Research Paper

For further information about this article or if you need reprints, please contact:

Department of Statistics,
Shahjalal University of Science and Technology,
Sylhet, Bangladesh

E-mail: akabir@sust.edu

Female Age at Marriage as a Determinant of Fertility

[1]Ahmad Kabir, [2]Gulshana Jahan and [3]Rukhshana Jahan

Using the data derived from the 1989 Bangladesh Fertility Survey (BFS), the 1993-94 and 1996-97 Bangladesh Demographic and Health Surveys (BDHS), this paper attempts to investigate the relationship between the age at marriage and fertility. It also examines the factors affecting age at marriage at different time periods. Analysis using number of children ever born as a measures of fertility shows that lower the age at marriage, higher is the fertility. Application of multiple classification analysis technique indicates that age at marriage increases with higher socioeconomic conditions in Bangladesh. Female education appears to be the strongest determinant of variation in age at marriage and all other factors such as place of residence, work status, religion and geographic region show a statistically significant relationships.

Key words: Marriage, fertility, determinants, multiple classification analysis

[1]Department of Statistics, Shahjalal University of Science and Technology, Sylhet, Bangladesh,
[2]Department of Mathematics, Amberkhana Girl's School and College, Sylhet, Bangladesh
[3]Department of Gynecology and Obstetric, M. A. G. Osmani Medical College, Sylhet, Bangladesh

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Introduction

Marriage is universal in most of the societies, but its type and the custom vary depending upon the religious and other cultural practices of the communities. Bangladesh have a long tradition of early marriage among women (Aziz and Maloney, 1985; Maloney _et al._, 1981) which is still prevailing. Several studies conducted in sixties and seventies also reported very low age at marriage (Khuda, 1985; Obaidullah, 1966; Sadiq, 1965). During 1975-1976 the mean age at marriage among all ever married women in Bangladesh was reported to be 12.3 years (BFS, 1975).

Age at marriage is influenced by the socioeconomic condition. It is usually low among the women who belong to the lower socioeconomic status. It is assumed that longer the duration of reproductive span, higher is the number of children. Many studies have shown a negative relationship between age at marriage and fertility (Agarwala and Coale, 1965; Audinarayana, 1985; Bongaarts, 1982; Wyon and Gardan 1971; Zachariah, 1983).

This investigation makes an attempt to explore the relationship between fertility and female age at marriage as well as it's determining factors.

Materials and Methods

Source of Data: This investigation utilized the data derived from the 1989 Bangladesh Fertility Survey (BFS, 1989), the 1993-94 Bangladesh Demographic and Health survey (BDHS, 1993-94) and the 1996-97 Bangladesh Demographic and Health survey (BDHS, 1996-97). Almost similar sampling design was adopted in each survey. However, there is a slight difference in sampling design between the 1989 BFS and the 1993-94 and the 1996-97 BDHS. In conducting the 1989 BFS, a two-stage probability sample design was used. At the first stage a sample of clusters was drawn. Each selected cluster was then mapped and all households were listed. At the second stage, a sample of households were selected within the area. Thus, a total of 11729 households were selected, of which 11236 households successfully interviewed. Finally the successfully households, a total of 12906 ever married women under 50 years were identified as eligible for the individual interview. The 1993-94 BDHS was also nationally representative of two-stage sample survey. A total of 9681 households were selected for the survey, of which 9174 were successfully interviewed. In these household 9900 women were identified as eligible for the individual interview and the interviews were completed for 9640 or 97% of these.

The 1996-97 BDHS which was also nationally representative two-stage sample survey that was selected from the Integrated Multi-purpose Master Sample (IMPS) maintained by the BBS. Because the primary sampling units in IMPS were selected with probability proportional to size from the 1991 census frame, the units for the BDHS were subselected from the IMPS with equal probability so as to retain the overall probability proportional to size. Thus, a total of 9099 households were selected, of which 8682 households successfully interviewed. Finally in these households, 9335 ever married women under 50 years were identified as eligible for the individual interview and they were completed for 9127 or 98% of them.

The 1989 BFS was conducted by the NIPORT with the financial support from the World Bank while the two BDHSs, namely 1993-94 and the 1996-97 BDHSs respectively were conducted by Mitra and Associates with technical support from Macro International, USA and NIPORT jointly. Both the Surveys were funded by the USAID, Dhaka.

Statistical Analysis: To estimate the fertility according to the age at marriage as measured by the number of children ever born (CEB). The number of CEB has been further standardized by the age composition of the respondents. This removes any bias caused by differing age structure. Multiple classification analysis (MCA) (Suits, 1957) was used to evaluate the effect of socio-economic factors on age at first marriage. The independent variables were education, place of residence, employment status (currently working or not), religion and geographic region, of the respondents.

Results and Discussion

When the women of reproductive age group of 15-49 years is classified according to marital status, it indicates the extent to which the female population is exposed to marital unions and risks of pregnancies, which ultimately determine the fertility level of a community. The proportion of female married, in the age group 15-19 years is the most sensitive fertility index. It reveals the age , either early or late, at which a woman starts her sexual activity within marriage and the duration of marriage, which are strong factors for fertility determination. Table 1 presents the percentage distribution of the female of reproductive ages who were never married according to the current age. The results indicated that in the age group 15-19 years, only about half of the female were never married for each period. A higher percentage of married girls in this age group may cause the social pressures, norms and expectations. This is one of the cultural factors favorable for higher fertility in Bangladesh. The number of women aged 30 or more who are still single is effectively zero which suggested that Bangladesh is still characterized by universal marriage.

Table 1: Percent age of women of reproductive age who were never married according to their current age

Age group	1989 BFS	1993-94 BDHS	1996-97 BDHS
15-19	49.0	50.5	49.8
20-24	12.0	12.4	17.2
25-29	2.3	2.2	3.4
30-34	0.3	0.3	0.5
35-39	0.1	0.3	0.0
40-44	0.2	0.7	0.0
45-49	0.1	0.2	0.0

Table 2: Percentage distribution of ever married women under 50 years of age at first marriage

Age	1989 BFS	1993-94 BDHS	1996-97 BDHS
< 11	4.1	10.2	11.9
12-13	27.4	36.1	37.1
14-15	34.9	28.2	26.0
16-17	20.8	13.6	12.7
18+	12.7	11.9	12.3
Mean age	14.72	14.25	14.08
Median age	14.0	14.0	13.0

Table 2 showed the percentage distribution of ever-married women under 50 years of age by age at first marriage. The results indicate that, the mean age at marriage in 1989 was 14.7 years whereas it was 14.3 years November 17, 2001years in 1993-94 and 14.08 years in 1996-97. The median age at marriage in these periods were 14.0, 14.0, and 13.0 years, respectively. The results also indicated that in each period, about 90% of the women were married before reaching at the minimum legal age at marriage.

Age at Marriage and Fertility: Age at marriage is an important demographic variable, influencing fertility. Since most births take place within marriage in many traditional societies, it

Table 3: Mean number of children ever born by age at marriage

Age at Marriage	1989 BFS				1993-94 BDHS				1996-97 BDHS			
	age <30	age 30+	all ages	standardized mean	age <30	age 30+	all ages	standardized mean	age <30	age 30+	all ages	standardized mean
≤11	2.77	6.53	5.36	4.20	2.68	5.92	4.60	3.88	2.47	5.38	4.36	3.48
	(162)	(353)	(516)		(396)	(577)	(973)		(393)	(722)	(1115)	
12-13	2.51	6.31	4.50	4.16	2.29	5.75	3.96	3.82	2.25	5.35	3.64	3.40
	(1610)	(1772)	(3382)		(1790)	(1661)	(3451)		(1911)	(1656)	(3467)	
14-15	2.04	6.04	3.74	3.89	1.96	5.28	3.30	3.46	1.83	5.04	3.12	3.33
	(2443)	(1800)	(4242)		(1632)	(1106)	(2739)		(1404)	(939)	(2343)	
16-17	1.74	5.27	3.07	3.42	1.57	4.77	2.61	3.01	1.53	4.38	2.59	2.84
	(1505)	(916)	(2421)		(899)	(432)	(1331)		(722)	(426)	(1148)	
18+	1.14	4.37	2.39	2.61	1.14	3.36	1.92	2.11	0.97	2.96	1.73	1.84
	(824)	(523)	(1346)		(744)	(402)	(1146)		(648)	(406)	(1064)	

Figures in the parenthesis indicate the number of women

Table 4: Multiple classification analysis on age at marriage by women's socioeconomic characteristics

Explanatory Variables	1989 BFS			1993-94 BDHS			1996-97 BDHS		
	N	Unadjusted (gross)	Adjusted (net)	N	Unadjusted (gross)	Adjusted (net)	N	Unadjusted (gross)	Adjusted (net)
Education									
None	8204	14.44	14.44	5598	13.82	13.84	4983	13.44	13.49
Primary	2567	14.88	14.91	2603	14.13	14.17	2485	13.89	13.91
Secondary +	1135	16.38	16.35	1439	16.13	16.01	1659	16.29	16.09
β^2		(0.24)	(0.24)		(0.28)	(0.26)		(0.39)	(0.32)
Residence									
Rural	11005	14.68	14.71	8532	14.14	14.20	8064	13.91	13.99
Urban	902	15.26	14.87	1108	15.13	14.62	1063	15.35	14.79
β^2		(0.07)	(0.02)		(0.11)	(0.05)		(0.15)	(0.09)
Work status									
Not working	10230	14.71	14.70	8116	14.28	14.24	5736	14.25	14.13
Working	1677	14.76	14.84	1524	14.11	14.29	3391	13.79	14.00
β^2		(0.01)	(0.02)			(0.02)	(0.01)*	(0.07)	(0.02)*
Religion									
Muslim	10253	14.66	14.65	8468	14.15	14.18	8168	13.96	14.00
Non Muslim	1654	15.08	15.13	1172	14.95	14.77	959	15.07	14.80
β^2		(0.06)	(0.07)		(0.09)	(0.07)		(0.11)	(0.08)
Region									
Chittagong	2882	15.06	15.06	2527	14.77	14.78	1836	14.77	14.63
Dhaka	3621	14.65	14.68	2963	14.24	14.21	2882	13.95	13.92
Khulna	2259	14.35	14.26	1217	14.01	13.95	1107	13.78	13.71
Rajshahi	3145	14.75	17.49	2326	13.83	13.93	2198	13.46	13.66
Barisal				606	14.24	14.07	598	14.42	14.23
Sylhet							506	15.25	15.47
β^2		(0.10)	(0.11)		(0.12)		(0.12)	(0.18)	(0.16)
Grand mean		14.72			14.25				14.08
Proportion of variance explained		0.076			0.096				0.169

* The main effect of this variable is insignificant at the level of 0.05.

Table 5: Multiple classification analysis on age at marriage by education and current age

Variables	1989 BFS			1993-94 BDHS			1996-97 BDHS		
	Means			Means			Means		
	N	unadjusted (gross)	adjusted (net)	N	unadjusted (gross)	adjusted (net)	N	unadjusted (gross)	adjusted (net)
Education									
None	8204	14.44	14.47	5598	13.82	13.85	4983	13.61	13.62
Primary	2567	14.88	14.85	2603	14.13	14.12	2485	14.06	14.07
Secondary +	1135	16.38	16.38	1439	16.13	16.03	1659	16.46	16.41
β^2		(0.24)	(0.22)		(0.28)	(0.26)	(0.36)	(0.35)	
Current age									
<30	6543	14.98	14.93	5461	14.57	14.49	5079	14.37	14.27
30-34	1886	14.98	14.93	5461	14.57	14.49	5079	14.20	14.24
35-39	1364	14.48	14.55	1197	13.83	13.92	1128	13.85	13.91
40+	2113	13.98	14.11	1526	13.38	13.55	1518	13.17	13.43
β^2		(0.17)	(0.13)		(0.18)	(0.15)	(0.15)	(0.11)	
Grand mean		14.72			14.25			14.08	
Proportion of variance explained		0.077			0.098			0.138	

seems quite reasonable to assume that age at marriage is likely to effect the number of children a woman eventually bears. A lower age at marriage provides a long reproductive span and results in a higher fertility in societies where adoption of contraceptives is low. However, the increase in the age at marriage may tend to raise fertility by reducing the incidence of reproductive impairments associated with early marriages. Ryder (1959) observed that late marriage eliminated fecund exposure, whereas early marriage may prejudice fecundity through morbidity attributable to premature exposure. However, McDonald *et al.* (1980) while analyzing WFS data from several countries found that there was relatively low level of significance of fecundity impairment due to very early age at marriage. The level of fertility in the first 20 years of marriage is somewhat lower for women who marry at very young ages, but their completed fertility is at least equivalent to those marrying at higher ages. Further women marrying at older ages may try to compensate for the loss of their reproductive life by bearing children at relatively shorter intervals.

Table 3 presents the mean number of children ever born (CEB) by age at marriage and current age of mothers. The data indicate that CEB declined as the age at marriage increases, which suggested an inverse relationship between age at marriage and fertility. For example, the BFS 1989 survey suggested that for the women who were married at the age 12-13 years, the CEB was 4.16, smaller by 0.85 than among those who were married at the age of 11 years or less and higher by 0.67 than among those married at the age of 14 or 15. Similarly for the women who were married at the age 16-17 years, the CEB was 3.07, smaller by 0.68 than among those married at the legal age at marriage (18 years). Controlling the age of the respondents, obtained the standardized mean number of children ever born.

The consistent inverse relationship between the female age at marriage and their mean number of children ever born was more explicit when the standardized means were compared. For instance in 1989, the standardized mean was 4.20 for the mothers married at the age of 11 years or less, and it declined consistently with the increase in age at marriage. Exactly same relationship was observed for younger as well as older age cohorts. For instance, in 1989, women aged less than 30 years and who were married at the age of 11 years or less had a CEB of 2.77 and it declined consistently as the age at marriage increases. Among the women aged 30 years or more the mean number of children ever born for the mothers whose age at marriage was 11 years or less, was 6.53 and it declined with increase in the age at marriage. The 1993-94 and 1996-97 BDHS also suggested the similar pattern of differences in the mean number of children ever born as well as in the standardized means.

Socioeconomic Determinants of Age at Marriage: An important aspect of age at marriage, particularly in relation to fertility behavior, is its socio-economic differentials. The age at marriage is influenced by a variety of institutional factors, both at the societal and familial level (Dixon, 1971). Several authors (Ahmed, 1986; Islam and Ahmed, 1998; Shaik, 1984; Rahman, 1984) have been reported that age at marriage increases with higher socioeconomic conditions in Bangladesh. It was observed that age at marriage is positively associated with education. Education may affect the age at marriage in the following ways:

(a) schooling over an extended period may lead to postponement of marriage because it may interfere with studying;

(b) after receiving higher education, a girl may be more willing to work outside the home and/or looking for a husband of her own choice and status, which may also delay the process of marriage;

(c) education fosters new values and aspirations which may be inconsistent with an early marriage (Chaudhury, 1979). The higher age at marriage in urban areas may be attributed to the joint effect of education and urban life style. Chaudhury (1979) suggested that education and/or employed opportunities are the best policy for effective increases in age at marriage.

The results (Table 4) of MCA suggested that of the variables considered in the analysis, women's education has the strongest influence ($\beta^2 = 0.24$ in 1989, 0.26 in 1993-94, 0.32 in 1996-97) on the variation of age at first marriage. Its positive relationship holds overall and for each age cohort. The 1989 BFS suggested that, for all ever married women, the mean age at marriage for women with primary education is 14.91 years, 0.47 years higher than for women with no education (14.44 years) and 1.44 years lower than for the women with a high school education or beyond (16.35 years). The 1993-94 BDHS suggest that, for all ever-married women, the mean age at marriage for women with primary education is 14.17 years, 0.86 years higher than for women with no education (13.49 years) and 2.18 years lower than for the women with a high school education (16.09 years).

After allowing for all other variables, the 1989 BFS indicates that women currently residing in urban areas, on average, marry 0.16 years later than their rural counterparts. This difference seems to be very low in comparison with the effect of other variables. The 1993-94 BDHS indicated that, for all ever-married women, the mean age at marriage for women currently residing in urban area is 14.62 years, 0.42 years higher than their rural counterparts (14.20 years). The 1996-97 BDHS indicate that for all ever-married women, the mean age at marriage for women currently residing in urban area is 14.79 years and 0.80 years higher than their counterparts residing in rural area (13.99).

Work status has a little influence on age at marriage in 1989 ($\beta^2 = 0.02$). The 1989 BFS suggested that for all ever-married women, the mean age at marriage for women currently employed in income generating activities is 14.84 years, 0.14 years higher than their counterparts who are not currently employed (14.70 years). In the 1993-94 and 1996-97 BDHSs work status had no significant effect on age at marriage (Table 4). In Bangladesh, all social relations are inevitably suffered with religious concepts and practices. Because individuals take their particular religion as a pervasive force in their lives, marriage norms, customs and traditions vary widely according to religious groups. Mean age at marriage for all ever-married Muslim women, controlling for other factors is lower than for Non-Muslims by 0.48 years in 1989, 0.59 years in 1993-94 and 0.80 years in 1996-97.

The geographic region is found to be the second strongest determinant of age at first marriage, presumably because the regions are not homogeneous in socio-economic conditions. The 1989 BFS suggested that among the four regions, Khulna has the lowest mean age (14.26 years) and Chittagong has the highest (15.06 years). Dhaka and Rajshahi have 14.68 and 14.79 years mean age at marriage, respectively. The 1993-94 BDHS suggested that among the five regions, Chittagong has the highest mean age at marriage (14.78 years) Khulna and Rajshahi have the lowest (13.95 and 13.93 years, respectively). The mean age at marriage for all ever married women in Barisal and Dhaka are 14.07 and 14.21 years, respectively in 1993-94. The 1996-97 BDHS suggest

that for all ever married women, among the six regions Sylhet has the highest mean age at marriage (15.47 years) and Rajshahi and Khulna have the lowest (13.66 and 13.71 years, respectively). The mean age at marriage for all ever-married women in Barisal, Chittagong and Dhaka are 14.23, 14.63 and 13.92 years, respectively.

Table 5 shows an inverse relationship of age at marriage with current age. Age at marriage is higher in the younger age cohorts compared to older age cohorts which remains significant after controlling for the effect of education. The same results were observed for each survey. The results obtained from several national surveys indicated that age at first marriage was below 11 years for older cohorts (CPS, 1983; Rahman, 1984). In a study of Bangladeshi village (Khuda 1985) found that the mean female age at first marriage in the study village was 15.4 years. It was highest among women aged 20-24 years after which it declined with a rise in age.

The rise in age at marriage in Bangladesh has been remarkably slow during the last eight years. Although the Government of Bangladesh established the legal age at marriage as 18 years for females, the law is hardly observed. As a result, the age at marriage remains appreciably low. The mean number of children ever born to ever-married women is inversely associated with age at marriage. That is to say, lower the age at marriage, lower is the duration of marital unions and higher is the fertility. An important aspect of age at marriage is its socioeconomic differentials. Of the several background variables included in the analysis, women's education makes by far the strongest contribution to the variability in age at marriage, although the average level of education is very low. It was lower among the non-Muslims, urban dwellers, currently employed and the younger women. Higher age; lower educational attainment and rural residence all are associated with more traditional lifestyle that is more conductive to early marriage. Each of the geographic regions in Bangladesh is characterized by sociocultural and religious differences. These affect, the norms and traditions of marriage consequently, the age at marriage.

These findings suggested that in order to bring down fertility in Bangladesh, where contraceptive prevalence still remains at low levels, age at marriage have to be raised. Since women's education is one of the prime determinants of age at marriage, more vigorous attempts should be made to keep the girls in school for an extended period.

References

Agarwala S. N. and A. J. Coale, 1965. Factors Associated with the Development of Low Fertility and Historical Summary, Papers Contributed for the World Population Conference.

Ahmed, A. U., 1986. Socioeconomic Determinants of Age at First Marriage in Bangladesh. J. Bio. Sci., 8, 1: 35-42.

Aziz A. K. M and C. Maloney, 1985. Life Stage, Gender and Fertility in Bangladesh. ICDDR'B, Dhaka, Bangladesh.

Audinarayana, N., 1985. Age at Marriage and its Determinants among the Hindu and the Muslims in the Rural Andhra Pradesh, Ph.D., Thesis, S.V. University, Tirupati.

BFS, (Bangladesh Fertility Survey), 1975. Secondary Analysis, National Institute of Population Research and Training, Dhaka, Bangladesh

BFS (Bangladesh Fertility Survey), 1989. Bangladesh Fertility Survey, 1989. National Institute of Population Research and Training, Dhaka, Bangladesh

BDHS (Bangladesh Demographic and Health Survey), 1993-94. National Institute of Population Research and Training (NIPORT), Mitra and Associates, Dhaka, Bangladesh and Macro International Inc., Calverton, Maryland, USA.

BDHS (Bangladesh Demographic and Health Survey), 1996-97. National Institute of Population Research and Training (NIPORT), Mitra and Associates, Dhaka, Bangladesh and Macro International Inc., Calverton, Maryland, USA.

Bongaarts, J., 1982. The Fertility Inhibiting Effects of the Intermediate Fertility Variables. Studies in Family Planning, 13: 179-189.

Caldwell, J. C., 1980. Mass Education as a Determinants of the Timing Fertility Decline. Population and Development Review, 6, 2: 225-255

Chaudhury, R. H., 1979. Socio-cultural Factors Affecting Practice of Contraception in a Metropoliton Urban Area of Bangladesh. Demography India 8, 1-2: 127-153.

CPS, 1983. Contraceptive Prevalence Survey 1983.: Mitra and Associates, Dhaka, 1985.

Dixon, R. B., 1971. Explaining Cross -Cultural Variations in Age at Marriage and Proportions Never Marrying. Population Studies 25: 215.

Islam, M. M. and A. U. Ahmed, 1998. Age at Marriage and its Determinants in Bangladesh Asia-Pacific Population Journal, 2: 73-92.

Khuda, B., 1985. Age at Marriage and Fertility in a Rural Area in Bangladesh. Asian Profile, 6: 541-554.

Maloney, C., A. K. M. Aziz and P. C. Sarker, 1981. Beliefs and Fertility in Bangladesh. ICDDR'B; Dhaka.

McDonald, P., L. T. Ruzicka and J. C. Caldwell, 1980. Interrelations Between Nuptiality and Fertility: The evidence from the world Fertility Survey, in World Fertility Conference 1980. Record of Proceedings, Volume 2, London

Obaidullah, M., 1966. On Marriage, Fertility and Mortality. in Demographic Survey of East Pakistan, 1961-62, Part two, Institute of Statistical research and Training, University of Dhaka.

Rahman, M., 1984. Tradition, Development and Individual. Asian Population Change Series No. 1.

Ryder, N. B., 1959. Fertility, in P.M. Hauser and O.D. Duncan (ed), The study of Population: An Inventory and Appraisal, The University of Chicago Press, Chicago.

Sadiq, N. M., 1965. Estimation of Nuptiality and it's Analysis from the Census Data of Pakistan. Pakintan Development Review, 5: 112-119.

Shaik, K., 1984. Nuptiality Pattern in Rural Bangladesh. Demography India, 8: 42-53.

Suits, D. B., 1957. Use of Dummy Variables in Regression Equations. J. Am. Stat. Assoc., 280: 313-551.

Wyon, B. and J. E. Gardan, 1971. The Khanna Study, Harvard University Press, Cambridge, Massachusettes.

Zachariah, K. C., 1983. Anomaly of the Fertility Decline in Kerala, Report no.1 from R. Po. 671-70, Washington D.C. World Bank