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Research Article

A STATISTICAL STUDY TO EVALUATE THE CLOSED TIME INTERVAL BETWEEN MARRIAGE AND FIRST PREGNANCY AGE IN HILLY RURAL POPULATION OF UTTARAKHAND- A COHORT BASED APPROACH

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ABSTRACT

The term nuptiality is associated with the frequency of marriages that takes place. The social impact on nuptiality is of great importance to understand the dynamics of a society. Marriage and pregnancy are important factors in the analysis of nuptiality. The study aims to recognizing self-attention practices related to pregnancy by women from rural area, as well as identifying these practices according to the different models of attention to health/birth.

This paper presents the study on the difference in age of marriage and the age at first pregnancy for the overall population of rural areas of Uttarakhand for the birth cohort from 1931-40, 1941-50, 1951-60, 1961-70, 1971-80, 1981-90 and 1991-2000 within age group 17-86.

This retrospective study is done for the rural areas of Uttarakhand. The data for this study is collected through the primary collection technique and the data is analysed through the comparative study in order to study the changes in the shift in ages of the birth cohort.

INTRODUCTION

The previous several decades have seen a general ascent in the age at marriage for females around the globe.(1,2) There is a problem in measuring the impact of family planning programmes on fertility which has been a major research issue now-a-days for the demographers and policy makers. (3). There are three distinct meanings of marriage: the social institution, the demographic event, and the union of two persons created by the event.(4) Marriage age is a crucial demographic variable which affects fertility, infant and childmortality and the health of women. Marriage was not only universal but also child marriages have been practised in the past India. (5,6)

Delayed marriage is an effective strategy to delay childbearing according to the population policy. In the societies where delayed marriage occurs, the young women are in highest periods of fecundity, societies are impatient to establish fertility through pregnancy. These things may be more contrary to delayed child bearing in the first birth interval. The settings of late marriage where the first birth interval is normally short one should expect greater oppose to acceptance of birth control and norms may evolve to delay sexual initiation and marriage instead. (7)

Previous studies shows that age at marriage and the length of the first birth interval have causal effects on the number of children in the family and that the magnitude of these effects is not reduced significantly by controlling for the effects of other variables. The older the age at first marriage and the longer the interval between entry into marriage and parenthood, the smaller the number of children. (8)

The observed length of different closed interval between age at marriage and first pregnancy can be taken as good indicator. In this paper, an attempt has been made to focus on the variation in the interval between age at marriage and age at first pregnancy of a woman for the hilly rural population of Uttarakhand through a stochastic model, follows exponential distribution.

MATERIAL AND METHODS

Study area: The study was conducted in the hilly rural areas of Uttarakhand.

Study participants: The subjects of the study were the local residents of selected hilly rural areas of Uttarakhand state.

Inclusion criteria for subjects: Women, who were ever married and unmarried, born in between 1931 to 2000..

Exclusion criteria for subjects: The following category of women have been excluded from the study-

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- Those who were born before 1931 and after 2000.
- Who were unable to give their history because of mental illness, physical disability?
- Who were not signing the informed consent?

Ethical Approval: The study has been approved by the Ethics Committee of Swami Rama Himalayan University, Jolly Grant, Dehradun. Informed consent in the local language have been taken from subjects during filling pre-designed questionnaire.

Data Collection: The data for the study was collected by conducting field survey in the hilly rural areas of Uttarakhand on key demographic characteristics of women and their households and detailed information on fertility and maternity. In this paper, we use the data for viewing the variation between age at marriage and first pregnancy in seven distinct birth cohorts.

Statistical Analysis: Data were analysed using R Software 3.3.1 version. In this paper, an attempt has been made to fit the data in the stochastic model to view the variation in the interval between age at marriage and first pregnancy age for seven different birth cohorts, follows an exponential distribution with a density function-

$f_0(t) = \lambda e^{-\lambda t}\ ;\ \lambda > 0, t > 0$
having parameterλ.
The Kruskal-Wallis test has been used to view the significant difference and Sidak test is used to focus on the two cohorts which differs significantly with each other.

RESULTS

The variation in the interval between age at marriage and first pregnancy in females is the point of focus in seven different birth cohorts of hilly rural population of Uttarakhand.

Table 1 Mean age at Marriage and first pregnancy age in females in 1931-2000

Cohort	Frequency	Mean age at first marriage(years)	Standard Deviation	Mean age at first Pregnancy(years)	Standard Deviation
1931-1940	87	15.67	3.899	18.91	4.315
1941-1950	134	16.07	3.777	19.75	4.630
1951-1960	213	17.64	4.156	20.09	4.343
1961-1970	199	19.03	3.750	20.35	5.493
1971-1980	212	18.96	3.619	20.74	3.805
1981-1990	206	19.81	3.526	20.1	5.985
1991-2000	107	19.13	2.168	18.25	6.244

The above table presents the mean age at first marriage and mean age at the first pregnancy in the hilly rural population of Uttarakhand for 7 distinct birth cohorts. The mean age at first marriage is high in the cohort 1961-1970 while minimum in the cohort 1931-1940.

Also, mean age at first pregnancy is maximum in the cohort 1971-1980 while minimum in 1991-2000.

The above table presents mean and median of the interval between the age of marriage and age at first pregnancy in months in hilly rural areas of Uttarakhand for seven cohorts which shows that the interval among age at marriage and first pregnancy is consistently decreasing with the time and the minimum interval is one month for each cohort except the cohort 1941-1950 in which the minimum gap is 2 months and the maximum interval is of 240 months(20 years) in 1931-1940.

The above table presents median values of the gap between age at marriage and first pregnancy for female in 7 distinct birth cohorts of hilly rural population of Uttarakhand which shows significant difference between them.

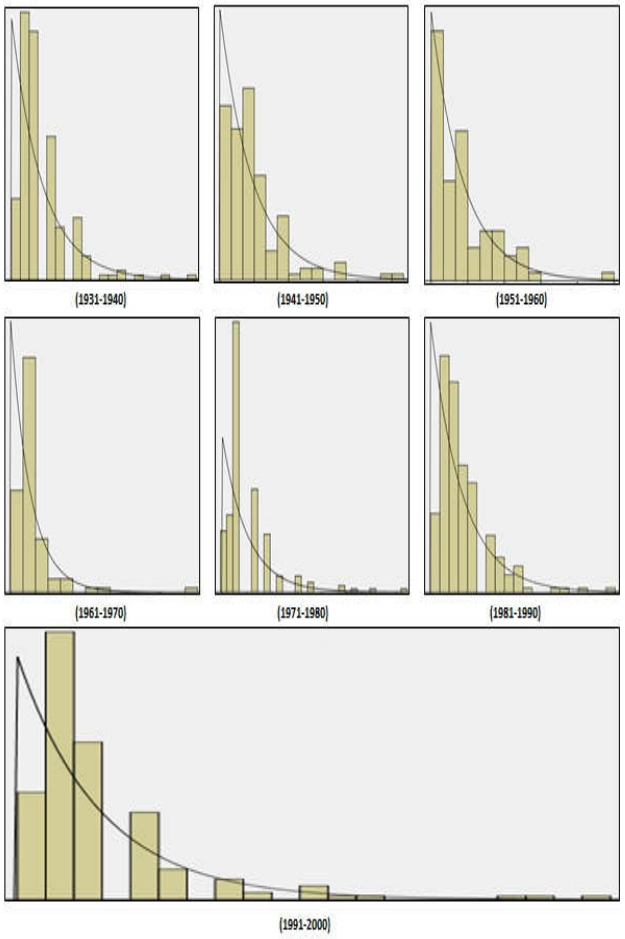

Table 2 Mean and Median interval between the age at first marriage and first pregnancy age in females for seven different cohorts

Birth Cohort	Frequency	Mean interval(in months)	Standard Deviation	Median interval(in months)	Minimum gap between age at marriage and first pregnancy(in Months)	Maximum gap between age at marriage and first pregnancy(in Months)
1931-1940	85	43.84	41.737	36	1	240
1941-1950	133	47.63	43.232	36	2	264
1951-1960	210	34.05	28.891	24	1	192
1961-1970	191	29.15	24.695	24	1	168
1971-1980	211	24.2	24.323	12	1	168
1981-1990	195	20.08	21.069	12	1	144
1991-2000	97	15.8	17.922	12	1	144

Table 3 Median interval between age at marriage and age at first pregnancy

Birth Cohort	Frequency	Median interval(in months)	p-value
1931-1940	84	36	
1941-1950	132	36	
1951-1960	206	24	
1961-1970	199	24	0.000
1971-1980	208	12	
1981-1990	197	12	
1991-2000	96	12	

The graphical representation of the gap between the age at first marriage and age at first pregnancy and frequency in seven birth cohorts of hilly rural area of Uttarakhand shows that the data follows exponential distribution.

Table 4 Significance difference between the two respective cohorts

Birth Cohort	Mean Difference	Std Error	p-value
(1931-1940)-(1941-1950)	-2.935	4.008	1.000
(1931-1940)-(1951-1960)	10.925	3.717	.068
(1931-1940)-(1961-1970)	16.382*	3.736	.000
(1931-1940)-(1971-1980)	20.874*	3.712	.000
(1931-1940)-(1981-1990)	25.288*	3.742	.000
(1931-1940)-(1991-2000)	29.710*	4.290	.000
(1941-1950)-(1951-1960)	13.860*	3.201	.000
(1941-1950)-(1961-1970)	19.317*	3.223	.000
(1941-1950)-(1971-1980)	23.809*	3.195	.000
(1941-1950)-(1981-1990)	28.223*	3.230	0.000
(1941-1950)-(1991-2000)	32.645*	3.852	0.000
(1951-1960)-(1961-1970)	5.456	2.854	.703
(1951-1960)-(1971-1980)	9.949*	2.822	.009
(1951-1960)-(1981-1990)	14.363*	2.861	.000
(1951-1960)-(1991-2000)	18.784*	3.548	.000
(1961-1970)-(1971-1980)	4.492	2.847	.923
(1961-1970)-(1981-1990)	8.906*	2.886	.043
(1961-1970)-(1991-2000)	13.328*	3.568	.004
(1971-1980)-(1981-1990)	4.414	2.855	.935
(1971-1980)-(1991-2000)	8.836	3.543	.237
(1981-1990)-(1991-2000)	4.422	3.574	.994

The above table presents which two cohort shows significance difference. The cohorts (1931-1940)-(1941-1950), (1931-1940)-(1951-1960), (1951-1960)-(1961-1970), (1961-1970)-(1971-1980), (1971-1980)-(1981-1990), (1971-1980)-(1991-2000), (1981-1990)-(1991-2000) shows that there is no significance difference since the p-value is greater than 0.05.

DISCUSSION

The variation between the age at marriage and first pregnancy is seen this paper. This study helps us in estimating the variation in the interval between age at marriage and first pregnancy over time. It determines how and till what extent the changes in the median time of the interval between the age at marriage and first pregnancy would have been fluctuating over time.

This paper contains a detailed examination of the variation in the gap between the age of women at the time of marriage and first pregnancy age in the hilly rural areas of Uttarakhand for the 7 different cohorts of 10 years. In the study by Susheela Singh *et al*., it is mentioned that the continuing useful indicator of woman's status is a woman's age at first marriage and of the start of childbearing. Mostly married women have their first child within 24 months of the start of the first union.(9)

In India, Nepal and Bangladesh, early marriage is inversely related to the first birth interval but neither monotonically nor directly. There are factors such as physiological, health, and social factors which could explain the longer interval between first marriage and first birth among those who got married early.(10-13)Also, Ying Hong shows in his study that there is strong negative relationship between the length of first-birth intervals and women's age at first marriage. (14)

In the study "Marriage and First Birth Intervals in Early and Late Marrying Societies: An Exploration and determinants", it is observed that gap between the age at marriage and first pregnancy is also decreasing as in our study. (7) In the Thematic report of Rwanda, it is stated that women get married earlier than men; between the ages of 20 and 24. The average age at first marriage is 25 for women and 27 for men. Both men and women marry later than before and the age at first marriage has increased continuously over the last three decades.(15)In the study "Fertility transition in Kathmandu" it is observed that the fertility rate is high among women aged 25-29 years which declines after the age of 30 years.(16)

In previous study "Population Projections and expectd levels of achievement for family planning progamme in Uttarkhand", it is mentioned that the determinant of fertility is early age at first marriage in a population which is usually associated with a longer period of exposure to the risk of pregnancy, and thus higher fertility levels. (17)In the study by Mosammat Zamilun Nahar *et al*., it is concluded that with the increase age at marriage, the, fecundibility of women sharply rises, whereas the age-specific sterility decrease and there is a positive association between age at first marriage and age-specific marital fertility rates.(18)

The study by Zahra Shayan showed that age at marriage had highly significant effects on the duration of birth intervals after marriage.(19) It is observed from our study that the gap between the age at first marriage and first pregnancy is decreasing with time.

CONCLUSION

This analysis is related to the married women of hilly rural areas of Uttarakhand. We analyze the relationship between the age at marriage and first pregnancy using primary data on 1931-2000 in decades. The length of the interval between marriage and first pregnancy in the process of demographic change. The relationship between the subsequent events are sharpest because the interval between the age at marriage and first pregnancy age is shorten over the time.

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