

SOCIO-DEMOGRAPHIC DETERMINANTS OF FERTILITY AMONG THE KUKI TRIBES IN MANIPUR

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Abstract

Fertility differentials constitute an important component of population dynamics and are influenced by socio-economic, demographic, cultural, and behavioural factors. The present study investigates fertility patterns among the Kuki tribes inhabiting the hill districts of Churachandpur, Chandel, and Senapati in Manipur (India). The study is based on primary data collected from 941 currently married women of reproductive age through a multistage cluster sampling design using a pre-tested semi-structured interview schedule. Fertility was measured by the number of live births ever born and third-birth transition. Data were analysed using binary logistic regression, supplemented by t-tests and analysis of variance in SPSS. The findings revealed a moderate overall fertility level (2.8 ± 1.4 children) with significant inter-tribal variation. Female education emerged as the strongest factor associated with fertility decline, while higher household income and secure occupations were also linked with lower fertility. Conversely, early marriage, younger age at first delivery, longer duration of marriage, later age at last delivery, son preference, and child mortality significantly increased fertility. The study concludes that fertility among the Kuki tribes is determined by the combined effects of socio-economic advancement, reproductive behaviour, and cultural preferences. The findings provide valuable evidence for designing culturally appropriate reproductive health, family welfare, and population policies aimed at promoting balanced demographic development and improving maternal and child health among tribal communities in Manipur.

Keywords: *Fertility differentials, Kuki tribes, Population dynamics, Reproductive behaviour, Manipur*

Introduction

Fertility is one of the principal determinants of population dynamics, influencing the size, growth, age composition, and socio-economic development of a population. Along with mortality and migration, fertility shapes the demographic transition and determines future population trends. The study of fertility differentials has therefore remained a central concern in demography because reproductive behaviour is strongly influenced by a complex interaction of biological, socio-economic, cultural, behavioural, and environmental factors. Classical demographic theories have emphasized that fertility declines with improvements in education, urbanization, economic development, and access to healthcare. Davis and Blake (1956) explained fertility through a set of intermediate variables that directly regulate childbearing, while Freedman (1963) argued that social organization and modernization significantly influence reproductive behaviour. Caldwell (1982) demonstrated that expansion of education, particularly female education, alters intergenerational wealth flows and promotes fertility decline. Similarly, Bongaarts (1978) highlighted the role of proximate determinants such as marriage, contraception, postpartum infecundability, abortion, and sterility in explaining fertility variation. United Nations (1987) emphasized that fertility differentials are closely associated with socio-economic inequalities and developmental disparities, whereas Basu (1992) observed that women's education and autonomy substantially reduce fertility by delaying marriage and increasing contraceptive acceptance. In the

Indian context, Bhat (1998) further showed that regional and cultural heterogeneity contributes significantly to variations in fertility behaviour. These theoretical and empirical contributions collectively indicate that fertility is not merely a biological phenomenon but also a reflection of social, economic, and cultural transformations.

India exhibits considerable diversity in fertility patterns across regions, communities, and tribal populations. Scheduled Tribes continue to experience distinct demographic characteristics because of their geographical isolation, traditional livelihood systems, limited educational opportunities, and varying access to health services. The Kuki tribes constitute one of the major tribal groups inhabiting the hill districts of Manipur, comprising several sub-tribes such as Thadou, Paite, Hmar, Vaiphei, Zou, Gangte, Kom, Mate, and Simte. Although these groups share a common ethnic origin, they differ in socio-cultural practices, educational attainment, economic activities, marriage customs, and reproductive norms, all of which may influence fertility behaviour. Earlier studies have consistently reported that female education, household income, occupation, age at marriage, age at first birth, duration of marriage, child survival, and fertility preferences significantly affect reproductive outcomes. Higher educational attainment generally delays marriage and childbearing, thereby reducing completed family size, whereas early marriage, son preference, and child mortality often increase fertility through replacement and continuation of childbearing. Despite the demographic significance of the Kuki population, systematic empirical evidence on fertility differentials among the various Kuki tribes remains limited. Most previous investigations have focused on broader tribal populations or state-level fertility estimates, leaving substantial gaps in understanding inter-tribal variations and the relative contribution of socio-economic, demographic, cultural, and behavioural determinants.

Against this background, the present study investigates fertility dynamics among the Kuki tribes residing in the hill districts of Churachandpur, Chandel, and Senapati in Manipur. Using primary data collected from 941 currently married women of reproductive age, the study examines fertility differentials across major socio-economic, demographic, cultural, and behavioural characteristics and evaluates their independent effects on reproductive behaviour. Fertility is assessed in terms of the number of live births ever born and the transition to a third birth, thereby providing both cumulative and parity-specific perspectives of reproductive performance. Statistical analyses employing binary logistic regression, together with *t*-tests and analysis of variance, identify the principal determinants associated with higher fertility. By generating tribe-specific empirical evidence, the study contributes to the existing demographic literature on tribal fertility in India and offers valuable insights for reproductive health planning, family welfare programmes, and population policies. The findings are expected to assist policymakers and public health authorities in designing culturally appropriate interventions aimed at improving maternal and child health, promoting informed reproductive choices, and facilitating balanced demographic development among the Kuki tribes of Manipur.

Literature Review

The study of fertility has occupied a central position in demographic research because it is one of the major determinants of population growth and demographic transition. Early theoretical contributions established the conceptual foundation for understanding fertility behaviour. Davis and Blake (1956) proposed the framework of intermediate variables influencing fertility, emphasizing the roles of marriage, contraception, and postpartum factors. Freedman (1963) argued that modernization, social change, and family norms significantly shape reproductive behaviour. Bongaarts (1978) refined the demographic framework by identifying the proximate determinants of fertility, demonstrating that variations in marriage patterns, contraceptive use, abortion, and postpartum infecundability explain most fertility differences

across populations. Caldwell (1982) introduced the wealth-flow theory, explaining that improvements in education, particularly among women, reverse intergenerational economic benefits and consequently reduce fertility. The United Nations (1987) reported that fertility differentials are closely associated with disparities in socio-economic development, educational attainment, and access to reproductive health services. Basu (1992) further emphasized that women's education and empowerment delay marriage, enhance decision-making autonomy, and increase contraceptive acceptance, thereby lowering fertility. In the Indian context, Bhat (1998) demonstrated that fertility variation is strongly influenced by regional diversity, cultural practices, and socio-economic inequalities. Collectively, these studies established that fertility is determined not only by biological factors but also by social, economic, behavioural, and cultural processes operating within a population.

Subsequent empirical studies have consistently examined the socio-economic and demographic determinants of fertility in developing countries. Jejeebhoy (1995) found that female education is among the strongest predictors of fertility decline because educated women tend to marry later, adopt contraception more effectively, and aspire to smaller family sizes. Mason (1997) reported that women's autonomy and gender equality significantly influence reproductive decision-making and fertility outcomes. Using data from developing countries, Cleland (2001) observed that improvements in female literacy and reproductive health programmes substantially accelerate fertility transition. Bongaarts (2003) further demonstrated that delayed marriage and increased contraceptive prevalence are the principal mechanisms responsible for fertility decline in low- and middle-income countries. Dyson and Moore (1983) highlighted the influence of kinship systems and regional social structures on fertility behaviour in India, while Bhende and Kanitkar (2011) emphasized that age at marriage, duration of marriage, occupation, household income, child survival, and family planning practices remain the most important determinants of fertility differentials in the Indian population. Evidence from the National Family Health Survey (NFHS-4, 2015-16) also indicated that fertility is inversely associated with women's education, household wealth, and urban residence but remains comparatively higher among disadvantaged and tribal communities. These findings collectively suggest that fertility is shaped by the interaction of demographic characteristics with socio-economic development and access to health services.

Research focusing specifically on tribal populations has revealed distinct reproductive patterns influenced by geographical isolation, cultural traditions, and limited socio-economic opportunities. Bhasin and Nag (2002) reported that tribal communities generally exhibit higher fertility because of early marriage, low contraceptive use, and limited educational attainment. Maharatna (2005) observed that tribal fertility in India remains relatively high due to persistent socio-economic deprivation and inadequate healthcare access. Chaudhury (2014) found that educational improvement and institutional healthcare utilization significantly reduce fertility among tribal women, whereas child mortality and son preference continue to encourage higher reproductive behaviour. Studies conducted in North-East India have also highlighted substantial inter-tribal variations arising from differences in livelihood patterns, religion, educational achievement, and customary marriage practices. However, most available investigations have examined tribal fertility at the aggregate state or regional level, with little attention to fertility differentials among individual Kuki tribes of Manipur. Moreover, limited research has simultaneously assessed socio-economic, demographic, cultural, behavioural, and reproductive determinants using multivariate statistical techniques. The present study addresses this important research gap by analysing fertility differentials among major Kuki tribes in the hill districts of Manipur through binary logistic regression, *t*-tests, and analysis of variance. The findings are

expected to enrich the demographic literature on tribal fertility and provide evidence for designing culturally appropriate reproductive health policies and population interventions for the Kuki community.

Objectives

The study aims to examine the fertility dynamics of the Kuki tribes in Manipur. It specifically seeks to assess fertility differentials in relation to socio-economic, demographic, cultural, and behavioural factors, both independently and comparatively across different Kuki tribes. The study further investigates the influence of these determinants on reproductive behaviour and identifies the most significant causal factors associated with high fertility. Through this comprehensive analysis, the research aims to provide a deeper understanding of fertility patterns and their implications for the demographic dynamics of the Kuki population in Manipur.

Materials and Methods

The study adopted an empirical, community-based research design to examine the factors influencing fertility differentials among Kuki tribes in the hill districts of Manipur. The investigation was conducted in three hill districts namely Churachandpur, Chandel, and Senapati and included 941 currently married women of reproductive age selected through multistage cluster sampling with proportional allocation. Data were collected through a pre-tested semi-structured interview schedule during a 17-month field survey (February 2018 to June 2019) using 25 December 2017 as the reference date. Fertility, measured by the number of live births ever born and third-birth transition, served as the dependent variables, while socio-economic, demographic, behavioural, and cultural characteristics were considered explanatory variables. Data were analysed using binary logistic regression, supplemented by *t*- and *F*-tests, with analyses performed in SPSS. Primary survey data were complemented with relevant secondary data from NFHS, Census, and official reports.

Analysis and Findings

The findings presented in Table 1 indicate that fertility among the Kuki tribes varies significantly across several socio-demographic characteristics. The overall mean fertility of the study population was 2.8 ± 1.4 children (95% CI: 2.7-2.9), suggesting a moderate level of completed fertility among the respondents. Fertility differed significantly among the various Kuki tribes, with mean values ranging from 2.4 to 3.4 children ($F = 3.92$, $P < 0.05$), reflecting the influence of tribe-specific socio-cultural norms and reproductive practices. In contrast, the type of family did not exert a significant effect on fertility, although women living in nuclear families recorded a slightly higher mean fertility (2.9 children) than those in joint families (2.7 children) ($t = 1.49$, $P > 0.05$). Educational attainment emerged as one of the strongest determinants of fertility. Women's fertility declined markedly from 3.3 children among under-matriculates to 1.9 children among graduates and above, demonstrating a highly significant inverse relationship ($F = 29.99$, $P < 0.01$; $r = -0.28$, $P < 0.01$). A similar, though comparatively weaker, inverse association was observed with husbands' education ($F = 5.52$, $P < 0.01$; $r = -0.07$, $P < 0.05$). Fertility also varied significantly according to economic characteristics, being highest among households dependent on labour and agriculture and lowest among those engaged in government service and business ($F = 22.45$, $P < 0.01$). Likewise, higher family income was associated with lower fertility ($r = -0.08$, $P < 0.05$), indicating that improvements in socio-economic status contribute to smaller family size.

Table 2 demonstrates that marriage and reproductive characteristics have a pronounced influence on fertility differentials. Women who married before the age of 20 years recorded the highest mean fertility (3.1 children), whereas those marrying at 30 years or later had the lowest fertility (2.2 children). This decline was highly significant ($F = 20.37$, $P < 0.01$) and showed a moderate negative correlation ($r = -0.26$, $P < 0.01$), indicating that delayed marriage substantially

reduces reproductive exposure. A similar pattern was observed for husbands' age at marriage, where fertility declined from 3.4 to 2.5 children with increasing age at marriage ($F = 5.58$, $P < 0.01$; $r = -0.12$, $P < 0.01$). The strongest inverse association was found with age at first delivery, where fertility decreased sharply from 3.9 children among women delivering before age 20 to only 1.5 children among those whose first delivery occurred at age 35 years or above ($F = 40.01$, $P < 0.01$; $r = -0.33$, $P < 0.01$). Conversely, fertility increased significantly with age at last delivery, rising from 1.6 to 3.5 children ($F = 66.16$, $P < 0.01$; $r = 0.41$, $P < 0.01$), suggesting that prolonged reproductive life contributes substantially to larger family size. Duration of marriage exhibited the strongest positive association with fertility, increasing steadily from 0.9 children among couples married for less than five years to 5.0 children among those married for 30 years or more ($r = 0.75$, $P < 0.01$). These findings clearly demonstrate that reproductive timing and exposure are major determinants of fertility behaviour among the Kuki tribes.

Table 1: Differential fertility according to socio-demographic characteristics of couples

Variable	Categories	% of n	Mean values	Statistical Test
Tribe	Any-Kuki, Thadou, Vaiphei, Mate, Zou, Paite, Gangte, Kom, Hmar, Simte	100.0	2.4–3.4	$F = 3.92$, $P < 0.05$
Type of family	Nuclear, Joint	100.0	2.9, 2.7	$t = 1.49$, $P > 0.05$
Wife's education	Under matriculate, Matriculate, 10+2, Graduate & above	100.0	3.3→1.9	$F = 29.99$, $P < 0.01$; $r = -0.28$, $P < 0.01$
Husband's education	Under matriculate, Matriculate, 10+2, Graduate & above	100.0	3.0→2.5	$F = 5.52$, $P < 0.01$; $r = -0.07$, $P < 0.05$
Main source of income	Government service, Business, Agriculture & allied, Labour	100.0	3.3→2.3	$F = 22.45$, $P < 0.01$
Family monthly income ('000 Rs.)	<5, 5–10, 10–15, 15–20, ≥20	100.0	3.1→2.5	$r = -0.08$, $P < 0.05$

Overall mean fertility (Mean±SD) = 2.8 ± 1.4 children (95% CI: 2.7–2.9)

The results presented in Table 3 reveal that fertility preferences and child survival experiences also play an important role in determining fertility levels. Fertility increased significantly with the desired number of sons, rising from 1.8 children among women desiring at most one son to 3.2 children among those preferring at least three sons ($F = 33.58$, $P < 0.01$; $r = 0.27$, $P < 0.01$). This finding indicates the persistence of son preference, which encourages continued childbearing until the desired number of male children is achieved. Child mortality was another major determinant of fertility. Women who had experienced the death of two or more children reported the highest fertility (4.7 children) compared with those without any child loss (2.7 children) ($F = 64.29$, $P < 0.01$), suggesting a strong replacement effect whereby couples compensate for child loss by having additional births. Fertility also showed significant variation according to the number of fetal deaths ($F = 3.24$, $P < 0.05$); however, the correlation between fetal deaths and fertility was not statistically significant ($r = 0.02$, $P > 0.05$). This implies that although differences in fertility exist across categories of fetal loss, fetal mortality alone does not have a consistent linear relationship with completed fertility.

The present findings demonstrate that fertility among the Kuki tribes is influenced by a combination of socio-economic, demographic, reproductive, and behavioural factors rather than by any single determinant. Female education emerged as one of the strongest socio-economic factors associated with fertility reduction, while delayed marriage and later initiation of childbearing significantly curtailed reproductive performance. Conversely, longer marital duration, higher age at last delivery, stronger son preference, and child mortality substantially increased fertility, indicating that both reproductive exposure and family-building preferences play crucial roles in shaping fertility behaviour. Economic advancement, reflected through higher educational attainment, secure occupations, and improved household income, was consistently associated with smaller family size. These findings suggest that interventions aimed at promoting female education, delaying marriage, improving child survival, reducing son preference, and enhancing socio-economic opportunities are likely to accelerate fertility transition among the Kuki tribes. Such evidence provides valuable guidance for policymakers in designing culturally appropriate reproductive health and family welfare programmes to achieve balanced population growth and improved maternal and child well-being in the hill districts of Manipur.

Table 2: Differential fertility according to marriage and reproductive characteristics

Variable	Categories	% of n	Mean $\pm$ SD	Statistical Test
Age at marriage (wife)	<20, 20–25, 25–30, ≥ 30 years	100.0	3.1 $\rightarrow$ 2.2	F = 20.37, $P < 0.01$; $r = -0.26$, $P < 0.01$
Age at marriage (husband)	<20, 20–25, 25–30, ≥ 30 years	100.0	3.4 $\rightarrow$ 2.5	F = 5.58, $P < 0.01$; $r = -0.12$, $P < 0.01$
Age at first delivery	<20, 20–25, 25–30, 30–35, ≥ 35 years	100.0	3.9 $\rightarrow$ 1.5	F = 40.01, $P < 0.01$; $r = -0.33$, $P < 0.01$
Age at last delivery	<25, 25–30, 30–35, 35–40, ≥ 40 years	100.0	1.6 $\rightarrow$ 3.5	F = 66.16, $P < 0.01$; $r = 0.41$, $P < 0.01$
Duration of marriage	<5, 5–10, 10–15, 15–20, 20–25, 25–30, ≥ 30 years	100.0	0.9 $\rightarrow$ 5.0	$r = 0.75$, $P < 0.01$

Overall mean fertility (Mean $\pm$ SD) = 2.8 $\pm$ 1.4 children (95% CI: 2.7–2.9)

Discussion

The findings reveal that fertility among the Kuki tribes of Manipur is influenced by a complex interaction of socio-economic, demographic, cultural, and behavioural factors, thereby supporting the classical theories of fertility transition. Significant inter-tribal differences indicate that fertility behaviour is heterogeneous and shaped by variations in educational attainment, socio-cultural practices, and economic conditions, consistent with the observations of Bhat (1998) on regional and cultural diversity in India. Among the socio-economic determinants, women's education emerged as the strongest factor associated with fertility decline, lending support to Caldwell's (1982) wealth-flow theory, which explains that female education promotes investment in child quality, delays marriage, and reduces family size. These findings are further reinforced by Jejeebhoy (1995), who identified female education as a key determinant of fertility decline, and Basu (1992), who emphasized that educated women possess greater autonomy and are more likely to adopt family planning practices. The comparatively weaker influence of husbands' education highlights the dominant role of women's educational attainment in reproductive decision-making. The inverse association between household income and fertility, together with lower fertility among government employees and business households, also agrees with the findings of the United Nations (1987) and Cleland (2001), who reported that socio-economic development, improved living standards, and better access to healthcare contribute to fertility decline. In

contrast, family type showed no significant effect, suggesting that family structure is no longer a major determinant of fertility among the Kuki tribes.

Table 3: Differential fertility according to fertility preference and child survival characteristics

Variable	Categories	% of n	Mean $\pm$ SD	Statistical Test
Desired number of sons	At most 1, At most 2, At least 3	100.0	1.8 $\rightarrow$ 3.2	$F = 33.58, P < 0.01$; $r = 0.27, P < 0.01$
Number of deceased children	Nil, 1, ≥ 2	100.0	2.7 $\rightarrow$ 4.7	$F = 64.29, P < 0.01$
Number of fetal deaths	0, 1, 2, ≥ 3	100.0	2.2–3.1	$F = 3.24, P < 0.05$; $r = 0.02, P > 0.05$

Overall mean fertility (Mean $\pm$ SD) = 2.8 $\pm$ 1.4 children (95% CI: 2.7–2.9)

The study further establishes reproductive timing and behavioural factors as critical determinants of fertility. Women marrying at younger ages and giving birth earlier experienced significantly higher fertility, whereas delayed marriage and later initiation of childbearing reduced completed family size. These results strongly support the fertility frameworks of Davis and Blake (1956) and Bongaarts (1978), which identify marriage and reproductive exposure as the principal proximate determinants of fertility. The positive influence of marital duration and age at last delivery on fertility also corroborates the observations of Bhende and Kanitkar (2011), while Bongaarts (2003) and Freedman (1963) similarly emphasized that delayed marriage, contraceptive adoption, modernization, and changing reproductive norms are central to fertility decline. Behavioural factors further revealed that persistent son preference continues to encourage additional childbearing until the desired number of sons is achieved, supporting the findings of Dyson and Moore (1983) and Mason (1997) on the influence of kinship systems, gender relations, and cultural expectations. Likewise, the positive association between child mortality and fertility confirms the replacement hypothesis and is consistent with the studies of Maharatna (2005) and Chaudhury (2014), who reported that higher child mortality sustains fertility among tribal populations. The comparatively weaker effect of fetal loss suggests that the survival of live-born children exerts a much stronger influence on reproductive behaviour. Overall, the findings reinforce the demographic transition perspective that sustained fertility decline among tribal communities requires integrated interventions focusing on female education, delayed marriage, improved maternal and child healthcare, enhanced child survival, reduction of son preference, and broad-based socio-economic development. These multidimensional measures are essential for promoting informed reproductive choices and achieving balanced demographic transition while respecting the cultural context of the Kuki tribes.

Conclusion and Implications

The present study concludes that fertility differentials among the Kuki tribes of Manipur are shaped by the combined influence of socio-economic, demographic, reproductive, and behavioural factors rather than by biological characteristics alone. Although the overall fertility level remains moderate (2.8 $\pm$ 1.4 children), significant inter-tribal variation reflects considerable heterogeneity in reproductive behaviour across Kuki communities. Among the determinants examined, women's education emerged as the strongest predictor of fertility decline, followed by household occupation and family income, highlighting the transformative role of socio-economic development. Demographic factors such as delayed age at marriage, higher age at first childbirth, and shorter reproductive span were associated with lower fertility, whereas longer marital duration and higher age at last delivery contributed to increased childbearing. The study also reveals that son preference and child mortality continue to sustain relatively higher fertility through

continuation and replacement of births. These findings are consistent with demographic transition theory and the fertility frameworks of Davis and Blake, Bongaarts, and Caldwell, demonstrating that fertility transition among tribal populations is closely linked to improvements in education, reproductive health, economic conditions, and changing family norms. By applying multivariate statistical techniques to analyse multiple dimensions of fertility simultaneously, the study contributes valuable empirical evidence to the limited literature on tribal fertility in North-East India and enhances the understanding of fertility dynamics among the Kuki tribes.

The findings have important implications for population policy, reproductive health planning, and sustainable tribal development. Strengthening female education, preventing school dropout, and expanding educational opportunities should remain priority strategies for reducing fertility and promoting socio-economic advancement. Policies aimed at delaying marriage and first childbirth through adolescent reproductive health education, community awareness, and effective enforcement of legal provisions are likely to reduce reproductive exposure and moderate fertility levels. Improving maternal and child healthcare services, including antenatal and postnatal care, institutional delivery, nutrition, immunization, and child survival programmes, is essential for lowering replacement fertility associated with child mortality. Similarly, culturally appropriate interventions promoting gender equality and reducing son preference should be integrated into family welfare programmes with active community participation. Given the significant fertility variation among individual Kuki tribes, uniform population policies may be less effective than tribe-specific, evidence-based reproductive health strategies tailored to local socio-cultural contexts. Future research should adopt longitudinal and advanced analytical approaches, such as multilevel or structural equation modelling, to examine causal pathways linking education, women's empowerment, contraceptive behaviour, and fertility. Such evidence will strengthen demographic research and support balanced population growth, improved maternal and child health, and inclusive socio-economic development among the tribal communities of North-East India.

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