

# Age at First Marriage and its Impact on Reproductive Behaviour of Women in Uttar Pradesh, India

Brijesh Pratap Singh<sup>1</sup> and Sonam Maheshwari<sup>2,\*</sup>

<sup>1</sup> Faculty of Commerce, DST-CIMS, Banaras Hindu University, Varanasi-221 005, India

<sup>2</sup> JRF, Department of Statistics, Banaras Hindu University, Varanasi-221 005, India

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**Abstract:** The present study explores the impact of socio-economic and demographic variables on age at first marriage and its association to reproductive behavior of women. Using the multinomial regression approach, it is observed that place of residence, religion, wealth index, education, and occupation are significant, important and decisive variable for the age at first marriage. Along with, it is also found that the overall fertility declined sharply as age at first marriage rises. Using the method of linear regression, the study shows if the age at first marriage of adolescents is increased by 1 year then the age at first birth is postponed by 0.780 years and the total parity per women at the end of the reproductive period is expected to reduce by 0.288 for each 1-year delayed marriage. With the increase in age at first marriage, the fecundability of women sharply rises, whereas the proportion of temporary sterility decreases.

**Keywords:** age at marriage, fecundability, fertility, linear regression

## 1 Introduction

Marriage in India marks that point in a women's life when childbearing becomes socially acceptable. Age at first marriage has a profound impact on childbearing because women who marry early have on average a longer period of exposure to pregnancy and a greater number of lifetime births. The relationship between women's age at first marriage and fertility has received a considerable amount of attention both in developed and developing countries. From time to time, Indian demographers have advocated that the age at marriage of girls to be raised so as to reduce the reproductive span of women, and thereby, bring down the birth rate. Generally, women with low age at first marriage tend to experience early childbearing and high fertility [5, 14], and particularly in rural areas these are still very common [6, 7]. A study conducted by Yang in rural China revealed that women who married earlier had longer intervals between marriage and first birth, but after five years of marriage, most women achieved about the same mean number of children regardless of age at marriage. Thus, there may be some 'catching-up' effect soon after marriage for those marrying late. However in third round of NFHS, when completed fertility was examined, there was a difference of about one child between those who married at 16-18 years of age (5.61) and those who married at 20-24 years of age (4.51) in Uttar Pradesh.

According to NFHS-III, more than half of women marry before reaching the legal minimum age at marriage age in Uttar Pradesh (52%) and Celibacy is almost non-existent. Marriage at low ages has severe social, psychological, and health consequences for both immature women and their offspring. Child marriage is an abuse of girl's human rights, because it terminates their education when they marry early (Save the Children 2004), prevents them from enjoying optimal health, and reduces their quality of life. Moreover, restricted mobility, household responsibilities, early pregnancy after marriage, taking care of children, and other social restrictions limit them from taking the advantage of education or work opportunities [8]. Furthermore, early marriage may also contribute to a reduction in education and employment opportunities for women, hindering them from contributing effectively to the social and economic development of a country [9]. Education is a significant factor in determining entry into marriage as an increase in educational attainment positively correlates with an increased age at first marriage. This can be explained by the longer period that is spent in schools, but the relationship with timing of entry into marriage is confounded by other factors such as place and type of

\* Corresponding author e-mail: [maheshwarisonam2@gmail.com](mailto:maheshwarisonam2@gmail.com)

residence, ethnicity and religion [10]. Birth cohort differentials in age at first marriage provide an indication of trends in marriage rates over time.

According to Nahar et al. [1] early marriage is a barrier to individual and social development. Previous research pointed out a variety of social, familial, health, and financial outcomes that are strongly correlated with early adolescent marriage and low education. So, postponement of first marriage has been outlined as one of the main determinants of declining fertility [11]. While India has a successful history in reducing its fertility, the rate is so far high with respect to its population. Moreover, the prevalence of early marriage and early motherhood is still more frequent throughout the country. Thus, considering age at first marriage as the prime determinant of fertility in the context of Uttar Pradesh, an attempt will be made in this study to identify the important socio-economic and demographic factors influencing the female's age at first marriage and the effect of age at first marriage on fertility in Uttar Pradesh.

## 2 Data and Methodology

This study utilizes the data from the 2005-06 National Family Health Survey (NFHS). NFHS-3 was conducted under the stewardship of the Ministry of Health and Family Welfare (MOHFW), Government of India, and is the result of the collaborative efforts of a large number of organizations. The International Institute for Population Sciences (IIPS), Mumbai, was designated by MOHFW as the nodal agency for the project. Funding for NFHS-3 was provided by the United States Agency for International Development (USAID), DFID, the Bill and Melinda Gates Foundation, UNICEF, UNFPA, and MOHFW. Macro International, USA, provided technical assistance at all stages of the NFHS-3 project. The survey obtained detailed questions on socio-economic background, reproductive history, marriage, fertility preferences, family planning methods, breastfeeding practices, women and young childrens nutritional status, maternal and child health, infant and child mortality, knowledge and attitudes regarding HIV/AIDS, etc. In the present study, 7669 out of 12,183 women were considered, and the remaining women were excluded for reasons like missing information and having premarital first conception, which was unlawful in Indian society. For suitable diagnoses of the data, various statistical techniques such as linear regression, multinomial regression, and life table analysis were used in the study. For life table analysis we take Age at first birth as dependent variable and interval marriage to first birth is taken as independent variable and women who are married but have no birth are taken as censored cases.

## 3 Multinomial Logistic Regression Model

The multinomial or polytomous logistic regression model is a generalization of the binary logistic regression model and the predictors in this model may be quantitative, categorical or a mixture of the two. For example, the dependent variable  $Y$  is classified into several categories, say,  $K$  and  $X$  is the vector of covariates, the logit functions are defined as,

$$Z_j(x) = \ln \left[ \frac{P(y = j/x)}{P(y = k/x)} \right]$$

for  $j = 1, 2, \dots, k-1$  and comparing logits for  $y=j$  to  $y=k$ .

## 4 Results

Because marriage is virtually universal and the onset of female marriage is at very early stage of life, age at marriage is a decisive matter for family formation in Uttar Pradesh, India. First in this study, Table 1 presents the mean age at marriage according to different socio economic variables like current age, residence type, maternal education, wealth index of household and type of family etc. According to the current age, relative contribution of socio-economic factors results in the upward change in the age at first marriage over time although the change is very slow, the percentage of marrying after age 19 years is somewhat lower among the younger women compared with their older group. The reverse trend is seen between marriages happening at ages before 12 years, while the proportion of women married beyond these ages is approximately the same in both the groups. As a result, younger women marry, on an average, by 0.13 years later than older women (17.16 years). As per place of residence, the mean age at marriage in urban higher than rural area by 2.38 years. Premature marriage is much more common in rural than in urban women, about 4 percent more women got married before 12 years of age than their urban counterparts. Urban areas seem to have contributed relatively more towards the rise in age at marriage. Lack of education and participation to labour force are the main reason behind this. Presumably, this place was the locale of adolescent socialization and education which exposed the respondent to community norms about

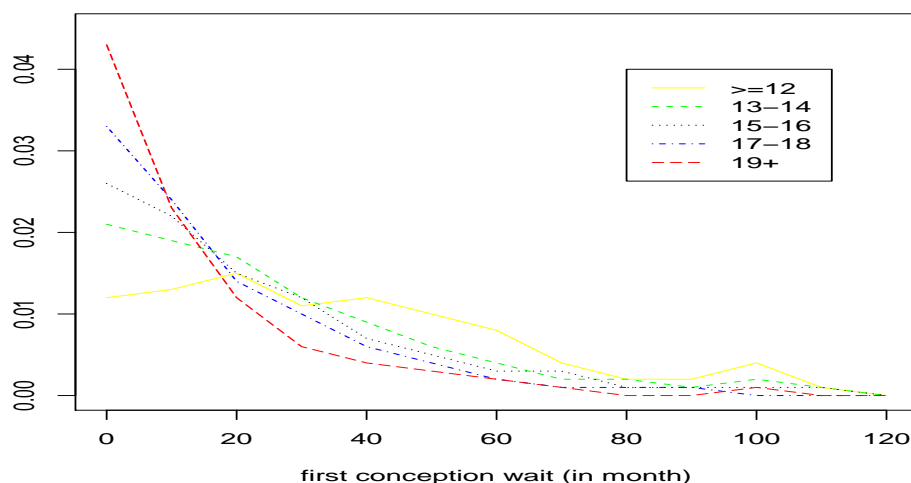
adult behaviour. Table 1 demonstrates that early marriage causes women to cut short their educational attainments, and hence increases the mean age at first marriage. Near about 84 percent higher educated women marry after age 19 while about 5 percent and 20 percent illiterate women marry before age 12 and during 13-14 years respectively. The difference between no schooling and a few years of primary education is modest but real, resulting in about 0.40 year of marital postponement. But entry into Higher education has the strongest effect; the mean age at first marriage increases another two to three years. A young woman with a higher level of education is more likely to be employed and the employment is likely to delay marriage. Religion affiliation effect exists on age at first marriage. The percentages of marrying age after 17 years are higher among Non-Hindu women and the percentages for marrying at early ages are found to be higher among Hindu women. It is seen that non-Hindu marry on average, 0.52 years later than Hindu Women. All the caste groups, namely SC/ ST, and OBC and General group showed very alarming percentages of marriages of girls taking place below the legal age. General category has highest mean age at marriage among three categories. Thus, the policy recommendation for the planners and policy makers is to focus their concerted efforts to increase educational facilities and employment opportunities for girls in the areas inhabited by SC/ ST. In fact, these reasons behind this, terms of social, cultural, and behavioural aspects of castes.

Variation due to exposure to mass media shows that women who are exposed to at least one media have a higher mean age at marriage compared to those who have no access to media. There is almost about two year difference between these two categories. This explains the increasing awareness of the consequence of early marriage by media. There is a strong association between wealth status and age at marriage. The more the wealth status increases, the more the prevalence of early marriage decreases. The mean age at marriage of rich women is 18.55 years and that for middle and poor women are 16.34 and 15.81 years respectively. The working status of women is primary based on her education. Women belongs to agricultural activity, belongs to rural area basically and in rural area prevalence of early marriage is higher as compared to women who are not working while women who are professional are highly educated, the main reason behind their mean age at marriage is highest among all. Husband's education plays a great role in reducing the prevalence of early marriage of women. The higher the level of the husbands' education, the lesser is the number of premature marriages of women. The highest mean age at first marriage is found to be 19.56 years for the wives of husbands with higher education level. Illiterate husbands have, on average, 16.07 years lowest mean age at first marriage of their wives. When husbands are service holders, the mean age at first marriage of women is the highest (17.46 years). The lowest mean age at first marriage of women is 16.07 years, found among those whose husbands work in the agricultural sector. Women belongs to non-nuclear family has 0.50 years more average age at marriage.

Multinomial Regression technique is used to explore the relative contribution of covariates on age at first marriage. In this analysis, the age at first marriage is considered as a dependent variable and categorized into five groups: earliest (12 years), very early (13-14 years), early (15-16 years), almost mature (17-18 years), and mature (More than 19 years) age at marriage. Among these five categories mature one is considered to be reference category. Here the aim is to assess the effect of covariates on different groups of women of marital age compared to women who marry at a mature age. Table 2 demonstrates the outcomes for multinomial regression analysis are presented as relative odds. The analysis appears that current age has an impact on age at first marriage. The propensity of marrying before and at/after 15 years is, respectively, lower and higher from older to younger women. Most of this effect of age is mediated through education of women [12]. The propensity of marrying at any of the ages relative to mature age is markedly higher among rural than urban women Rural women 11 times more prone to marry before age 12 years as compared to their counterparts. Women's education markedly declines the early marriage. If the level of education is higher, the risk of marrying early is lower. For example, There is 251, 132 and 27 times more chances to getting marriage before age 12 for illiterate, primary and secondary educated women respectively as compared to higher educated women. Partner education also plays an important role in determining the age at marriage. Secondary and higher educated men are less likely to marry women who are aged lower than 19 years compared to their illiterate and primary educated counterparts. Hence, there is a significant role of husband's occupation on female age at marriage. Husband who are doing Professional kind of job, compared to husband who involves in agricultural activity, are extremely less likely to marry women who are not matured.

Religion variable also affects the age at marriage in Uttar Pradesh, Hindu Women are more prone to early marriage as compared to non-Hindus women the reason behind is socio and cultural factors of the religion. As well as age at marriage is mediated by caste, SC/ST women are eight times more likely to marry earlier as compared to general category women while OBC women are 5 times more likely to marry earlier. For women who have no exposure to any media, the chance of marriage at very early ages is 4-5 times more higher compared with their counterparts. The importance of females working differs with marital age. That is, women involved in agricultural activity are much less likely to marry at almost mature age. Compared to women in the rich class, the intention of marrying earliest, very early, early, or almost mature ages is much higher in the poor class, followed by the middle class.

Table 3 explores the as the age at marriage is increasing, the age at first birth is also increasing slowly. The average age at first birth found to be 16.33 years women who get marriage before age 12 years. Early motherhood is found among early marriages. Marini[3] There is a tendency for those who marry and have their first child at older ages to have fewer children than those who marry and have their first child at younger ages. Because age at first marriage and age at first



**Fig. 1:** Probability of first conception of women by age at first marriage

birth are highly related, these two variables have been used interchangeably in analyses of the determinants of fertility. Women who marry after age 19 have lesser interval (2.02 years) as compared to those who marry before age 12 years. This increased interval possibly is due either to less exposure to sexual activities at younger ages or to adolescent sterility. Gini [13] discussed that fecundability, monthly probability of first conception is estimated by the inverse of the average number of months for first conception when all women are considered to be homogeneous with respect to first conception which was calculated in Table 3. Women who marry earlier as before 12 has fecundability 0.023 and it is increasing gradually to 0.066 for women who marry after age 19 years. As previous research discussed women marry in earlier age have less fecundability because of adolescent sterility. To estimate the percentage of adolescent sterility at different ages, it is assumed that all women become fecund after age 19 years. The percentage of sterility can be obtained by the following expression

$$(1 - a) * o + ab = c \quad (1)$$

Where  $a$  = proportion of women fecund,  $b$  is fecundability for women who are fecund, and  $c$  is observed fecundability for the specific age group. Therefore, proportion of temporal sterility is  $(1 - a)$ . Based on the above expression the percentage of sterility in different age groups is computed as shown Table 3. The results of this column represent sharply the reduction in the percentage of sterility with age.

To explore the relationship between age at first birth and age at marriage we use linear regression among women married before 19 years. We find the following linear equation linear regression equation

$$\text{Age at first birth} = 6.232 + 0.780 * \text{Age at first marriage}$$

Which shows age at first birth is postponed by 0.780 years for every year increase in age at first Marriage. Also we tried to find out the influence of age at first marriage on the total number of children at the end of the reproductive period with the help of linear regression. The regression equation is as follows:

$$\text{Total number of children} = 7.038 - 0.288 * \text{Age at first marriage}$$

The coefficient indicates that if age at first marriage is postponed by 1 year, the final number of children per women is reduced by 0.288.

Also we examined power of age at marriage in shaping the fertility behaviour of women at different ages. Table 4 reveals as age at marriage increases the mean number of children born to a female is decreases, which implies women have a tendency to take more children within first period of nuptials life. The variations in fertility performance between cohorts are much more appreciable in the reproductive life. From the figure it can be observed that as age at first marriage increase probability of getting conception in first year is high and tends to zero for higher month for women who marry in mature age.

**Table 1:** Percentage distribution of ever-married women by age at first marriage and some selected background characteristics along with their corresponding mean age at first marriage in Uttar Pradesh, India

Back Ground Characteristics	Age at first Marriage					N	Mean (Years)
	>=12	13-14	15-16	17-18	<=19		
Current Age							
>30	2.90	14.70	28.00	28.40	26.00	3534	17.03
<=30	4.10	15.00	28.60	24.90	27.50	4129	17.16
Place of Residence							
Urban	1.20	6.80	20.00	28.10	43.90	3028	18.54
Rural	5.10	20.10	33.70	25.50	15.70	4635	16.16
Education							
Illiterate	5.20	20.60	34.50	25.60	14.10	4141	16.07
Primary	3.40	15.90	33.50	30.00	17.30	863	16.48
Secondary	1.40	7.50	22.50	34.00	34.60	1844	17.75
Higher	0.10	1.00	4.40	10.70	83.80	815	21.56
Partners Education							
Illiterate	5.70	20.10	35.30	24.90	14.00	1967	16.07
Primary	4.40	20.40	33.80	27.00	14.40	838	16.15
Secondary	3.30	14.10	28.40	29.00	25.50	3560	17.01
Higher	1.20	5.30	13.80	22.00	57.80	1298	19.56
Religion							
Hindu	4.00	15.80	28.60	25.50	26.00	6173	17.00
Non- Hindu	1.60	10.70	27.00	30.60	30.00	1490	17.52
Caste							
General	1.70	8.60	20.30	24.20	45.20	2307	18.50
OBC	4.00	16.30	31.30	27.90	20.50	3648	16.65
SC/ST	5.00	20.30	32.70	26.70	15.30	2307	16.19
Access to Mass Media							
No Access	5.80	22.20	36.10	23.80	12.10	2014	15.88
Have Access	2.70	12.20	25.50	27.50	32.10	5649	17.54
Wealth Index							
Poor	5.90	22.90	36.40	23.90	10.90	2985	15.81
Middle	4.10	16.30	34.80	29.10	15.70	1328	16.34
Rich	1.30	7.00	18.50	27.90	45.40	3350	18.55
Family Type							
Nuclear	4.10	16.30	31.30	25.10	23.30	3633	16.82
Non-Nuclear	3.40	13.80	25.10	27.60	29.30	4030	17.29
Respondents Occupation							
Not _working	2.80	12.30	26.90	28.20	29.80	5209	17.38
Agriculture	6.80	25.30	34.50	22.60	10.70	1569	15.67
Professional	2.10	11.10	25.40	23.60	37.70	885	18.00
Partners Occupation							
Not _working	5.10	14.60	24.20	29.90	26.10	157	16.89
Agriculture	5.60	19.50	34.20	25.40	15.20	2008	16.14
Professional	2.70	13.10	26.30	26.80	31.00	5498	17.46

## 5 Conclusion

The study concludes in Uttar Pradesh early marriage is still prevalent. A striking deliberation of married women is found before legal age 18. Early marriage prevalence is also observed when using multinomial regression, An increased propensity to marry at early and very early ages is found among Hindu women, illiterate as well as less educated, poor and women who belongs to nuclear family. In addition women who are unaware from media are more prone to marry early. Along with it is obvious from the result that marked concentration of rural, illiterate Hindu women residing in Uttar Pradesh. As a result, to date, the mean age at first marriage is very low and cannot rise to the expected level. The findings in the study state that education plays the strongest role in the variability in age at first marriage. The results of this analysis indicate that the ages at which an individual enters into marriage and parenthood are important causal factors influencing the number of children the individual has. Because age at first marriage and age at first birth are



**Table 2:** The relative risk of earliest, very early, early, and almost mature age at first marriage of all ever-married women aged 15-49 years by background factors:

Back Ground Charactersitics	Age at first marriage (Years)							
	>=12		13-14		15-16		17-18	
	RR(95% CI)	P value	RR (95 % CI)	P Value	RR (95 % CI)	p value	RR (95% CI)	P value
<b>Current Age</b>								
>30*	1.000	-	1.000	-	1.000	-	1.000	-
<=30	1.323(1020-1.717)	0.035	0.969(0.838-1.020)	0.676	0.968(0.857-1.093)	0.599	0.831(0.735-0.939)	0.003
<b>Residence</b>								
Urban*	1.000	-	1.000	-	1.000	-	1.000	-
Rural	11.941(8.312-17.514)	0.000	8.218(6.894-9.797)	0.000	4.707(4.132-5.362)	0.000	2.544(2.242-2.886)	0.000
<b>Respondents Education</b>								
Illiterate	251.44(35.15-1798.75)	0.000	124.846(61.69-252.64)	0.000	46.42(32.75-65.79)	0.000	14.23(11.14-18.18)	0.000
Primary	132.933(17.96-983.55)	0.000	78.499(37.65-163.64)	0.000	36.79(24.93-54.30)	0.000	13.64(10.10-18.43)	0.000
Secondary	27.834(3.706-205.710)	0.000	18.467(8.981-37.972)	0.000	12.341(8.63-17.63)	0.000	7.715(.016-9.895)	0.000
Higher*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Partners Education</b>								
Illiterate	20.545(11.782-35.826)	0.000	15.613(11.675-20.879)	0.000	10.589(8.54-13.12)	0.000	4.679(3.827-5.722)	0.000
Primary	15.289(8.144-28.705)	0.000	15.361(10.943-21.563)	0.000	9.00(7.495-12.813)	0.000	4.915(3.392-6.372)	0.000
Secondary	5.837(3.370-10.110)	0.000	6.009(4.589-7.869)	0.000	4.670(3.877-5.625)	0.000	2.991(2.541-3.520)	0.000
Higher*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Religion</b>								
Hindu	2.863(1.859-4.409)	0.000	1.699(1.394-2.069)	0.000	1.219(1.048-1.417)	0.010	0.961(0.829-1.114)	0.601
Non- Hindu*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Caste</b>								
OBC	5.249(3.643-7.563)	0.000	4.171(3.462-5.024)	0.000	3.398(2.946-3.919)	0.000	2.535(2.204-2.913)	0.000
SC/ST	8.676(5.801-12.977)	0.000	6.957(5.577-8.677)	0.000	4.755(3.960-5.709)	0.000	3.247(2.703-3.901)	0.000
General*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Access to Mass Media</b>								
No Access	5.577(4.235-7.346)	0.000	4.846(4.051-5.796)	0.000	3.757(3.199-4.413)	0.000	2.305(1.947-2.728)	0.000
Have Access*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Wealth Index</b>								
Poor	19.427(13.590-27.773)	0.000	13.514(11.172-16.346)	0.000	8.195(7.018-9.570)	0.000	3.558(3.044-4.152)	0.000
Middle	9.396(6.121-14.422)	0.000	6.719(5.315-8.495)	0.000	5.454(4.517-6.585)	0.000	3.031(2.514-3.655)	0.000
Rich*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Family Type</b>								
Nuclear	1.669(1.294-2.152)	0.000	1.491(1.287-1.727)	0.000	1.514(1.339-1.713)	0.000	1.148(1.012-1.302)	0.000
Non-Nuclear*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Respondents Occupation</b>								
Not_working	1.642(1.004-2.688)	0.048	1.410(1.105-1.798)	0.006	1.341(1.116-1.612)	0.002	1.512(1.254-1.822)	0.000
Agriculture	11.196(6.643-18.869)	0.000	8.054(6.035-10.747)	0.000	4.789(3.760-6.100)	0.000	3.377(2.624-4.345)	0.000
Professional*	1.000	-	1.000	-	1.000	-	1.000	-
<b>Partners Occupation</b>								
Not_working	2.206(1.016-4.791)	0.046	1.326(0.790-2.226)	0.285	1.096(0.701-1.713)	0.689	1.328(0.868-2.030)	0.191
Agriculture	4.138(3.149-5.437)	0.000	3.029(2.548-3.601)	0.000	2.654(2.280-3.089)	0.000	1.934(1.651-2.265)	0.000
Professional*	1.000	-	1.000	-	1.000	-	1.000	-

highly related, the independent effects of the timing of marriage and first birth are analyzed by considering the effects of age at first marriage, on the number of children in the family. When the analysis is carried out in this way, the timing of marriage and first birth are found to have independent effects on the number of children. The older the age at first marriage and the longer the interval between first marriage and first birth, the smaller the number of births. It would appear to make little difference how an increase in age at first marriage is brought about, since variables such as educational and occupational attainment, which are known to be important predictors of age at first marriage and have little direct effect on fertility.

To overcome these difficulties of early marriage and early childbearing, a public consensus about an acceptable marriage age (legal age at first marriage) and childbearing age needs to be developed. Hence, to implement the marriage act, various steps taken by the government might be fruitful if it is possible to educate all women minimum up to the higher secondary level and to create more opportunities so they can participate in the labour market as much as possible.

**Table 3:** The relative risk of earliest, very early, early, and almost mature age at first marriage of all ever-married women aged 15-49 years by background factors:

Age at first marriage	Estimated averages age (years)	Mean age of mother at first birth (years)	Mean interval for first birth (years)	Mean interval (months) for conception leading to live birth	Monthly probability of conception leading to live birth	Percentage of temporary sterility
>=12	11.43	16.33	4.39	43.68	0.023	65
13-14	13.62	17.37	3.25	30.03	0.033	49
15-16	15.55	18.94	2.91	25.94	0.039	41
17-18	17.47	20.31	2.39	19.65	0.051	23
<=19	21.05	23.46	2.02	15.21	0.066	0

**Table 4:** Mean number of children ever born to females at specified aged by different ages at first marriage cohorts:

Age in Year	Age at first marriage					Total
	>=12	13-14	15-16	17-18	<=19	
15-20	1.03	0.95	0.53	0.22	0.00	0.53
20-25	2.57	2.39	1.94	1.37	0.74	1.50
25-30	4.11	3.61	3.28	2.76	1.66	2.66
30-35	5.09	4.74	4.33	3.92	2.55	3.79
35-40	5.39	5.39	4.86	4.50	3.22	4.46
40-45	6.00	5.53	5.78	4.96	3.38	4.90
45+	6.41	5.91	5.37	5.47	4.02	5.14
Total	4.52	4.02	3.65	3.13	2.29	3.23

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