Journal for Re Attach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 August; 6 (8s): 862-866

Exploring Factors Influencing First Birth Intervals In Manipur, India

Md. Abdul Latif[1], Ch. Shyamkesho Singh[2], N. Sharat Singh[3*]

[1*]Associate Professor, Department of Statistics, Liberal College, Luwangsanbam (Imphal - India),
Email: drmalatif67@gmail.com
[2]Research Scholar, Department of Mathematics, CMJ University, Meghalaya (India)
[3]Associate Professor, Department of Statistics, D. M. University, Manipur (India), Email: sharatstats65@gmail.com

[*]**Corresponding Author:** N. Sharat Singh
Associate Professor, Department of Statistics, D. M. University, Manipur (India), Email: sharatstats65@gmail.com

Abstract

Background: In developing countries, delayed childbearing, particularly the timing of the first birth, has gained considerable attention over the past decades. Strategies often focus on postponing marriage to ensure that the first childbirth occurs during the twenties or early thirties. **Objectives:** This study aims to investigate the determinants of first birth intervals in Manipur, a state situated in the North Eastern region of India. **Materials and Methods:** A cross-sectional, community-based study was conducted in the valley districts of Manipur. A sample survey of 977 currently married women with at least one live birth was conducted using a pre-tested semi-structured schedule via personal interviews from April 2022 to October 2022 with 1st April 2022, as the reference date. The survey employed a cluster sampling scheme. **Analysis:** The time interval between marriage and the first live birth, including censored cases where women reported first conception at the survey, served as the response variable. Various socio-economic, behavioral, cultural, and demographic factors were considered as explanatory variables, utilizing dummy variable techniques for qualitative factors. Cox's regression model (PH-model) was employed for analysis. **Findings:** Educational level ($p < 0.01$), Christian religion ($p < 0.05$), and age at marriage ($p < 0.05$) emerged as determinants of the first birth interval after adjusting for other variables. **Implications:** The findings of this empirical study provide valuable baseline information for understanding first birth intervals in Manipur and the North Eastern region of India.

Keywords: Relative risk, educational level, religion, age at marriage, p-value

Introduction

In recent decades, developed countries have witnessed a notable trend towards delaying childbirth, particularly in terms of the timing of the first birth. This shift often coincides with a postponement in the age of marriage, ensuring that individuals experience their first childbirth during their twenties or early thirties (Kumar and Danabalan, 2006). The first childbirth marks a significant milestone in a woman's reproductive journey, known as the "first birth interval," which encompasses the duration between marriage and the first live birth. Numerous studies have illuminated the impact of socio-demographic and cultural factors such as educational attainment, occupational status, and age at marriage on the dynamics of this interval (Brien, 1994).

In developing nations, the age at first birth among women carries profound implications for population demographics, serving as a key determinant of fertility behavior (Singh et al., 2007; Singh et al., 2013). Delays in both marriage and first childbirth have contributed to a decline in fertility rates across South Eastern Asia in recent years, reflecting evolving gender roles and shifts in women's societal status (Prachuabmoh, 2002). Couples seeking smaller families often opt to extend the duration between marriage and first childbirth, allowing them more time for personal development and career advancement (Martin, 1995).

In India, despite a gradual increase in the age of marriage for females since the mid-20th century, persistently low ages at marriage persist, leading to sustained high fertility rates with notable disparities observed among states and social groups. Social practices, such as temporary separations of married couples with the wife residing at her parents' home post-marriage, have been identified as factors delaying the first birth, particularly in rural areas (Kumar and Danabalan, 2006). Early childbearing remains a contributing factor to population growth, underscoring the importance of policies aimed at reducing fertility rates and population growth, as outlined in national policies such as the National Population Policy-2000 and National Health Policy-2002.

The timing of first birth intervals in India is intricately linked to socio-demographic factors including religion, educational attainment of couples, female age at marriage, desired number of sons, wanted and unwanted fertility, and unmet need for family planning. Notably, data from NFHS-5 (2019-21) reports a median age at first marriage of 18.8 years for women in India, compared to 17.2 years in 2015-16 (NFHS-4). Conversely, men marry at a median age of 24.9

years, up from 23.4 years in the previous survey. Legislative measures such as the Child Marriage Restraint Act of 1978 have contributed to raising the legal age of marriage to 18 years for girls and 21 years for boys, resulting in an increase in the average age at marriage to 19 years for girls and 24 years for boys in 1991. In Manipur, marriage tends to occur at a relatively later age compared to other parts of India, with recent data suggesting an average age at marriage of 20.4 years for women and 25.7 years for men (Singh and Singh, 2018). Moreover, the prevalence of unwanted births significantly affects the total fertility rate, with the total wanted fertility rate slightly declining from 1.8 children in 2015-16 to 1.6 children in 2019-21 in India. Notably, Manipur reports a total wanted fertility rate of 2.0, second only to Meghalaya at 2.7, among Indian states and union territories. Despite efforts to meet family planning needs, a notable unmet need persists, with 9% of eligible women in Manipur lacking access to family planning services, down from 13% in the previous survey (2015-16).

Against the backdrop of ongoing efforts to control fertility rates, population momentum ensures continued growth in absolute population numbers. Thus, this study aims to investigate the impact of socio-demographic factors on the variation in the first birth interval in Manipur, contributing to a deeper understanding of population dynamics and informing future policy interventions.

Materials and Methods

A cross-sectional, community-based study was conducted in four valley districts of Manipur, namely Bishnupur, Imphal East, Imphal West, and Thoubal, involving 977 eligible mothers who were currently married and had at least one live birth. Cluster sampling was adopted due to the absence of a sampling frame. The study aimed to analyse the interval between the date of effective marriage and the date of the first delivery as the outcome variable, with retrospective inclusion of the time duration for women who had their first conception at the time of the survey, managed through a censoring scheme. Various socio-economic, behavioural, cultural, and demographic factors were considered explanatory variables, with some qualitative factors quantified using dummy variable techniques. Data collection was conducted through personal interviews using a pre-tested and semi-structured schedule over six months from April 2022 to October 2022 with 1st April 2022, as the reference date for the survey. The analysis utilized Cox's regression model (PH-model) through SPSS.

The Cox's semi-parametric model or so called proportional hazard (PH) model explores the risks of attaining sterility after marriage. It is easy to fit the data and require hardly any assumptions about the shape of the hazards rate since it varies according to the duration since marriage (Teachman, 2002). The PH model is one of the most cited regression models (Cox, 1972) in survival analysis. The life time is defined here to be the effective reproductive span, the time interval between marriage and menopause or sterilisation. Its simplified form may be given by $\lambda(t;\underline{x}) = \lambda_0(t)\ \varphi(\underline{x})$ where $\lambda_0(t)$ is the baseline hazard function, defined to be the hazard function when all x 's equal zero and $\varphi(\underline{x})$ is a parametric link function bringing in the covariates. It satisfies $\varphi(0) = 1$ and $\varphi(\underline{x}) \geq 0$ for all $\underline{x}$. The commonly used form of φ is $\varphi(\underline{x}) = \varphi(\underline{x},\underline{\beta}) = \exp(\underline{\beta}'\underline{x})$, known as the log linear form. Thus, for the woman with covariate vector $\underline{x}$, the hazard function $\lambda(t;\underline{x})$ can be represented as $\lambda(t;\underline{x}) = \lambda_0(t)\exp(\underline{\beta}'\underline{x})$, so that the ratio, $\frac{\lambda(t;\underline{x})}{\lambda_0(t)} = \exp(\underline{\beta}'\underline{x})$ represents the 'risk of exposure' within the effective reproductive span. Further, $\text{Log}\frac{\lambda(t;\underline{x})}{\lambda_0(t)} = \underline{\beta}'\underline{x}$ is the usual form of linear regression model and hence the name 'log linear model'. In this model, regression coefficients are constants and the covariates are fixed. Therefore, the hazards $\lambda(t;\underline{x})$ and $\lambda_0(t)$ are proportional, hence the name proportional hazard. The Cox's PH model is also known as semi-parametric model as the base line hazard function, $\lambda_0(t)$ is a completely unknown and unspecified function. It assumes that the effects of the different covariates on the reproductive period are constant over time and are additive in a particular scale.

The covariates considered here are age at marriage, couple's desire number of son and daughter, educational level, employment status (employed in Govt. Sector=1, otherwise=0), family income, place of residence (rural=1, urban=0), type of family (joint=1, nuclear=0), and religion (noted=1, others=0). Here, the educational level is defined by illiterate, under matriculate, undergraduate, and graduate and above as quantified in ordinal scale by 0, 1, 2 and 3 respectively.

Analysis and Results

In the unadjusted regression analysis, five variables were found to significantly influence the survival time of the first birth interval: Christian religion ($p < 0.05$), educational level of the wife ($p < 0.001$), educational level of the husband ($p < 0.01$), employment status of the wife ($p < 0.05$), and age at marriage of the wife ($p < 0.05$). However, these significant effects were observed without controlling for other variables, suggesting potential joint effects that were not detected in this analysis. Specifically, Christian mothers exhibited a significantly shorter first birth interval compared to mothers of other religions, with a 19% higher hazard of experiencing a shorter survival time. The educational level of the female spouse emerged as the most significant factor ($p < 0.001$) influencing the duration of the first birth interval, with the interval shortening by 3% for each additional year of education. Similarly, the education level of the male spouse also significantly impacted survival time ($p < 0.01$), although the wife's education had a more influential effect. Additionally, the employment status of the women significantly affected the survival time of the first birth interval, with employed mothers having a 21% higher hazard of experiencing a shorter first birth interval than unemployed ones, potentially linked to their educational level. Moreover, regardless of other factors, the age at marriage of the wife also had a statistically significant impact ($p < 0.05$) on the first birth interval.

In the adjusted Cox regression analysis, three variables were found to have a significant impact on the survival of the first birth interval at a 0.05 probability level. Specifically, after controlling for the joint effects of other variables, the duration of the first birth interval was found to vary significantly with the education of the wife ($\beta = 0.240$, $P = 0.016$). For each additional year of education attained by the wife, there was a 5% higher risk of the first birth interval shortening. Similarly, the age at marriage of the wife had a significant influence, with a 4% higher risk of a shorter first birth interval for each year increase in the age at marriage, holding other factors constant. Additionally, Christian women were found to have a 36% higher hazard of experiencing a shorter survival time for the first birth interval compared to women of Hindu and Muslim religions. Notably, only education and Christian religion emerged as the most important factors influencing the survival time of the first birth interval in the population under study, as determined through stepwise Cox regression analysis.

Discussion

The present interpretative analysis underscores the significance of education and religion as the most influential factors affecting the variation in women's first birth intervals. This notable impact of educational attainment may be linked with the age at marriage of the eligible women under study, as suggested by Singh et al. (2007). Interestingly, prior research has indicated that while the educational level of the husband has no significant impact on the duration of the waiting time to conception, the educational level of the wife becomes significant after adjusting for other factors. This observation suggests that educational attainment may play a crucial role in shaping reproductive decisions and behaviors among women. Furthermore, the differing religious teachings and beliefs regarding family importance and fertility control measures such as contraception and abortion could also contribute to the observed variations. These findings align with previous research, further highlighting the complex interplay of socio-cultural factors in shaping reproductive outcomes.

Conclusion

The interpretative findings suggest that in order to achieve an adequate family size leading to a reduction in fertility levels in the state, the Government of Manipur may need to formulate, execute, and implement measures such as raising the female age at marriage, promoting proper spacing between marriage and the first birth, increasing educational levels, especially for girls, and making serious efforts to improve the economic status of the general public, resulting in a better quality of life.

Table - 1: Unadjusted Cox Regression analysis on first birth interval

Factors	β	SE	P-value	Exp(β)	95% CI for Exp(β)
Residence	-0.045	0.073	0.535	0.956	0.828, 1.103
Type of family	0.086	0.073	0.239	1.090	0.945, 1.257
Religion (Christian)	0.197	0.098	0.027	1.193	0.984, 1.447
Religion (Hindu)	-0.078	0.077	0.314	0.925	0.795, 1.076
Religion (Islam)	-0.002	0.169	0.991	0.998	0.717, 1.389
Education of wife	0.025	0.007	0.000	1.025	1.012, 1.039
Education of husband	0.025	0.008	0.001	1.025	1.010, 1.040
Employment of wife	0.196	0.095	0.040	1.210	0.980, 1.421

Employment of husband	-0.193	0.173	0.265	0.824	0.587, 1.158
Family income (in '000 Rs)	0.015	0.009	0.260	1.015	0.889, 1.524
Age at marriage of wife	0.021	0.008	0.012	1.021	1.005, 1.038
Age at marriage of husband	0.005	0.007	0.459	1.005	0.991, 1.019
Couple's desire no. of son	0.016	0.066	0.810	1.016	0.893, 1.155
Couple's desire no. of daughter	0.002	0.070	0.980	1.002	0.873, 1.149

Table - 2: Adjusted Cox Regression analysis on first birth interval

Factors	***β***	**SE**	**P-value**	**Exp(*β*)**	**95% CI for Exp(*β*)**
Residence	0.105	0.098	0.284	1.111	0.916, 1.347
Type of family	0.034	0.087	0.693	1.035	0.873, 1.227
Religion (Hindu)	-0.032	0.099	0.744	0.968	0.798, 1.175
Religion (Islam)	0.125	0.221	0.570	1.134	0.735, 1.748
Religion (Christian)	0.305	0.126	0.015	1.357	1.060, 1.736
Education of husband	0.018	0.013	0.159	1.018	0.993, 1.044
Education of wife	0.240	0.013	0.016	1.046	0.999, 1.059
Employment of husband	0.117	0.221	0.597	1.124	0.729, 1.734
Employment of wife	0.099	0.107	0.358	1.104	0.894, 1.362
Family income (in '000 Rs)	-0.071	0.056	0.209	0.932	0.834, 1.040
Age at marriage of husband	-0.022	0.012	0.069	0.978	0.956, 1.002
Age at marriage of wife	0.208	0.015	0.036	1.038	0.998, 1.059
Couple's desire no. of son	0.030	0.093	0.750	1.030	0.859, 1.236
Couple's desire no. of daughter	0.050	0.086	0.564	1.051	0.888, 1.244

Table - 3: Stepwise Cox Regression analysis on first birth interval

Step	**Factors**	***β***	**SE**	**P-value**	**Exp(*β*)**	**95% CI for Exp(*β*)**
1	Education of wife	0.023	0.007	0.002	1.023	1.008, 1.038
2	Religion (Christian)	0.279	0.113	0.014	1.322	1.058, 1.650
	Education of wife	0.025	0.008	0.001	1.025	1.010, 1.041

References:

1. Brien, J. M. and Lilliard, L. A. (1994). Education, marriage and first conception in Malaysia. *The Journal of Human Resources, 29*(4): 1167-1204.
2. Cox, D. R. (1972). Regression models and life tables (with discussion). *Journal of Royal Statistical Society, Series B, 34*: 187-220.
3. Gray, E. and Evans, A. (2004). Parity progression in Australia: What role does sex of existing children play. *Proceedings of the 12th Biennial Conference of the Australian Population Association; Canberra.*
4. International Institute of Population Sciences (IIPS) and ICF, 2021. *National Family Health Survey (NFHS - 5), 2019-21:* India. Mumbai: IIPS.
5. Kumar, G. A. and Danabalan, M. (2006). Determinants of delayed first birth. *Indian Journal of Community Medicine, 31*(4): 272-273.
6. Martin, T. C. (1995). Women's education and fertility: Results from 26 demographic and health surveys. *Studies in Family Planning, 26*: 187-202.
7. Patnaik, M. M. (1985). Fertility behaviour: Socio-economic, cultural and demographic rationality. *New Delhi: Janaki Prakashan.*
8. Prachuabmoh, V. (2002). Southeast Asia's population in a changing Asian context: Policy implications. [Accessed 2005 Aug 12]. Available from: URL: http://www.iussp.org/Bangkok2002/5APPC.
9. Singh, N. S., Narendra, R. K. and Hemochandra, L. (2007). Determinants of waiting time to conception in Manipuri women. *Kuwait Medical Journal, 39*(1): 39-43.
10. Singh, N. S., Singh, T. M. and Brajabidhu, S. (2012). Survival analysis of covariates risk of exposure on women reproductive span in Manipur. *International Journal of Management, Statistics and Applied Economics, 2*(1): 205-218.
11. Singh, N. S., Tomba, W. S. and Singh, T. M. (2013). Retrospective reporting on the determinants of postpartum amenorrhea in rural Manipur. *International Journal of Mathematical Sciences and Engineering Application, 7*(1): 445-457.

12. Singh, S. N., Singh, N. S. and Narendra, R. K. (2010). Demographic and socio-economic determinants of birth interval dynamics in Manipur: A survival analysis. *Online Journal Health and Allied Sciences, 9*(4), 3: 1-5.
13. Singh, H. B. and Singh, N. S. (2018). Differential in the Fertility Indicators in Tribal Dominated Population in Manipur. *Demography India (Special Issue)*: 17-24.
14. Teachman, D. J. and Heckert, D. A. (1985). The declining significance of first birth timing. *Demography, 22*(2): 185-198.
15. Zheng, Z. (2000). Social-demographic influence on first birth interval in China, 1980-1992. *Journal of Biosocial Sciences, 32*(3): 315-327.