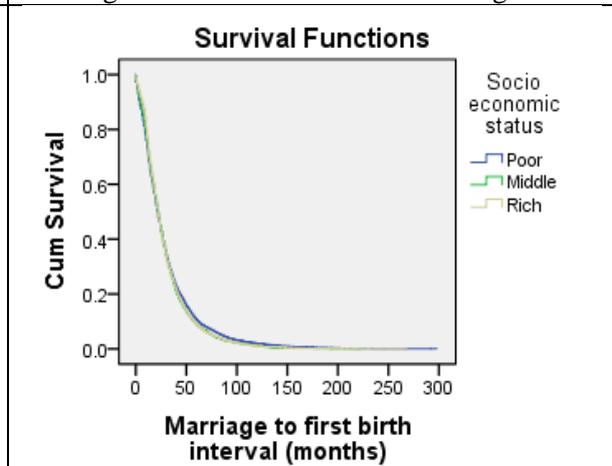


Figure 7. Survival Function for socio-economic status

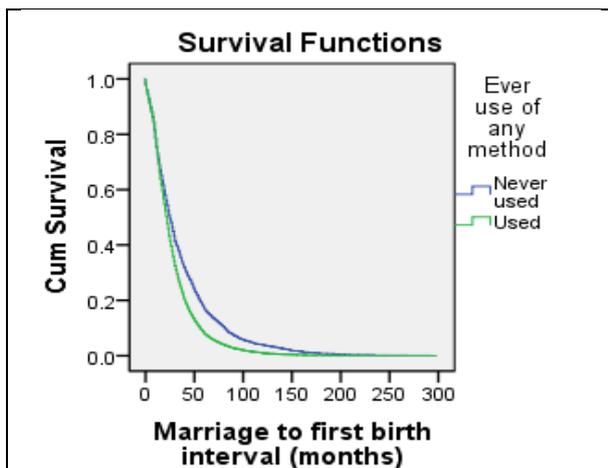


Figure 8. Survival Function for ever use of any method

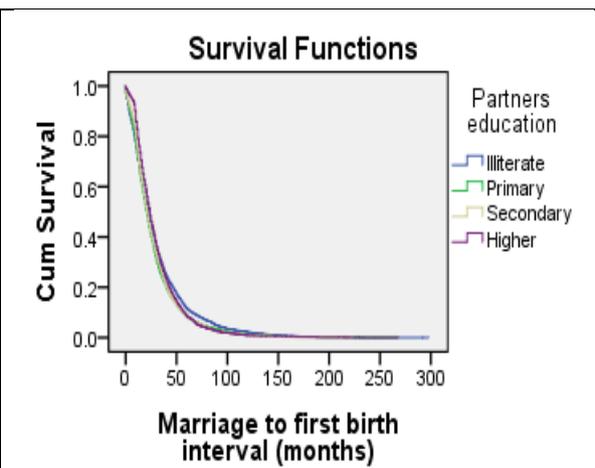


Figure 9. Survival Function for partners' education

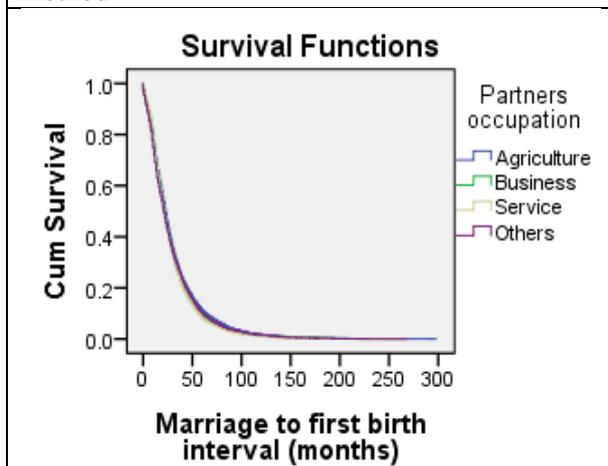


Figure 10. Survival Function for partners' occupation

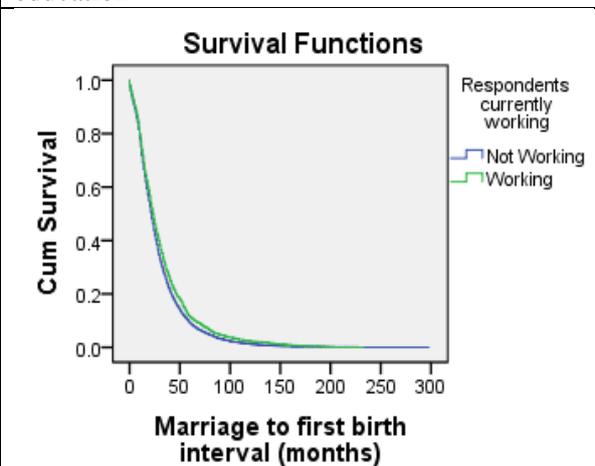


Figure 11. Survival Function for respondents' currently working

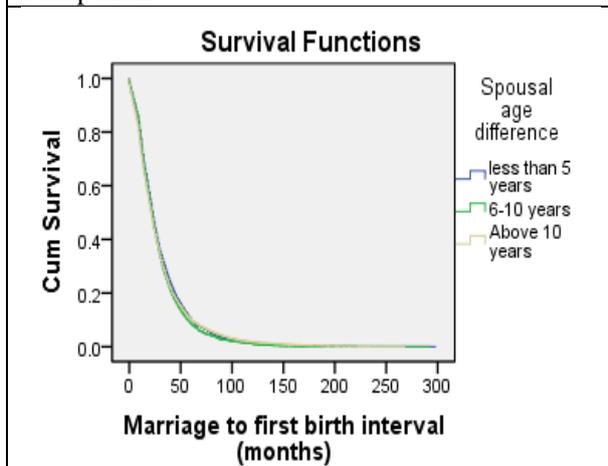


Figure 12. Survival Function for spousal age difference

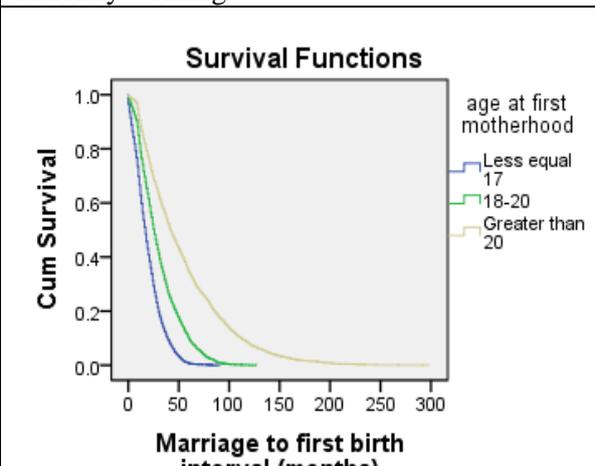


Figure 13. Survival Function for age at first birth

Figures 2-13. Graphs of Survival Functions for women background characteristics and marriage to first birth interval

The most notable difference in marriage to first birth interval is found between different categories of women age at first birth and age at first marriage. Older cohort has longest

while younger has shortest birth interval. Women who married before sixteen year of age have shown sharper decline than other categories of age at marriage. All other age groups had similar pattern. As age at first marriage increases, woman prefers to have her first child early. For rest of factors little difference in the length of first birth interval is observed among various categories of women. Similar pattern also observed in survival curves among urban and rural women. Urban women want child slightly earlier than rural. From the figure it has been seen that Chittagong and Sylhet have close first birth interval length and Barisal and Rajshahi have almost same trend. There is little difference in the length of first birth interval among Dhaka, Khulna and Rangpur division. Non-Muslim women want child earlier than their Muslim counterparts. Difference in the length of first birth interval is pragmatic among various categories of spouse's education. Socio-economic status and Ever use of any method depict negative relationship. Women who do not work want to have a child early as compared to women belonging to other categories. Respondent whose husband belongs to service holder has more chances of early birth as compared to others occupation. Woman whose spousal age difference belongs to 6 to 10 years has more chances of early birth as compared to others categories.

Kaplan Meier estimates of Mean and Percentiles by socio-economic and demographic characteristics are given in Table 1.

Table 1. Kaplan Meier Estimates of Mean and Percentiles by socio-economic and demographic characteristics for timing of first motherhood

Covariates	Levels	Mean Survival Time for Birth Interval		Percentiles					
		Estimate	SE	25 %		50 %		75 %	
		Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Age at first marriage (Years)	<= 15	31.791	.304	41.000	.458	25.000	.260	13.000	.205
	16-18	24.939	.324	32.000	.492	19.000	.292	11.000	.167
	> 18	25.065	.511	32.000	.828	19.000	.454	11.000	.219
Type of place of residence	Rural	28.876	.264	37.000	.381	22.000	.231	12.000	.150
	Urban	28.824	.350	37.000	.540	22.000	.286	12.000	.196
Division	Barisal	30.766	.601	40.000	.863	25.000	.502	14.000	.506
	Chittagong	25.431	.469	33.000	.752	18.000	.444	11.000	.190
	Dhaka	29.814	.520	38.000	.783	23.000	.483	12.000	.298
	Khulna	29.907	.528	39.000	.787	24.000	.434	13.000	.332
	Rajshahi	30.707	.594	39.000	.809	24.000	.463	12.000	.354
	Rangpur	29.543	.588	39.000	.883	22.000	.538	11.000	.334
	Sylhet	25.847	.629	32.000	.973	17.000	.491	10.000	.260
Religion	Muslim	28.965	.225	38.000	.335	22.000	.191	12.000	.126

	Others	28.022	.603	37.000	.900	21.000	.537	12.000	.314
Respondents Education	Illiterate	33.419	.484	45.000	.825	24.000	.406	11.000	.308
	Primary	27.379	.362	36.000	.571	21.000	.333	11.000	.221
	Secondary	25.934	.286	34.000	.431	21.000	.276	12.000	.159
	Higher	31.270	.780	40.000	1.187	25.000	.705	15.000	.486
Socio-economic Status	Poor	29.614	.386	38.000	.599	22.000	.318	11.000	.222
	Middle	28.559	.447	37.000	.618	22.000	.422	12.000	.297
	Rich	28.105	.297	37.000	.461	22.000	.248	12.000	.165
Ever use of any Method	Never used	36.251	.748	49.000	1.222	25.000	.650	12.000	.371
	Used	27.602	.210	36.000	.313	22.000	.190	12.000	.124
Partners Education	Illiterate	30.649	.430	40.000	.697	23.000	.380	11.000	.258
	Primary	27.397	.391	35.000	.585	21.000	.336	11.000	.229
	Secondary	27.727	.364	36.000	.542	21.000	.315	12.000	.189
	Higher	30.067	.519	39.000	.782	24.000	.449	14.000	.303
Partners Occupation	Agriculture	30.517	.450	39.000	.686	23.000	.375	12.000	.271
	Business	28.571	.439	37.000	.605	22.000	.354	12.000	.240
	Service	27.902	.318	36.000	.482	22.000	.293	12.000	.174
	Others	28.797	.591	39.000	.951	21.000	.529	10.000	.296
Respondents Currently Working	No	28.417	.222	37.000	.336	22.000	.192	12.000	.124
	Yes	31.710	.648	41.000	.969	24.000	.536	12.000	.351
Spousal Age Difference (Years)	<= 5	29.792	.446	39.000	.686	23.000	.380	12.000	.244
	6-10	27.990	.312	37.000	.477	22.000	.281	12.000	.181
	>10	29.183	.363	37.000	.499	21.000	.297	11.000	.192
	<=17	19.448	.154	28.000	.240	17.000	.208	9.000	.162
Age at first Motherhood (Years)	18-20	30.382	.300	42.000	.585	26.000	.366	14.000	.253
	< 20	54.065	.803	77.000	1.537	42.000	.982	21.000	.549
Overall		28.858	.211	37.000	.311	22.000	.180	12.000	.117

Source: BDHS-2011, Note: SE = Standard Error

Cox’s Proportional Hazard Analysis of Marriage to First Birth Interval

Table 2 presents the proportional hazard model estimate of relative risk of covariates of first birth interval in Bangladesh. It has been observed from the Cox’s proportional Hazard regression analysis that age at first marriage is an important factor, which has a great positive significant influence on marriage to first birth interval. Within (16-18 years) and above 18 years of age have respectively 21 percent and 23 percent higher likelihood on first birth interval as compared to respondent’s are married below 16 years. The women’s were lived in urban areas are found to have 6 percent higher risk of being a mother than those of rural sister. From the analysis it observed that region of respondents’ is found to have a highly significant positive influence on the first birth interval for the women of Chittagong and Sylhet division. Here it reveals that about 22 percent and 32 percent respondents’ corresponds to Chittagong and Sylhet have higher probability of being a mother than Barisal division. Rajshahi division has also significant positive effect on first birth interval and is found to have 6 percent higher risk compared to Barisal division.

Table 2. Cox’s Proportional Hazard Regression coefficients and relative risk of marriage to first birth interval by different covariates

<i>Parameters</i>		<i>Coefficient (β)</i>	<i>SE</i>	<i>Odds Ratio</i>
<i>Age at First Marriage*** (Years)</i>	<= 15 years (RC)			
	16-18 years	0.271	.023	1.212***
	> 18 years	0.294	.040	1.234***
<i>Type of place of Residence</i>	Rural(RC)			
	Urban	.006	.019	1.060
<i>Division***</i>	Barisal (RC)			
	Chittagong	.201	.031	1.223***
	Dhaka	.049	.031	1.050
	Khulna	.027	.031	1.027
	Rajshahi	.057	.032	1.059*
	Rangpur	.004	.032	1.004
	Sylhet	.275	.034	1.317***
<i>Religion***</i>	Muslim (RC)			
	Others	.088	.026	1.092***
<i>Respondents Education***</i>	Illiterate (RC)			
	Primary	.115	.022	1.122***
	Secondary	.187	.026	1.206***
	Higher	.141	.049	1.151***
<i>Socio-economic Status*</i>	Poor (RC)			

	Middle	-.037	.023	.963
	Rich	-.046	.023	.955**
<i>Ever use of any Method***</i>	Never used(RC)			
	Used	.180	.024	1.198***
<i>Partners Education***</i>	Illiterate(RC)			
	Primary	.006	.022	1.006
	Secondary	-.042	.025	.959*
	Higher	-.136	.035	.873***
<i>Partners Occupation**</i>	Agriculture (RC)			
	Business	.027	.025	1.027
	Service	.076	.022	1.079***
	Others	.064	.027	1.066
<i>Respondents Currently Working***</i>	No (RC)			
	Yes	-0.78	0.24	.925***
<i>Spousal Age Difference (Years)</i>	<= 5 (RC)			
	6-10	-.026	.021	.975
	>10	-.002	.022	.998
<i>Age at First Birth (Years)***</i>	<=17(RC)			
	18-20	-1.409	.023	.244***
	< 20	-3.231	.039	.040***

Source: BDHS-2011, *** p<0.01, ** p<0.05, *p<0.10, RC = Reference category. Note: SE = Standard Error

From the proportional hazard model it is apparent that Non-Muslim women have 9 percent longer first birth interval than that of Muslim women. Respondent's education has a strongly positive influence on the first birth interval. From the analysis it observed that, the respondents who are primary educated have 12 percent higher risk of having first birth than illiterate counterparts. And it is also revealed that the respondents who are secondary and higher educated have 21 percent and 15 percent higher likelihood of having a child as compared to illiterate respondents. Socio-economic status is statistically significant negative influence on having marriage to first birth interval. Ever use of any method is also statistically significant positive influence on having marriage to first birth interval. Respondents' who are used of any method having 19 percent higher risk of being a mother than the never users. Partners' educations are partially significant on first birth interval. Respondents' who are married with secondary and higher educated man have 4 percent and 12 percent lower likelihood of being a mother compared to illiterate husbands. For only

service holder husbands' is found to have a highly statistically significant positive influence on first birth interval. From the analysis it is evident that the respondent's whose husbands are service holder have 7 percent higher risk of being a mother before than those of agriculture counterparts. Working status also found to be important differential of length of first birth interval. Employed women found to have 7 percent lower risk of first birth interval than that of non-employed women. Mothers having first birth on age 18 to 20 years have 76 percent lower risk of first birth than that of reference category (having birth on or before reaching 18). Similarly mothers having first birth after 20 years have 4 percent lower risk of first birth than mothers having first birth before age 18. Spousal age difference and type of place of residence are not statistically significant on marriage to first birth interval in Bangladesh.

CONCLUSION AND RECOMMENDATION

The main purpose of the study has been to examine marriage to first birth interval and its associated factors in Bangladesh. For conducting the aforementioned topic, the study utilizes the nationally representative Bangladesh Demographic and Health Survey (BDHS) data, 2011. Out of 17842 ever married women aged 15-49 years, 15916 women have been extracted to accomplish the study fruitfully. For in-depth study of marriage to first birth interval as well as its significant covariates, some important techniques are applied. The major findings obtained from this study have been mentioned in the following section. The result on the marriage to first birth interval suggests that the overall mean first birth interval among Bangladeshi women is about 29 months.

To investigate the risk factors of timing of first motherhood Cox's proportional Hazard model is employed because of time varying covariates. The finding of multivariate analysis straight that; age at first marriage, division, religion, respondents' education, partners' education, respondents' currently working, Partners' occupation, ever use of any method, socio-economic status and respondents age at first birth are the most important significant factors of marriage to first birth interval in Bangladesh. Among the significant covariates, age at first marriage, Age at first birth and educational levels of respondents are found important for explaining marriage to first birth interval. Respondents whose husbands are higher educated are found 1.51 times higher likelihood of having first birth compared to respondents whose husbands are illiterate. Age at first marriage shows the same pattern. It is very clear that, in theory, age at first marriage and timing of first motherhood influences population growth directly. Therefore, we conclude that the average timing of first motherhood declined steadily with an increasing age at first marriage. But using the 2011 BDHS data, the mean timing of first motherhood observed only 28.86 month, which is far below the minimum legal age at first marriage for females (18 years), established by the government of Bangladesh in 1976. Legislation on the marriage therefore, seems to be ineffective in delaying childhood marriage practice.

Based on the findings of this research task the following recommendations can be suggested for effective policy implications:

1. Government of Bangladesh should take necessary steps to increase the proportion of educated women. Working opportunity should be increased too for women, else women will not have interest to be higher educated when there is no appropriate jobs available for them;
2. Age gaps between brides and groom could increase the age at first motherhood, thus there should have minimum spousal age difference between couples;
3. The existing Marriage Act should be implemented all over the country.

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