Socio-Demographic Factors Influencing Fertility in Elderly Women in Manipur, North East India

Moirangthem Suresh Singh

Assistant Professor, Department of Statistics Thoubal College, Thoubal (Manipur - India)
Email: sureshtenth@gmail.com

Abstract:

Located at India's easternmost border, Manipur exhibits diverse stages of demographic transition and high fertility rates. Despite the National Population Policy (NPP)-2000's aims for stable population growth through 12 strategic themes, community-based studies on fertility determinants in Manipur are lacking. This study evaluates socio-demographic factors influencing completed fertility among elderly married women aged 50-55 years in Manipur. Using a retrospective cross-sectional design, data were collected from 1179 menopausal women in valley districts via cluster sampling. The survey, conducted from March 2019 to January 2020, analysed data using multiple binary logistic regression models. Results indicate a significant association between completed fertility (3.1) and factors like education $(P<0.01)$, sex of the second child $(P<0.01)$, and son preference $(P<0.01)$. These findings offer critical insights for future research on maternal health and support India's population control objectives.

Keywords: Fertility, socio-demographic, elderly women, Manipur, education, son preference

Introduction:

In response to the Cairo International Conference on Population and Development (ICPD) in 1994, India established its National Population Policy (NPP) in 2000, which set forth short, medium, and long-term objectives. According to Banerjee (2000), the medium-term objective aimed to achieve a total fertility rate (TFR) of replacement level (2.1) by 2010, while the long-term goal targeted population stabilization by 2045, aligning with sustainable economic growth, social development, and environmental protection. The interconnectedness of these objectives underscores the significance of achieving short and medium-term goals to realize long-term population stabilization. Moreover, India's National Rural Health Mission: 2005-12, within the Millennium Development Goal (MDG) framework, emphasizes the importance of health in economic and social development, highlighting population stabilization, gender equality, and demographic balance (Sinha, 2005). Research indicates that high fertility rates are often influenced by unwanted pregnancies resulting from unmet contraceptive needs (Patel, 2011). Additionally, a pronounced preference for sons over daughters in developing countries, including India, contributes significantly to fertility dynamics (Das Gupta, 1997). Studies conducted in various countries, including the United States and European nations, illustrate preferences for balanced sex compositions within families (Andersson et al., 2006). However, preferences for sons persist strongly in many developing countries, influencing reproductive intentions and behaviours significantly. Utilizing data from the Demographic and Health Surveys (DHS) across multiple countries, previous studies have highlighted the prevalence of son preference, particularly in Southern Asian countries (Arnold et al., 1998). Furthermore, women's contraceptive usage and birth interval duration after the birth of a son have been associated with fertility cessation in countries like Nepal (Thapa et al., 2005).

Despite national efforts, India continues to witness significant inter-state variations in unwanted fertility, with unplanned pregnancies remaining common (National Family Health Survey, 2019-21). The recent National Family Health Survey (NFHS) reports underscore the potential impact of eliminating unwanted fertility on reducing the TFR to replacement levels or below, particularly in high-fertility states like Bihar, Rajasthan, Uttar Pradesh, Madhya Pradesh, and Orissa (NFHS-5, 2021). The persistence of higher fertility rates, often termed the "third birth transition," poses a demographic challenge to population growth, with factors such as lack of education and son preference playing pivotal roles (Jha et al., 2006). Past studies in India have identified economic, socio-cultural, and religious factors as major contributors to son preference, with sons traditionally viewed as providers of family labour, old-age support, and perpetuators of family lineage (Arnold, 1992). Additionally, sons hold religious significance in performing funeral rites and aiding in ancestral salvation in Hindu tradition (Das Gupta, 2001).

The present work has been proposed to investigate the socio-demographic determinants underlying higher fertility rates focusing on the context of Manipur, where a notable decline in son preference has been observed over the past three decades (Singh, 2020). This study seeks to provide insights into how socio-demographic factors influence fertility patterns among elderly women in Manipur, the Indian easternmost state internationally bordering with Myanmar, contributing to the broader understanding of population dynamics in India.

Literature Review:

Numerous studies have explored the intricate interplay of socio-cultural, economic, and religious factors shaping son preference and its implications for fertility behaviour in India. Dharmalingam (1996) and Nath and Deka (2004) identified economic incentives, such as the provision of family labour and old-age support, as significant drivers of son preference. These economic factors intertwine with socio-cultural norms that emphasize the perpetuation of family lineage and the enhancement of family status. Moore (1994) highlighted the pivotal role of sons within India's patriarchal family structure, where they are crucial for the continuity and prestige of the family lineage. Similarly, Nath and Leonetti (2001) discussed how religious practices, particularly in Hindu tradition, reinforce son preference, as sons are essential for performing funeral rites and facilitating ancestral salvation. Recent demographic surveys, such as those conducted by the International Institute for Population Sciences (IIPS) and ICF (2021), indicate a declining trend in son preference in Manipur over the past three decades. This shift suggests evolving socio-cultural dynamics within the region, potentially influenced by various socio-economic and educational interventions.

Gupta and Shukla (2020) explored the role of changing economic structures and educational attainment in altering traditional preferences for sons in India. Their findings suggest a gradual but significant shift towards gender equality in family planning decisions, driven by increased access to education and economic opportunities for women. Complementing this, Kumar and Singh (2021) examined the impact of government policies and interventions aimed at promoting gender equality and reducing son preference in Indian states. Their research highlights the importance of targeted policy measures in addressing deeply ingrained socio-cultural norms surrounding son preference and fertility behaviour. Further insights into these dynamics were provided by recent studies conducted between 2010 and 2020. Bhat and Zavier (2016) investigated regional variations in son preference and its effects on fertility behaviour, highlighting that urbanization and higher educational levels are associated with a decline in son preference. They found that as women's educational attainment increases, their reliance on traditional gender norms decreases, leading to more balanced fertility behaviours.

Moreover, Chakraborty and Sinha (2018) focused on the impact of women's employment on fertility choices, finding that employed women are more likely to adopt family planning measures and less likely to exhibit a strong preference for sons. This trend is particularly pronounced in regions with better access to education and employment opportunities for women. Srinivasan and Bedi (2019) analysed the effectiveness of various governmental and non-governmental initiatives aimed at reducing son preference. Their findings indicate that community-based programs promoting gender equality and women's empowerment have significantly contributed to changing attitudes towards son preference, particularly in rural areas. Collectively, these studies provide a comprehensive understanding of the factors influencing son preference in India. They underscore the importance of economic, socio-cultural, and religious elements, while also highlighting the significant impact of educational and policy interventions in shifting traditional gender norms and promoting more equitable family planning practices. The continued decline in son preference, as evidenced by recent research, reflects the evolving socio-economic landscape and the effectiveness of targeted interventions aimed at fostering gender equality.

Objectives:

This study aims to investigate the socio-demographic determinants of higher fertility rates, commonly referred to as the "third birth transition," in Manipur, India. Specifically, the research focuses on the influence of factors such as education, socio-economic status, and shifting preferences on fertility behaviours in the region. By understanding these determinants, the study seeks to contribute to informed policy interventions that promote population stabilization and demographic balance in Manipur and beyond.

Materials and Methods:

This study employed a retrospective cross-sectional approach, involving 1179 elderly married women aged 50-55 years who had experienced menopause. The research was conducted in the four valley districts of Manipur – Bishnupur, Imphal East, Imphal West and Thoubal using a cluster sampling scheme. Data collection occurred between March 2019 and January 2020 with March 14, 2019, as the reference date for the survey. A binary logistic regression analysis was utilized to analyse the community-based empirical data. The logistic regression model aimed to identify determinants associated with the "third birth transition" phenomenon within the state. In this context, the response variable was defined as the occurrence of a third live birth, coded as 1 if the mother had given birth to at least three children and 0 otherwise, indicating a maximum of two live births.

Several explanatory variables were considered in the analysis. They are religion (coded as 1 for the subject's religion and 0 for other religions); residence (urban=1, rural=0); family type (nuclear=1, joint=0); educational level (measured by the number of completed academic years); employment status (employed=1, others=0); age at marriage; desired number of sons by the couple; infant mortality (coded as death=1, alive=0) of previous children; sex of the previous/index child (female=1, male=0); and contraceptive use during the transition to a third birth (used=1, others=0). Categorical variables were represented using binary dummy variables (0, 1). The analysis involved interpreting the results based on the P-

values of the regression coefficients (b) and odds ratios (OR), quantified by the exponential of the regression coefficients (Exp.(b)) of the variables.

Analysis and Findings:

The Table - 1 presents the results of a binary logistic regression analysis examining the influence of various socio-demographic variables on the likelihood of having a third child, referred to as the "3rd birth transition." The analysis includes the regression coefficient (b), Wald statistics, P-values, and odds ratios (OR) with 95% confidence intervals (CI) for each variable. Higher educational attainment of the wife is significantly associated with a lower likelihood of having a third child. The odds ratio (OR) of 0.90 suggests that with each additional year of education, the odds of having a third birth decrease by 10% (b = -0.10, Wald = 31.53, P < 0.01). Husbands' employment status is significantly associated with a higher likelihood of having a third child. The OR of 2.16 indicates that employed husbands more than double the odds of a third birth compared to unemployed husbands (b = 0.77, Wald = 19.89, P < 0.01). A younger age at marriage is significantly associated with a higher likelihood of having a third child. The OR of 0.89 indicates that for each year increase in the age at marriage, the odds of a third birth decrease by 11% (b = -0.11, Wald = 37.76, P < 0.01). A stronger desire for sons significantly increases the likelihood of having a third child. The OR of 1.73 suggests that couples desiring more sons have a 73% higher chance of experiencing a third birth (b = 0.55, Wald = 25.92, P < 0.01). The presence of a female child as the previous child significantly increases the likelihood of having a third child. The OR of 2.08 indicates that having a female child more than doubles the odds of a third birth (b = 0.73, Wald = 21.96, P < 0.01). The death of a previous child significantly increases the likelihood of having a third child. The OR of 2.39 suggests that the odds are more than doubled in such cases (b = 0.87, Wald = 18.11, P < 0.05). Longer durations of post-partum amenorrhea are significantly associated with a higher likelihood of having a third child. The OR of 1.04 indicates a 4% increase in the odds of a third birth for each additional month of amenorrhea (b = 0.04, Wald = 5.12, P < 0.05).

Residence (urban vs. rural) did not show a significant impact on the likelihood of having a third child (b = -0.31, Wald = 2.61, P > 0.05, OR = 0.74, 95% CI: 0.51, 1.07). While the type of family (nuclear vs. joint) approached significance, it did not significantly impact the likelihood of a third birth (b = 0.31, Wald = 3.77, P > 0.05, OR = 1.37, 95% CI: 1.00, 1.87). Religious affiliation (Hindu or Muslim) did not significantly influence the likelihood of having a third child, with coefficients (b) of 0.09 and 0.15 respectively, Wald statistics of 0.15 and 0.05 respectively, P-values > 0.05, and odds ratios (ORs) of 1.10 (95% CI: 0.69, 1.76) and 1.17 (95% CI: 0.28, 4.89) respectively. The education level of the husband did not show a significant impact on the likelihood of a third birth (b = 0.02, Wald = 0.51, P > 0.05, OR = 1.02, 95% CI: 0.97, 1.07). The employment status of the wife did not significantly influence the likelihood of a third birth (b = 0.66, Wald = 2.88, P > 0.05, OR = 1.93, 95% CI: 0.90, 4.12). The use of contraceptives did not significantly impact the likelihood of a third birth (b = 0.12, Wald = 0.15, P > 0.05, OR = 1.13, 95% CI: 0.61, 2.11).

The analysis reveals that the education and age at marriage of the wife, the employment status of the husband, the couple's desire for sons, the sex of the previous child, the death of a previous child, and the duration of post-partum amenorrhea are significant determinants of the third birth transition in Manipur. Educational attainment and later age at marriage for women are crucial factors in reducing higher fertility rates, while cultural preferences for sons and the experience of child loss drive the likelihood of having a third child. These findings underscore the importance of targeted educational and socio-cultural interventions to achieve population stabilization and demographic balance.

The Table - 2 confirms the odds ratios of variables influencing the likelihood of having a third child through stepwise logistic regression models. This approach progressively includes variables that significantly contribute to the transition to a third birth, revealing the changing significance and strength of each determinant as more factors are considered. Initially, the age at marriage of the wife emerges as a significant predictor. With a regression coefficient (b) of -0.14 and an odds ratio (OR) of 0.87 (95% CI: 0.85, 0.90), the data indicates that for each additional year of age at marriage, the odds of having a third child decrease by 13%. This suggests that younger marriages are associated with higher fertility rates, as evidenced by the Wald statistic of 72.52 and a P-value of less than 0.01. The constant in this model is 3.63, with a P-value of less than 0.01 and an OR of 37.64. In the next step, the wife's education level is added to the model. The education of the wife has a regression coefficient of -0.08, with an OR of 0.92 (95% CI: 0.89, 0.95), indicating that each additional year of education reduces the odds of a third birth by 8%. The age at marriage of the wife remains significant, though its impact slightly decreases, with a regression coefficient of -0.11 and an OR of 0.89 (95% CI: 0.86, 0.92). The Wald statistics for these variables are 28.08 and 44.81, respectively, both with P-values less than 0.01. The constant for this step is 3.77, with a P-value of less than 0.01 and an OR of 43.53. In the third step, the couple's desire for the number of sons is introduced. This variable has a regression coefficient of 0.44 and an OR of 1.56 (95% CI: 1.28, 1.89), indicating that a stronger desire for sons increases the likelihood of having a third child by 56%. The wife's education and age at marriage continue to be significant, with slightly adjusted ORs of 0.93 (95% CI: 0.90, 0.96) and 0.90 (95% CI: 0.87, 0.93), respectively. The Wald statistics for these variables are 24.81 and 37.18, both with P-values less than 0.01. The constant in this step is 2.62, with a P-value of less than 0.01 and an OR of 13.75.

The fourth step adds the sex of the previous child as a significant factor. The presence of a female previous child significantly increases the likelihood of having a third child, with a regression coefficient of 0.74 and an OR of 2.09

(95% CI: 1.55, 2.82). The wife's education, age at marriage, and couple's desire for sons remain significant, with ORs of 0.92 (95% CI: 0.90, 0.95), 0.90 (95% CI: 0.87, 0.93), and 1.72 (95% CI: 1.39, 2.11), respectively. The Wald statistics for these variables are 26.40, 37.24, and 26.63, all with P-values less than 0.01. The constant here is 2.14, with a P-value of less than 0.01 and an OR of 8.47. In the final step, the type of family is included. Living in a joint family increases the likelihood of having a third child, with a regression coefficient of 0.32 and an OR of 1.37 (95% CI: 1.01, 1.86). The wife's education, age at marriage, couple's desire for sons, and the sex of the previous child continue to be significant. The ORs for these variables are 0.93 (95% CI: 0.89, 0.95), 0.90 (95% CI: 0.87, 0.93), 1.74 (95% CI: 1.41, 2.14), and 2.07 (95% CI: 1.53, 2.79), respectively. The Wald statistics for these variables are 24.92, 37.89, 27.75, and 22.53, all with P-values less than 0.01. The constant in this final model is 1.92, with a P-value of less than 0.01 and an OR of 6.79. In summary, the stepwise regression models highlight that the age at marriage and education level of the wife, the couple's desire for sons, the sex of the previous child, and the type of family are significant determinants of the likelihood of a third birth. Younger age at marriage, lower education levels, a stronger desire for sons, having a female previous child, and living in a joint family all increase the likelihood of a third birth. These findings emphasize the need for targeted interventions focusing on education, cultural preferences, and family structure to achieve population stabilization and demographic balance in Manipur.

Discussion:

The binary logistic regression analysis in this study provides comprehensive insights into the socio-demographic factors influencing the likelihood of having a third child, known as the "3rd birth transition," in Manipur. Several key findings emerged, shedding light on the complex interplay between education, economic status, cultural preferences, and biological factors in shaping fertility behaviour. One of the most significant findings is the inverse relationship between the wife's educational attainment and the likelihood of having a third child. Specifically, each additional year of education decreases the odds of having a third child by 10%. This aligns with existing literature, suggesting that higher educational attainment for women is associated with reduced fertility rates due to increased awareness and access to family planning methods. Promoting female education thus emerges as a strategic intervention to control higher fertility rates and achieve population stabilization.

The employment status of the husband also significantly influences fertility decisions, with employed husbands more than doubling the odds of a third birth compared to unemployed husbands. This finding highlights the economic dimension of fertility, where employment and the associated financial stability encourage larger families. This is consistent with findings that identify economic incentives as significant drivers of fertility behaviour. Another crucial determinant is the age at marriage of the wife. A younger age at marriage is associated with a higher likelihood of having a third child, with each additional year of age at marriage reducing the odds by 11%. This underscores the need for policies that delay marriage age, which can significantly impact fertility rates. Policies promoting later marriage ages can be instrumental in reducing fertility rates, as supported by previous studies. Cultural factors, particularly son preference, significantly impact fertility behaviour. A stronger desire for sons increases the likelihood of having a third child by 73%. Additionally, having a female child as the previous child more than doubles the odds of having a third birth. These results reflect deep-rooted cultural preferences for sons, where sons are seen as essential for family lineage continuity and economic support. Addressing these cultural preferences through education and awareness programs is crucial for achieving demographic balance. The death of a previous child significantly increases the likelihood of having a third child, indicating that parents may seek to replace a lost child. Additionally, longer durations of post-partum amenorrhea are associated with a higher likelihood of having a third child, with a 4% increase in odds for each additional month of amenorrhea. These findings highlight the role of biological factors in fertility decisions.

Interestingly, variables such as residence (urban vs. rural), type of family (nuclear vs. joint), religious affiliation, education level of the husband, employment status of the wife, and the use of contraceptives did not show significant impacts on the likelihood of having a third child. This suggests that while these factors might influence fertility in broader contexts, they are not primary determinants in the specific setting of Manipur. The stepwise logistic regression models further emphasize the robustness of the key determinants identified. Throughout the models, the age at marriage, wife's education level, desire for sons, sex of the previous child, and type of family consistently emerged as significant predictors of the third birth transition. These findings highlight the importance of targeting these factors through educational and socio-cultural interventions to achieve population stabilization and demographic balance. The study's findings underscore the importance of multi-faceted interventions to address the determinants of high fertility rates in Manipur. Promoting female education, delaying marriage age, and addressing cultural preferences for sons are crucial strategies. Additionally, economic stability through employment can influence fertility decisions, suggesting that economic policies supporting job creation and financial stability could indirectly contribute to fertility reduction.

Targeted socio-cultural interventions, such as community-based programs promoting gender equality and women's empowerment, have proven effective in changing attitudes towards son preference, particularly in rural areas. These programs, coupled with educational and economic opportunities for women, can shift traditional gender norms and promote more equitable family planning practices. Government policies aimed at promoting gender equality and reducing son preference are essential. The importance of such policies in addressing deeply ingrained socio-cultural

norms is highlighted by their effectiveness in altering fertility behaviour and promoting gender equality, suggesting that continued support and expansion of these initiatives are necessary for sustained impact.

Conclusion:

This research work provides valuable insights into the socio-demographic factors influencing the likelihood of having a third child in Manipur. The findings highlight the significant roles of female education, age at marriage, economic stability, and cultural preferences in shaping fertility behaviour. Addressing these factors through targeted educational, economic, and socio-cultural interventions is crucial for achieving population stabilization and demographic balance. The study's results align with broader trends observed in India, where increasing educational attainment and economic opportunities for women are gradually shifting traditional fertility behaviours towards more balanced and equitable family planning decisions. This investigation delves into the intricate web of factors shaping fertility behaviour in India, with a particular focus on son preference. Through our analysis, we have uncovered several significant determinants influencing the transition to a third birth, encompassing socio-cultural, economic, and demographic dimensions. These findings emphasize the enduring impact of socio-cultural norms surrounding son preference on reproductive choices. Economic incentives, such as reliance on family labour and the cultural significance attached to sons within patriarchal family structures, perpetuate the preference for male offspring. However, there are indications of a gradual shift in this trend, possibly driven by socio-economic and educational advancements.

Key determinants identified in this study include the educational attainment and age at marriage of women. Higher levels of education and delayed marriage are associated with a decreased likelihood of transitioning to a third birth, highlighting the pivotal role of women's empowerment and education in reshaping traditional family dynamics. Conversely, the desire for sons and the sex of the previous child emerge as factors positively correlated with the occurrence of a third birth. This underscores the need for targeted policy interventions aimed at challenging deeply entrenched cultural norms and promoting gender equality in reproductive decision-making. The present findings suggest that initiatives aimed at enhancing women's education and empowerment, coupled with strategic policy interventions, have the potential to mitigate high fertility rates and foster gender equality. However, addressing entrenched cultural preferences surrounding son preference remains a formidable challenge, necessitating sustained efforts and multidimensional approaches. Further research and policy initiatives are essential to effectively tackle these complex issues and achieve national demographic goals.

Table - 1: Odds Ratios of Variables Influencing 3rd Birth Transition

Variable	b	Wald Statistics	P-value	OR (with 95%CI)
Residence	-0.31	2.61	P>0.05	0.74 (0.51, 1.07)
Type of family	0.31	3.77	P>0.05	1.37 (1.00, 1.87)
Religion (Hindu)	0.09	0.15	P>0.05	1.10 (0.69, 1.76)
Religion (Muslim)	0.15	0.05	P>0.05	1.17 (0.28, 4.89)
Education of husband	0.02	0.51	P>0.05	1.02 (0.97, 1.07)
Education of wife	-0.10	31.53	P<0.01	0.90 (0.87, 0.94)
Employment status of husband	0.77	19.89	P<0.01	2.16 (1.54, 3.03)
Employment status of wife	0.66	2.88	P>0.05	1.93 (0.90, 4.12)
Age at marriage of wife	-0.11	37.76	P<0.01	0.89 (0.86, 0.93)
Couples desire number of son	0.55	25.92	P<0.01	1.73 (1.40, 2.13)
Sex of previous child	0.73	21.96	P<0.01	2.08 (1.53, 2.83)
Use of contraceptives	0.12	0.15	P>0.05	1.13 (0.61, 2.11)
Death of previous child	0.87	18.11	P<0.05	2.39 (1.03, 6.17)
Post-partum amenorrhoea	0.04	5.12	P<0.05	1.04 (1.01, 1.07)
Constant	1.62	6.39	P<0.05	5.03

Table - 2: Odds Ratios of Variables Influencing 3rd Birth Transition in Stepwise Models

Step	Variable	b	Wald Statistics	P-value	OR (with 95%CI)
1	Age at marriage of wife	-0.14	72.52	P<0.01	0.87 (0.85, 0.90)
	Constant	3.63	94.63	P<0.01	37.64
2	Education of wife	-0.08	28.08	P<0.01	0.92 (0.89, 0.95)
	Age at marriage of wife	-0.11	44.81	P<0.01	0.89 (0.86, 0.92)
	Constant	3.77	97.84	P<0.01	43.53
3	Education of wife	-0.08	24.81	P<0.01	0.93 (0.90, 0.96)
	Age at marriage of wife	-0.10	37.18	P<0.01	0.90 (0.87, 0.93)
	Couples desire no. of son	0.44	19.44	P<0.01	1.56 (1.28, 1.89)
	Constant	2.62	33.19	P<0.01	13.75

4	Education of wife	-0.08	26.40	P<0.01	0.92 (0.90, 0.95)
	Age at marriage of wife	-0.11	37.24	P<0.01	0.90 (0.87, 0.93)
	Couples desire no. of son	0.54	26.63	P<0.01	1.72 (1.39, 2.11)
	Sex of previous child	0.74	23.47	P<0.01	2.09 (1.55, 2.82)
	Constant	2.14	20.64	P<0.01	8.47
5	Type of family	0.32	4.16	P<0.05	1.37 (1.01, 1.86)
	Education of wife	-0.08	24.92	P<0.01	0.93 (0.89, 0.95)
	Age at marriage of wife	-0.11	37.89	P<0.01	0.90 (0.87, 0.93)
	Couples desire no. of son	0.56	27.75	P<0.01	1.74 (1.41, 2.14)
	Sex of previous child	0.73	22.53	P<0.01	2.07 (1.53, 2.79)
	Constant	1.92	15.78	P<0.01	6.79

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