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Research Paper

First Birth Interval Dynamics in Manipur: A Cox's Regression Analysis

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ABSTRACT:- *A cross sectional investigation for identifying the determinants of the human first birth intervals is carried out empirically in four valley districts of Manipur. After adjusted the effects of other variables, educational level (P<0.01), Christian religion (P<0.05), and age at marriage (P<0.05) compose the set of determinants of the first birth interval in the Cox' regression analysis.*

Keywords:- *Cox regression, relative risk, educational level, religion, age at marriage*

I. INTRODUCTION

In developed countries, delayed child bearing particularly the first birth has attracted much attention in the last two decades. Gradually, the thinking has been to delay age at marriage so that the first childbirth occurs during twenties and early thirties (Kumar and Danabalan, 2006). In one sense, the first child bearing is an important event in the reproductive life of a woman. The gap between marriage and first live birth is termed as 'first birth interval'. Past findings evidenced that the first childbirth has relationship with many socio-demographic and cultural factors. Specifically, couples' educational level, occupational status, age at marriage etc. are of paramount importance on the dynamics of first birth interval. Incomplete conceptions occurring prior to the first live birth also have a significant impact on the firth birth interval (Brien, 1994).

The women age at first birth in developing countries has important consequences on the demographic characters of the population. Thus, women's ages at effective marriage and age at first childbirth are proximate determinants of fertility behaviour (Singh et al. 2007, Singh et al. 2013). The later the age at effective marriage, the longer the interval is between marriage and first birth, the slower is the rate of population growth. There is dramatic fertility decline in Southeastern Asia in recent decades partly due to women postponing marriage and the first childbirth (Prachuabmoh, 2002). These variables are also interesting as indicators of women's status and evolving gender roles. A couple who intend to have one or two children may desire to lengthen the spacing between marriage and first birth in order to better establish their life as a couple, and this would give more time for training and work experience before the first child arrives (Martin, 1995). Thus, the lengthening of the interval between marriage and first birth may be an important goal thereof, but also may be in the interest of individual couples (Zheng, 2000, Singh et al. 2012). In India, the impact of persisting low age at marriage in maintaining the high fertility rate is now well recognized. Though, female age at marriage in India has been rising slowly since around the middle of the last century, the current level is low in comparison to most of the low fertility countries. There is a significant variation in the age at marriage among the states especially between the northern and southern states, and within states among castes, communities and other social sections. It is well known that directly implementing the law and legislation may not be feasible in several of the backward states especially in female education rather government can approach through only factors that are amenable to social intervention. In this context it is important to know the recent changes in the female age at effective marriage in various states of India and identify the causal factors that are associated with low level of female age at marriage in the Indian states. In some rural parts of India, the first birth is usually delayed because of temporary separation of married partners with the female partners going over to their parents' place for some time even after marriage. This social custom plays an important role in delaying the first birth (Kumar and Danabalan, 2006). Early child bearing contributes to population growth in two ways (Teachman and Heckert, 1985). First, in the absence of any intentional contraceptive practices, women who begin bearing children early in their life have more births than equally fecund women who begin so at older ages and secondly, child births occurring at younger ages imply a higher rate of fertility and population growth because of the shorter length of

time between generations. India has achieved a little success in the reduction of fertility and child mortality in a lower population growth rate in the last two decades. The National Population Policy-2000, National Health Policy-2002 and even National Rural Health Mission-2005 have much emphasis on bringing down the fertility from the current level to the replacement level (2.1). However, even if fertility approaches to replacement level in the near future, absolute number of population will continue to increase for many years because of population momentum. In view of this, the present study is to examine the impact of some socio demographic factors of interest on the variation in first birth interval in Manipur.

II. MATERIALS AND METHODS

A cross sectional and community based study is conducted in four valley districts of Manipur namely Bishnupur, Imphal East, Imphal West, and Thoubal. It consists of 971 eligible mothers. The study subject is the eligible women, defined to be the currently married women having at least one live birth. As there is no sampling frame available, cluster sampling has been adopted. The response or outcome variable is the interval of tome between the date of effective marriage and the date first delivery. The time duration of the women who have first conception (retrospective) at survey is also included in the study through censoring scheme. Various socio-economic, behavioural, cultural and demographic factors are accounted to be explanatory or variables. Some qualitative factors are quantified by dummy variable technique. Utilizing a "pre-tested and semi-structural schedule" a sample survey was conducted though personal interview and it was completed during six months that is from the July to December, 2012 with 11th July 2012 as reference date of survey and the analysis has been carried out by applying Cox's (1972) regression model (PH-model) through SPSSvs19.

III. ANALYSIS AND RESULTS

The explanatory variables considered are residence (rural=1& urban=0), type of family (joint=1& nuclear=0), religion (1for subject & 0, otherwise), educational level (number of completed academic year in education), employment status (Govt. employed=1 & others=0), age at marriage, couple's desire number of son and daughter. The results of the analysis are interpreted on the basis of P-values of the regression coefficients (β) and relative risk (RR) quantified by Exp(β) with 95% confidence interval (CI).

Under unadjusted regression, five variables are found to be significant influencing the variation in the survival time of first birth interval. They are Christian religion (P<0.05), educational level of wife (P<0.001), educational level of husband (P<0.01), employment of wife (P<0.05) and age at marriage of wife (P<0.05) depicted in table-1. However, the significant effects of the variables are drawn when the effects of other variables are not controlled. It means that the insignificant factors may have their joint effects on the variation in the first birth interval under study. But the possible joint effects could not be detected in this unadjusted regression analysis. In fact, Christian religion has significantly shorter first birth interval than those who are belonging to other religions viz. Hindu, Islam and others. Christian mother has 19% more hazard of being shorter survival time of first birth interval than other religious groups as evidenced by its relative risk, e^{β} (1.193 with 95%CI: 0.985-1.447). Educational level of female spouse is found to be most significant factor (P<0.001) influencing the life time of first birth interval. The length of the time interval between age at marriage and the first birth is shortening 3% as per increasing one year of education (RR, e^{β} =1.025 with 95%CI: 1.012-1.039). In the similar manner the education of male spouse have also highly significant impact (P<0.01) on the survival time. But the education of wife has more influential on the life time than those of their husband counterpart. At the same time the employment of women under study has also significant impact on the survival time of first birth interval. It is again quantified by the value of RR (1.210 with 95% CI: 0.980-1.421). It statistically indicates that employed mothers have more hazards of 21% of being short first birth interval than those of unemployed ones. It may link with educational level. Irrespective of the effects of other factors, age at marriage of wife has also statistically significant impact (P<0.05) on the first birth interval.

Only three variables are found to be significant impact on the survival of first birth interval each at 0.05 probability level in the adjusted Cox regression analysis (Table-2). After adjusted the joint effects of other variables under study the duration of first birth interval varies (β =0.240, P=0.016) with education of wife. It has 5% more risk of being shortening of first birth interval for increasing one year in education as evidenced by its RR (e^{β} =1.046 with 95%CI: 0.999-1.059). At the same time age at marriage of wife has a significant influence of 4% more risk of being short first birth interval for one year increasing in women age at marriage in the population keeping the effects of other factors at constant level. It is quantified by the RR-value (e^{β} =1.038 with 95%CI: 0.998-1.059). In the similar way, Christian women have also 36% (RR=1.357 with 95%CI: 1.060-1.736) more hazards of being short the survival time than that of Hindu and Muslim. It may interestingly be noted that only education and Christian religion are identified to be most important factors influencing the

survival time of first birth interval in the population under study. It is selected through the stepwise Cox regression analysis (Table-3). After controlling the effects of each factor in isolation the educational level of wife has highly significant impact (P<0.01) on the variation in the survival time of first birth interval. It means that the educational level of mother has at least 2% more risk of being shorten first birth interval for advancement of one year in their educational achievement (e^{β} =1.023 with 95%CI: 1.008-1.038) which is found in 1st step of the stepwise regression model. In second as well as last model, Christian religion is again screened out to be important determinant (P<0.05) of first birth interval in the population under study. In this last fitted model, Christian mother have a 32% more risk than the mothers of Hindu and Muslim. It is indicated by the RR-value (e^{β} =1.322 with 95%CI: 1.058-1.650) after adjusted the effects of other factors under study.

IV. DISCUSSION

In the present interpretative analysis, education and religion are found to be most important factors influencing the variation in the women's first birth interval. This significant impact of educational level may have a linkage with the age at marriage of the eligible women under study (Singh et al., 2007). They also found that educational level of husband has no significant impact on the duration of waiting time to conception but that of wife is observed to be significant only after adjustment of other factors. This view is supported by the findings of Patnaik (1985), Singh et al., (2007), Singh et al., (2010). It might be caused due to the fact that different religious teachings play varying weight on the issue such as the importance of family, as well as perspective messages regarding fertility control measure that is contraception and abortion. Muslims place the highest premium on large families and they have restriction of using contraceptive devices. Moreover, Muslims are minority in population among the other religious groups in the study population. Generally they wish to increase their population through fertility so that their population growth becomes faster than that of other religious groups. Widow remarriage system is common among the Muslim society in the study population. On the other hand, Hindus do not have such religious practices. They are majority in population among the other religious groups. So, the event history of the time to conception of Hindu women might perhaps be the longest and that of the Muslim is somewhat shorter. This view is again in agreement with the findings of Gray et al., (2004).

V. CONCLUSION

In view of the present interpretative findings arrived at, it may be suggested that in order to achieve an adequate family size leading to reduction in fertility level in the state, the Government of Manipur may practice to formulate, execute and implement the measures female age at marriage be raised, couples be aware to maintain proper spacing between age at effective marriage and the first birth, policies be made to increase the educational level specially for girls and serious attempt also be made to improve the economic status of general public resulting into better way of life.

Table1: Unadjusted Cox Regression analysis on first birth interval

Factors	β	SE	P-value	Exp(β)	95% CI for Exp(β)	
					Lower	Upper
Residence	-.045	.073	.535	.956	.828	1.103
Type of family	.086	.073	.239	1.090	.945	1.257
Religion (Christian)	.197*	.098	.027	1.193	.984	1.447
Religion (Hindu)	-.078	.077	.314	.925	.795	1.076
Religion (Islam)	-.002	.169	.991	.998	.717	1.389
Education of wife	.025**	.007	.000	1.025	1.012	1.039
Education of husband	.025**	.008	.001	1.025	1.010	1.040
Employment of wife	.196*	.095	.040	1.210	.980	1.421
Employment of husband	-.193	.173	.265	.824	.587	1.158
Family income (in '000 Rs)	.015	.009	.260	1.015	.889	1.524
Age at marriage of wife	.021*	.008	.012	1.021	1.005	1.038
Age at marriage of husband	.005	.007	.459	1.005	.991	1.019
Couple's desire no. of son	.016	.066	.810	1.016	.893	1.155
Couple's desire no. of daughter	.002	.070	.980	1.002	.873	1.149

***indicates significance at 0.05 level; **indicates significance at 0.01 level**

Table 2: Adjusted Cox Regression analysis on first birth interval

Factor	β	SE	P	Exp(β)	95%CI for Exp(β)	
					Lower	Upper
Residence	.105	.098	.284	1.111	.916	1.347
Type of family	.034	.087	.693	1.035	.873	1.227
Religion (Hindu)	-.032	.099	.744	.968	.798	1.175
Religion (Islam)	.125	.221	.570	1.134	.735	1.748
Religion (Christian)	.305*	.126	.015	1.357	1.060	1.736
Education of husband	.018	.013	.159	1.018	.993	1.044
Education of wife	.240*	.013	.016	1.046	.999	1.059
Employment of husband	.117	.221	.597	1.124	.729	1.734
Employment of wife	.099	.107	.358	1.104	.894	1.362
Family income (in '000 Rs)	-.071	.056	.209	.932	.834	1.040
Age at marriage of husband	-.022	.012	.069	.978	.956	1.002
Age at marriage of wife	.208*	.015	.036	1.038	.998	1.059
Couple's desire no. of son	.030	.093	.750	1.030	.859	1.236
Couple's desire no. of daughter	.050	.086	.564	1.051	.888	1.244

Table 3: Stepwise Cox Regression analysis on first birth interval

Step	Factor	β	SE	P	Exp(β)	95%CI for Exp(β)	
						Lower	Upper
1	**Education of wife**	**.023**	**.007**	**.002**	**1.023**	**1.008**	**1.038**
2	**Religion (Christian)**	**.279**	**.113**	**.014**	**1.322**	**1.058**	**1.650**
	Education of wife	**.025**	**.008**	**.001**	**1.025**	**1.010**	**1.041**

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