Socio-economic Determinants of Age at First Marriage of Rural Women: A Statistical Analysis

Shamima Aktar, Samiran Mondal, Md. Akram Hossain, Md. Harun Rashid

Department of Mathematics, Jessore University of Science and Technology, Jessore-7804, Bangladesh

Abstract:
In this study it was our aim to investigate the socio-economic determinants of age at first marriage of the rural women of Kushtia district, Bangladesh. A sound methodology was adapted to gather information regarding age at first marriage and variables related to other socio-demographics. Cox proportional hazard regression analysis was applied to the data set containing 444 observations from different village of the district. The mean age at first marriage of the study women was found to be 15.8 years, which is very close that of national level. Findings revealed that woman's educational attainment and pre-marital work status significantly delayed the timing of marriage. Parents' economic status and respondents' birth order had the most significant effect on marital timing. The multivariate statistical analyses also identified several variables as important determinants of marriage timing for the study women childhood place of residence, father's literacy, father's survival status and mother's age at first marriage. The findings of the study may provide a clue to the rising age at first marriage of the disadvantaged rural women.

Keywords: Bangladesh, education, marriage, rural women.

1. Introduction

Marriage is an important institution both for the individual and the society at large. For the individual, it is a significant and memorable event in one's life cycle of as well as the most important foundation in the family formation process. It is also a rite of passage that marks the beginning of an individual's separation from the parental unit, even if generations continue to be socially and economically interdependent. For the society as a whole, it unites several individuals from different families and represents the creation of a production and consumption unit as well as one for the exchange of goods and services [1].

In most societies marriage defines the onset of the socially acceptable time for childbearing and is the most predominant context for childbearing in most countries. Age at marriage is of particular interest because it marks the transition to adulthood in many societies; the point at which certain options in education, employment, and participation in society are foreclosed; and the beginning of regular exposure to the risks of pregnancy and childbearing. Women who marry early will have, on average; a longer period of exposure to the risk of pregnancy, often leading to higher completed fertility. Variation in age of entry into marriage helps explain differences in fertility across populations and also helps explain trends in fertility within individual populations over time [2-3]. Therefore, age at first marriage has a direct bearing on fertility behavior [4-5].

Early marriage is associated with early childbearing as, in most cases particularly in the developing world; the main purpose of marriage is to have children. Early childbearing is fraught with substantial health risks for both the mother and the child. Young mothers are more likely to experience pregnancy

related complications and less able to deal with them, which often lead to maternal death [6]. Children born to young mothers are usually subject to elevated risks of morbidity and mortality [6-7].

Delayed age at marriage directly affects completed fertility by reducing the number of years available for childbearing. Later marriage permits women to complete their education, build labor force skills, and develop career interests that compete with childbearing within marriage. These career interests may, in turn, motivate women to limit family size and / or widen the spacing of their children [8-9]. In addition, late marriage helps women to be matured in conjugal life as well as in decision making particularly when they would take their child and family size.

Given the centrality of marriage in an individual's life history and its role in fertility and mortality transitions, surprisingly few analytic studies have been undertaken on marriage patterns and its determinants in Bangladesh, particularly rural areas where the vast majority of people live in. Studies elsewhere have, however, identified a number of factors that seem to influence marriage timing ([10-12], [15]. Increases in age at marriage are associated with major social-structural changes such as increases in educational attainment, urbanization, and the emergence of new roles for single women [13-14], [16-17]. Analyzed 51 studies based on a number of data sources, mostly the World Fertility Surveys and Demographic and Health Surveys (DHS), and found that education is the single factor most strongly related to the postponement of marriage, but the relationship may be subject to threshold effects. In many countries, the tendency for education to increase the age marriage becomes universal only after a few years of primary education. However, because the results of the few studies available are contradictory, little can be said about trends in the

relationship between education and age at marriage over time [12].

2. Statement of the problem

Early marriage is a common phenomenon in Bangladesh. Available literature reveal that the mean age at first marries varies significantly in the administrative regions of the country. The Bangladesh Demographic and Health Survey (BDHS) reported that mean age at first marriage of women is higher in the Chittagong and Sylhet divisions than other regions of the country. Parents encourage marriage of their daughters while they are still too young for different reasons. One reason is that they will benefit both financially and socially while the other is to protect their honor and protect them from pre-marital pregnancies, which is a big shame to the family. Early marriage denies girls their rights of further studies which they need for their future well-being. Moreover, early age at marriage is associated with higher level of fertility, unintended pregnancy and induced abortion. Due to many consequences of early marriage, there is an urgent need to study the relationship between socioeconomic and familial background and the females' age at the first marriage. Therefore, a study on the average age at the first early marriage of the south-western part of the country is of great importance.

3. Statistical techniques

Simple cross tabulation, bivariate and multivariate analysis were performed in this study. One-way Analysis of Variance (ANOVA) was conducted to examine the association of various socioeconomic factors with mean age at marriage. Following this, Cox's proportional hazard model was applied to examine what factors best explain the early or late age at marriage of women.

Analysis of Variance (ANOVA)

Analysis of Variance is a linear model that relates nominal predictor variables to a continuous outcome variable. The analysis of variance model (or "ANOVA model") examines the association between nominal predictor variables (e.g., gender, experimental condition, whether or not treatment was received or not) and a continuous outcome variable (e.g., depression, health quality of life). The predictor variables are sometimes called "factors" or "independent variables." The outcome variable may be also referred to as the "dependent variable." The ANOVA model is a univariate model, in that interest is in how the predictors affect a single outcome variable. If there is only a single nominal predictor variable, a "one-way" ANOVA is performed. If there are two nominal predictor variables, a two-way ANOVA is performed, and so on. When more than one predictor variable is included in an ANOVA model, higher-order interactions between the predictors can also be tested. Often, the interactions are where some of the most interesting predictions are. One general index of interest for the ANOVA model is the overall "R^2"–which tells, overall, how much the particular selection of independent variables is associated with the outcome. R^2 of 0.0 means none of the variability in the outcome is explained. An overall R^2 of 1.00 means all of the variability in the outcome is explained. In addition, an overall "F" statistic is also employed to describe how well the predictors are associated with the outcome. A second major

statistic of interest in the ANOVA model is the individual "t" statistics for each predictor variable. These "t" statistics tell how each independent variable predicts the outcome variable. Finally, it is important to note that there are several ways to consider the effect of the predictors on the outcome. The different ways of "partitioning variance" can yield slightly different individual predictor effects depending on what options are chosen. However, the total variance that is accounted for all of the predictors will always same regardless of what variance partitioning method is selected.

Cox Proportional Model

In this study we used Cox proportional hazard regression analysis to estimate the effect of the independent variable on the dependent variables "females' age at first marriage". The description of the model has been given in the following subsections. A Cox model is a statistical technique for exploring the relationship between the survival of a patient and several explanatory variables. Survival analysis is concerned with studying the time between entry to a study and a subsequent event (such as death). A Cox model provides an estimate of the treatment effect on survival after adjustment for other explanatory variables. In addition, it allows us to estimate the hazard (or risk) of death for an individual, given their prognostic variables. A Cox model must be fitted using an appropriate computer program (such as SAS, STATA or SPSS).

As mentioned, survival analysis typically examines the relationship of the survival distribution to covariates. Most commonly, this examination entails the specification of a linear-like model for the log hazard. For example, a parametric model based on the exponential distribution may be written as

$$\log h_i(t) = \alpha + \beta_1 x_{i1} + \beta_2 x_{ik} + \cdots + \beta_k x_{ik}$$

Or, equivalently,

$$h_i(t) = \exp(\alpha + \beta_1 x_{i1} + \beta_2 x_{ik} + \cdots + \beta_k x_{ik})$$

That is, as a linear model for the log-hazard or as a multiplicative model for the hazard. Here, i is a subscript for observation, and the x's are the covariates. The constant α in this model represents a kind of log-baseline hazard, since $\log h_i(t) = \alpha [or, h_i(t) = e^{\alpha}]$ when all of the x's are zero. There are similar parametric regression models based on the other survival distributions described in the preceding section.

The Cox model, in contrast, leaves the baseline hazard function $\alpha(t) = \log h_0(t)$ unspecified:

$$\log h_i(t) = \alpha(t) + \beta_1 x_{i1} + \beta_2 x_{ik} + \cdots + \beta_k x_{ik}$$

Or, equivalently,

$$h_i(t) = h_0(t) \exp(\beta_1 x_{i1} + \beta_2 x_{ik} + \cdots + \beta_k x_{ik})$$

This model is semi-parametric because while the baseline hazard can take any form, the covariates enter the model

linearly. Consider, now, two observations i and i_ that differ in their x-values, with the corresponding linear predictors

$$\eta_i = \beta_1 x_{i1} + \beta_2 x_{ik} + \cdots + \beta_k x_{ik}$$

and

$$\eta_{i'} = \beta_1 x_{i'1} + \beta_2 x_{i'k} + \cdots + \beta_k x_{i'k}$$

The hazard ratio for these two observations,

$$\frac{h_i(t)}{h_{i'}(t)} = \frac{h_0(t)e^{\eta_i}}{h_0(t)e^{\eta_{i'}}}$$

$$= \frac{e^{\eta_i}}{e^{\eta_{i'}}}$$

is independent of time t. Consequently, the Cox model is a proportional-hazards model. Remarkably, even though the baseline hazard is unspecified, the Cox model can still be estimated by the method of partial likelihood, developed by Cox (1972) in the same paper in which he introduced the Cox model. Although the resulting estimates are not as efficient as maximum-likelihood estimates for a correctly specified parametric hazard regression model, not having to make arbitrary, and possibly incorrect, assumptions about the form of the baseline hazard is a compensating virtue of Cox's specification.

4. Multivariate Analysis and Findings

It is our aim to examine the net effect of socioeconomic factors on the females' age at first marriage. To do so, we applied Cox proportional hazard regression analysis. The model-fitting process involved three stages of estimation. Irrespective of association between different background characteristics al the selected variables were included into multivariate analyses. The results of the multivariate analyses were presented for easy understanding of the effect of the corresponding factor, net of other confounders.

Survival plot of age at first marriage

This section deals with survival plot of age at first marriage of the women. Figure 4.1 shows the survival plot of age at first marriage by their level of education. The figure shows that, 92% of the women got marriage before they reach at age of 18 years. At the same age this proportion was 87%, 79% and 48% among women who had primary, secondary and higher level of education. The figure apparently reveals that the higher the level of education the higher the age at first marriage.
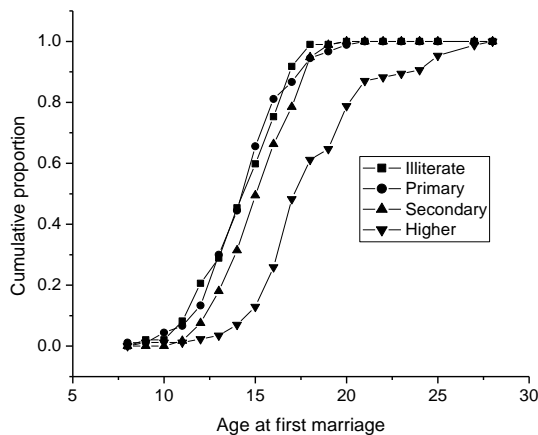

Figure 4.1 Survival plot of age at first marriage of women by their level of education.

Figure 4.2 shows the survival plot for age at first marriage of women by their employment status. The figure shows that almost 92% of the unemployed women were married by 17 years of age, whereas this proportion was 87% and 78% among women who were students and service holders during their marriage time.
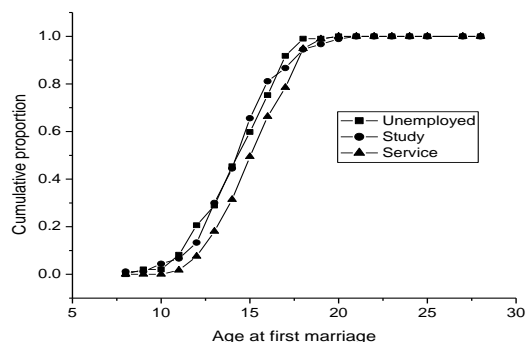

Figure 4.2 Survival plot of age at first marriage of women by their employment status.

When women's position among their sisters is broken down, the figure 4.3 shows that 81% of the women got marriage who placed first among their sisters. These proportions among women were 74%, 74% and 73% among those who were second, third and fourth or higher order places among sisters.
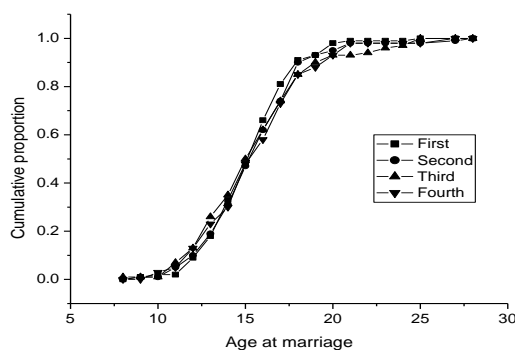

Figure 4.3 Survival plot of age at first marriage of women by their position among sisters.

It's seen that, higher education of the respondents is likely to be associated with lower probability of early marriage. The findings reveal that there is no basic difference in timing of marriage among women with no formal education, primary school and incomplete secondary education. It is only the completion of secondary education that has a major effect on marriage age. This implies that girls should be kept in school for a longer period, not only for the purpose of raising age at marriage, but also for biological, physical and mental maturity. In general, education is instrumental in placing an individual in a better labor market position [22]. This is also true in Bangladesh, where employment opportunities are more favorable for higher-educated women, particularly for disadvantaged indigenous communities. Due to prolonged schooling and delays in finding a suitable job, higher-educated women are more likely to delay their marriage [20].

Pre-marital work status is a potentially important determinant of timing of marriage. It is likely that women engaged in formal jobs have comparatively higher education than others. Besides, they are committed to their jobs, and to advancing their careers in the job market. They may also have to invest substantial time for training purposes, resulting in a delay in marital timing. In addition to these, in developing societies like Bangladesh, where job crises are common, a woman engaged in a formal job often delays the process of looking for a suitable groom, resulting in substantial postponement in timing of marriage. This finding is supported by an earlier study conducted on Nepalese women [23].

The patterns of covariates of marital timing among the women under study also reflect a society in evolution. Covariates associated with culture, such as place of birth or childhood residence and father's literacy status, have a significant effect on the pace of marital timing. Place of birth partially explains the socialization process. Besides, parents' education is an indicator of the development process. These variables would reflect the family values that a woman would have grown up with, and which would influence how she evaluates the costs and benefits between marriage and remaining single. Respondents born in rural areas are likely to reflect the more traditional behavior of early marriage. Incidences of early marriage are more frequent among women whose fathers are illiterate. Indeed, parents with some education are more likely to place greater emphasis on the educational attainment of their children. These findings are also consistent with those of earlier studies conducted elsewhere [22].

Father's survival status appears to be an important determinant of timing of female age at marriage. Women whose fathers were alive tended to be married later than those whose fathers were not alive. In patriarchal society, and in the Bangladeshi cultural context, women depend on their family for most decisions, including marriage. Girls become more helpless in the absence of their father, and depend, instead, on the rest of the family. In most cases, brothers see their sisters as an economic burden to the family and would arrange for their sisters to be married off as early as possible. Food security a major proxy for parents' economic status is also an important determinant of timing of marriage. The higher the economic status of the parents, the lower is the probability of early marriage. This is no doubt partly because parents with a worse economic status are less likely to keep their daughters in school, due to financial difficulties.

In the Bangladeshi culture, younger females are in higher demand than older females as potential brides, and they require less dowry as well [24]. Hence, marriage at a young age and early childbearing are encouraged, particularly in rural Bangladesh. In Muslim and Hindu communities, if a pubescent girl is not married off soon after her first menarche, her parents, and sometimes, the girl, are criticized by neighbors, and even by relatives, but the same is not true among the tribes. In spite of this, parents with poor socio-economic status, begin to think of their daughters as a burden. In contrast, better-off parents view adolescence as a time for education, not family formation [25]. Parents with a better economic status are likely to provide their children with more alternatives to early marriage, such as higher educational and occupational attainment. Birth order of the respondents*another cultural variable is shown to have a net effect on the timing of marriage. The higher the birth order, the lower is the probability of early marriage. This result is quite expected with the prevailing cultural practice in Bangladesh, where siblings are supposed to take turns in entering marriage, in accordance with their birth order. It is believed that if the elder sister is not married first, this may reflect on the personal character of the girl as well as on the family. To clear the path of marriage for the younger daughter, parents would be in a hurry to marry off the eldest daughter of the family. This finding is also consistent with that conducted in an advanced society like Hong Kong [25]. The earlier discussion leads to the conclusion that birth order and parental food security are the most important factors relating to female age at first marriage. Education is also an important determinant of timing of marriage. More vigorous attempts should be made to keep rural girls in school for extended periods. In this regard, economically disadvantaged rural girls should be provided with full free studentships till the undergraduate level of education. Along with formal education, women must have access to informal education. One such informal education is the creation of awareness on the risks and consequences of early marriage. The mass media can play an effective role in this regard. Awareness of the need to follow the ordinance of the legal age of marriage, and to keep family size small for the betterment of the family as well as children, should also be created. More efforts should be made toward the provision of suitable jobs for the educated rural women, to enhance their career advancement.

Conclusion

This study makes a contribution to this literature by disentangling the individual, familial and socio-economic factors affecting females' age at first marriage of rural women of Kushtia district in Bangladesh. The rural women in Bangladesh are disadvantaged in terms of socio-economic status than their urban counterparts. The mean age at first marriage was found to be 15.8 years among the study women. In an earlier report, the mean age at first marriage of

Bangladeshi women was found to be 15.3 years and that of Khulna division was 14.9 years. These comparisons indicate that the age at first marriage of the study rural women was little higher. The higher mean age at marriage of the study women, compared to other reports in Bangladesh, is partly attributed to their prevailing cultural practices, traditional beliefs and social norms. Analysis by age can be very useful to study women to timing of marriage. For instance, younger women were found to significantly delay the timing of marriage as opposed to their older counterparts. It attributed higher educational attainment of younger women compared to their older counterparts. Although the hazard risk showing that the youngest, compared to the eldest, were more likely to be married at later ages, the effect was insignificant as this might be partly attributed to the fact that more than one third of the women aged 20-25 remained unmarried. This finding is consistent with those of earlier studies conducted on national survey data in Bangladesh [18] and other developing countries [19-21].

References

1. Quisumbing, Agnes R and Kelly Hallman, (2003). Marriage in transition: Evidence on age, education, and assets from six developing countries'. Policy Research Working paper # 183. Population Council.

2. United Nations. (1990). Patterns of First Marriage: Timing and Prevalence. New York: United Nations, Department of International Economic and Social Affairs. ST/ESA/SER.R/111.

3. Ezeh, A. C. and F. N. A. Dodoo, (2001). "Institutional Change and African Fertility Transition: the case of Kenya". Genus Vol. LVII no.3-4 Pp.53-73.

4. Davis, Kingley and Judith Blake. (1956). "Social Structure and fertility: an analytic framework". Economic Development and Cultural Change (Chicago, Illinois), Vol.4. No. 3 (April), pp: 221-235.

5. Lesthaeghe, Ron, Georgia Kaufmann and Dominique Meekers. (1989). "The Nuptiality regimes in sub-Saharan Africa". In Reproduction and Social Organisation in Sub-Saharan Africa. Ron Lesthaeghe, ed. Berkeley: University Of California Press.

6. Zabin, L. and K. Kiragu (1998), "The health consequences of adolescent sexual and fertility behavior in sub-Saharan Africa". Studies in Family Planning, 29(2): 210-32. BANGLADESH BUREAU OF STATISTICS (BBS) (2003) Bangladesh Population Census 2001: National Report (Provisional), Ministry of Planning, Dhaka.

7. Ikamari, Lawrence D.E. (1996). Factors affecting child survival in Kenya. PhD Thesis. The Demography Program. The Research School of Social Sciences. The Australian National University. Canberra: Australia Kaufman, G. L. and D. Meekers. (1998). "The impact of women's socioeconomic position on marriage patterns in sub-Saharan Africa". Journal of Comparative Family Studies 29(1):101-114.

8. Amin, Sajeda. (1995). Female education and fertility in Bangladesh: The Influence of marriage and the family. In Girl's Schooling, Women's Autonomy and Fertility Change in South Asia, eds. Roger Jeffery and Alaka Basu. Sage Publications, New Delhi, London and Newbury Park.

9. Jensen, Robert and Rebecca Thornton (2003). Early female marriage in the developing world. In Gender, Development and Marriage, Caroline Sweetman, ed. Oxfam GB, Oxford, UK.

10. Hertrich, Véronique. (2002). "Nuptiality and gender relationships in Africa: An overview of first marriage trends over the past 50 years," session on Family Change in Africa and Latin America, Population Association of America Annual Meeting, Atlanta, 9–11 May.

11. SINGH, S. & SAMARA, R. (1996) 'Early marriage among women in developing countries', International Family Planning Perspectives, vol. 22, no. 4, pp. 148_157, 175.

12. Bloom, D. E., and Trussell, J. (1984). "What are the determinants of delayed childbearing and permanent childlessness in the United States?", Demography, 21, 591-611.

13. National Council for Population and Development (NCPD), Central Bureau of Statistics, and Macro International Inc. Calverton, Maryland USA. (1999). Kenya Demographic and Health Survey, 1998. Calverton, Maryland: NDPD, CBS, and MI. Oppenheimer, V. K. (1988). "A theory of marriage timing". American Journal of Sociology, 94, 563-591.

14. Jejeebhoy, S.J. (1995). Women's Education, Autonomy, and Reproductive Behavior: Experience from Developing Countries. Oxford: Clarendon Press.

15. Rindfuss, R. R., and St. John, C. (1983). "Social determinants of age at first birth". Journal of Marriage and the Family, 45, 553-565. Smith, P.C. (1980). "Asian marriage patterns in transition". Journal of Family History 5(1): 58–96.

16. United Nations, (1987). Fertility Behaviour in the context of development: Evidence from the World Fertility Survey. Population Studies, no. 100. Sales No. E.86.XIIIi.5.

17. JONES, G. W. (2007) 'Fertility decline in Asia: the role of marriage change', Asia-Pacific Population Journal, vol. 22, no. 2, pp. 13-32.

18. ISLAM, M. N. & AHMED, A. U. (1998) 'Age at first marriage and its determinants in Bangladesh', Asia-Pacific Population Journal, vol. 13, no. 2, pp. 73-92.

19. GUPTA, N. & MAHY, M. (2003) 'Adolescent childbearing in sub-Saharan Africa: can increased schooling alone raise ages at first birth?', Demographic Research, vol. 8, no. 4, pp. 93-106.

20. S.M. Mostafa Kamal, "Decline in Child Marriage and Changes in Its Effect on Reproductive Outcomes in Bangladesh", Journal of health, Population and Nutrition. 2012 Sep; 30(3): 317–330.

21. SINGH, S. (1998) 'Adolescent childbearing in developing countries: a global review', Studies in Family Planning, vol. 29, no. 2, pp. 117-136.

22. WONG, O. M. H. (1999) 'Indicators of women's social status as determinants of the marital timing of women in Hong Kong', Asian Profile, vol. 27, no. 5, pp. 389-400.

23. YABIKU, S. T. (2006) 'Land use and marriage timing in Nepal', Population & Environment, vol. 27, nos. 5-6, pp. 445-461.

24. ISLAM, M. M. & MAHMUD, M. (1996) 'Marriage patterns and some issues related to adolescent marriage in Bangladesh', Asia-Pacific Population Journal, vol. 11, no. 3, pp. 27-42.

25. WONG, O. M. H. (2005) 'The socioeconomic determinants of the age at first marriage among women in Hong Kong', Journal of Family and Economic Issues, vol. 26, no. 4, pp. 529-550.