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Unraveling the factors contributing to the failure of achieving national fertility goals in the hill areas of Manipur

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Abstract:
This study investigates the disparities between national demographic objectives and fertility levels in the hill areas of Manipur. A community-based, cross-sectional survey involving 1071 ever-married women from the Chandel Hill District of Manipur was conducted using a cluster sampling design between March 2018 and April 2019. Utilizing binary logistic regression, the study examines four primary factors contributing to the failure to achieve the national replacement fertility goal of a total fertility rate (TFR) of 2.1. Findings reveal that the current fertility rate of 3.3 is influenced significantly by early age at marriage ($P<0.01$), sex of 2nd birth ($P<0.05$), and low levels of female education, highlighting the pivotal role of these factors in hindering the attainment of national fertility objectives.

Keywords: *replacement fertility, logistic regression, odds ratio, education, son preference*

Introduction:

In alignment with international efforts on fertility management, India's National Population Policy (NPP) of 2000 established short, medium, and long-term objectives. The medium-term goal aimed to achieve a total fertility rate (TFR) at replacement level (2.1) by 2010, with a revised target for 2014 if unmet. The long-term objective aimed for a stable population by 2045, fostering sustainable economic growth, social development, and environmental preservation. Recognizing the unique challenges faced by tribal and marginalized communities, the policy emphasized tailored healthcare provisions and infertility treatment. To bolster these efforts, the Union Government initiated the National Rural Health Mission (NRHM) in 2005 nationwide. Despite these endeavors, rural and marginalized communities continue to encounter numerous challenges.

India harbors a diverse array of tribes, constituting over 8% of the population, broadly categorized into Negrito, Proto-Australoid, and Mongoloid groups. While Negrito tribes primarily inhabit the Andaman and Nicobar Islands and isolated regions of South India, Proto-Australoid tribes are predominantly found in the central Indian belt and parts of the Northeast. Mongoloid tribes, concentrated in the Northeast, comprise 12% of the country's tribal population, with tribes such as the Khasis, Jaintias, Nagas, and Mizos being prominent. Manipur, with 33 scheduled tribes representing around 30% of its population, exhibits a remarkable linguistic diversity despite relatively small populations. Tribes like the Aimol, Anal, and Angami, among others, coexist within the state's boundaries. The distribution of these tribes varies across districts, with Mao tribes prevalent in Senapati, Kabui in Tamenglong, Anals and Marings in Chandel, and Thadou and Kuki in Churachandpur.

In Manipur, while the valley is primarily inhabited by the Meiteis and Meitei Pangal communities, the surrounding hilly regions are home to Kuki and Naga tribes. The fertility dynamics in Manipur, therefore, hold significance, especially within its hilly regions, given the distinct lifestyle and socio-cultural attributes of these tribal communities. Despite developmental strides, Manipur's total fertility rate (TFR) witnessed a decline to 2.0 children per woman in NFHS-5 (2019-21), yet still falling short of the replacement fertility target of 2.1 children. In contrast, neighbouring North Eastern states like Meghalaya and Manipur reported TFRs of 2.9 and 2.2, respectively, failing to meet the replacement fertility objective according to NFHS-5 (2019-21).

Review of Literatures:

In the examination of fertility levels within tribal communities in India, research indicates a notable deviation from the national trends. This discrepancy is attributed to various factors such as low socio-economic status and infrastructural inadequacies (Bhagat and Chattopadyay, 2004; Saha and Verma, 2006). Despite the implementation of the national population policy for over six decades since India's independence, fertility rates remain notably higher among disadvantaged groups. For instance, among scheduled tribes, the fertility rate stands at 3.1 children per woman, while it is 2.9 among scheduled castes and 2.8 among other backward classes, compared to 2.4 children among women not belonging to any of these groups, with an overall national figure of 2.7 (IIPS, 2008).

The Census of 2001 identifies over eight percent of India's population, approximately 84.32 million people, as belonging to scheduled tribes. This population surpasses that of Germany or the combined populations of France and Australia. This demographic reality prompted an investigation into whether fertility patterns within this socio-economically disadvantaged group align with those of the broader Indian society, which is undergoing a rapid decline in fertility rates. Previous studies underscore the urgent need to bolster Reproductive & Child Health (RCH) services in tribal areas, with a particular focus on young tribal mothers. Strategies such as promoting longer inter-birth intervals through increased demand for family planning services, especially the utilization of spacing methods, and addressing gender preferences for children through intervention programs (IEC) in tribal areas are deemed necessary (Bhagat and Chattopadyay, 2004; Saha and Verma, 2006).

Moreover, the transition to a third birth emerges as a significant challenge in population dynamics. Lack of education and son preference are identified as primary contributors to this phenomenon. Previous research in India has delineated three key factors driving son preference: economic, socio-cultural, and religious utilities. Sons are traditionally seen as providers of family labor and support in old age, although the reliability of this support is increasingly questioned (Nath and Deka, 2004). Additionally, sons are instrumental in maintaining the family lineage, and their birth often carries religious significance, particularly in Hindu tradition where sons are essential for performing funeral rites (Nath and Leonetti, 2001). Consequently, there exists a strong inclination among Indian couples to prioritize having sons over daughters. This preference manifests in the continuation of childbearing even after achieving desired family sizes, with approximately 20% of Indian couples expressing a desire for more sons than daughters, while only 2 to 3% express a preference for more daughters than sons (IIPS, 2007).

Objectives:

The primary objective of this study is to discern the causal socio-demographic factors contributing to the failure in attaining the national demographic objective of replacement

fertility, denoted by a total fertility rate (TFR) of 2.1, specifically within the hill districts of Manipur, situated in the easternmost border region of India.

Materials and Methods:

A cross-sectional, community-based investigation encompassing 1071 eligible mothers was conducted in the Chandel district, representing the hill areas of Manipur, spanning from March 2018 to April 2019. Manipur, a constituent of the North Eastern Border States of India, served as the study population. Utilizing a cluster sampling strategy, primary data collection employed a pre-tested and semi-structured interview schedule as the survey instrument. Clusters were delineated according to the Population of Manipur - 2008 (Government of Manipur, 2008).

In addition to conventional statistical analyses, a binary logistic regression model was employed to scrutinize the influence of socio-demographic factors on the phenomenon of third live birth transition. This transition denotes the inability to achieve the national demographic goal of replacement fertility, quantified by a total fertility rate (TFR) of 2.1 children. The model operates on a dichotomous dependent variable, defined as 1 if a woman has had at least a third live birth and 0 if she has had at most two live births. Ten independent variables were investigated, including age at marriage of spouses (in completed years), present age of the wife (in completed years), sex of the second live birth (male=1, female=0), educational levels of spouses (categorized as: 1 – under matriculate; 2 – matriculate; 3 – 10+2 standard; and 4 – at least graduate), family monthly income (in thousands of Indian Rupees), type of family (joint=1, nuclear=0), and the couple's desired number of sons. Quantitative variables such as age, income, and desired number of sons were directly measured, while categorical variables such as sex of the second birth and type of family were represented using binary dummy variables (0, 1). Education, lacking a quantitative scale, was categorized into four levels for measurement purposes. The interpretation of findings involved considering the significance level (P-value) of the Wald test statistic of the regression coefficient, denoted by (β), and the Odds Ratio (OR=e^{β}) along with its 95% confidence interval (CI). Data analysis was executed using SPSS version 19.

Table - 1: Mean fertility according to socio-demographic factors

Factors (% of n)		Mean ± S.D	95%CI for OR	Test value
Age at marriage of wife (in yr)	< 20 (37.9)	3.1 ± 1.2	2.9 - 3.4	r= -0.26; P<0.01 & F=5.03 P<0.01
	20-25 (41.3)	2.8 ± 1.6	2.5 - 3.2	
	25-30 (15.7)	2.2 ± 1.4	1.7 - 2.6	
	30+ (5.1)	2.2 ± 1.3	1.3 - 3.0	
Age at marriage of husband (in yr)	< 20 (6.4)	3.4 ± 0.7	3.0 - 3.8	r= -0.12; P>0.05 & F=1.37 P>0.05
	20-25 (44.3)	2.8 ± 1.3	2.6 - 3.1	
	25-30 (32.3)	2.8 ± 1.7	2.5 - 3.2	
	30+ (17.0)	2.5 ± 1.3	2.1 - 3.0	
Present age of wife (in yr)	<40 (86.8)	2.6 ± 1.3	2.4 - 2.8	t= 6.0; P<0.01
	40+ (13.2)	4.2 ± 1.8	3.5 - 4.8	
Educational level	Under matriculate (42.3)	3.3 ± 1.6	2.9 - 3.6	F=7.45;

of wife	Matriculate (28.8)	2.6 ± 1.2	2.3 - 3.0	P<0.01
	10+2 standard (17.6)	2.5 ± 1.2	2.2 - 2.9	
	Graduate & above (11.3)	1.9 ± 1.0	1.5 - 2.3	
Educational level of husband	Under matriculate (26.2)	3.0 ± 1.5	2.7 - 3.4	F=1.35; P>0.05
	Matriculate (19.1)	2.8 ± 1.3	2.4 - 3.2	
	10+2 standard (25.8)	2.5 ± 1.3	2.2 - 2.9	
	Graduate & above (28.9)	2.9 ± 1.5	2.6 - 3.3	
Family monthly income (in '000Rs.)	< 5 (24.4)	3.1 ± 1.2	2.8 - 3.4	r=-0.11; P>0.05 & F=1.09; P>0.05
	5-10 (32.0)	2.7 ± 1.7	2.3 - 3.1	
	10-15 (11.6)	2.8 ± 1.4	2.2 - 3.4	
	15-20 (10.2)	2.9 ± 1.6	2.1 - 3.8	
	20+ (21.8)	2.5 ± 1.5	2.1 - 3.0	
Main source of income	Agriculture & allied (35.9)	3.2 ± 1.6	2.9 - 3.6	F=5.46; P<0.01
	Govt. services (24.9)	2.8 ± 1.2	2.5 - 3.1	
	Business (17.5)	2.5 ± 1.3	2.0 - 2.9	
	Labourer (21.7)	2.3 ± 1.4	1.8 - 2.7	
Type of family	Nuclear (52.3)	2.9 ± 1.5	2.6 - 3.2	t=0.78; P>0.05
	Joint (47.7)	2.7 ± 1.3	2.5 - 3.0	
Desire number of son by wife	At most 1 (18.9)	2.8 ± 1.2	2.4 - 3.1	F=3.59; P<0.05
	At most 2 (53.2)	2.6 ± 1.4	2.4 - 2.9	
	At least 3 (27.9)	3.2 ± 1.7	2.8 - 3.7	
Desire number of son by husband	At most 1 (10.8)	1.8 ± 1.3	1.1 - 2.4	F=8.22; P<0.01
	At most 2 (46.5)	2.6 ± 1.4	2.3 - 2.9	
	At least 3 (42.7)	3.2 ± 1.5	2.9 - 3.5	
Total		2.8 ± 1.5	2.5 - 3.0	

Analysis and Results:

When considering women aged 40 and above as contributing to total fertility, the total fertility rate (TFR) within the population stands at 4.2 ± 1.8 children, significantly exceeding the national goal of 2.1. Conversely, the TFR among women below 40 years is notably lower at 2.6 ± 1.3 ($p < 0.01$). Approximately 80% of women in the study were married before the age of 25, suggesting a lack of effective contraceptive practices during their fertile reproductive years. Educational levels of couples were found to have a significant impact ($p < 0.01$) on fertility regulation, with wives' education exhibiting a stronger influence compared to husbands'. Fertility levels decreased monotonically from 3.3 ± 1.6 for under-matriculate mothers to 1.9 ± 1.0 for graduate and above mothers. Additionally, family income sources significantly influenced fertility levels ($F = 5.46$, $p < 0.01$), with the highest fertility associated with agriculture and allied activities, potentially linked to factors such as low education, early marriage, and son preference.

Table - 2: Odds Ratios of variables on the failure in national fertility goal

Variable	OR (e^{β})	P-value	95%CI for OR
Age at marriage of wife (in year)	0.535	0.010	0.332, 0.863
Age at marriage of husband (in year)	1.193	0.342	0.829, 1.717
Present age of wife (in yr)	1.651	0.003	1.187, 2.297
Sex of 2nd birth: Female	1.000		
Male	0.140	0.031	0.024, 0.833
Education of wife (in level)	1.016	0.977	0.336, 3.078
Education of husband (in level)	0.557	0.296	0.185, 1.670
Monthly family income (in '000 Rs.)	0.956	0.264	0.883, 1.035
Type of family: Nuclear	1.000		
Joint	0.721	0.724	0.117, 4.440
Desire number of son by wife	2.983	0.153	0.666, 3.364
Desire number of son by husband	3.454	0.212	0.492, 4.238
Constant	0.003	0.167	

Furthermore, logistic regression analysis revealed that only three out of ten variables significantly impacted the failure to achieve the replacement fertility goal. These variables were age at marriage of the wife ($p < 0.05$, OR = 0.54), present age of the wife ($p < 0.01$, OR = 1.65), and sex of the second live birth ($p < 0.05$, OR = 0.14). Delayed marriage and male sex of the second child were associated with a reduced risk of failure, while increasing age increased the risk. Additionally, the desire for sons significantly increased the risk of failure, with wives' desire ($p < 0.05$) and husbands' desire ($p < 0.01$) both playing influential roles. Further analysis using stepwise logistic regression identified four major causal factors of the third birth transition: wife's education, present age of wife, age at marriage of wife, and sex of the second live birth. Among these factors, wife's education, age at marriage, and male sex of the second child were negatively associated with third birth transition, while present age of wife had a positive impact. Specifically, each advancement in wife's education level led to a 45% reduction in the risk of third birth ($p < 0.01$), while male sex of the second child reduced the risk by 82% ($p < 0.01$).

Table - 3: Stepwise Odds Ratios of variables on the failure in national fertility goal

Step	Variable	OR (e^{β})	P-value	95%CI for OR
1	Education of wife (in level)	0.501	0.008	0.302, 0.832
	Constant	10.682	0.000	
2	Present age of wife	1.203	0.007	1.051, 1.377
	Education of wife (in level)	0.412	0.004	0.225, 0.753

	Constant	0.063	0.149	
3	Age at marriage of wife	0.710	0.003	0.566, 0.890
	Present age of wife	1.467	0.001	1.176, 1.829
	Education of wife (in level)	0.495	0.039	0.254, 0.966
	Constant	0.151	0.374	
4	Age at marriage of wife	0.671	0.002	0.519, 0.868
	Present age of wife	1.533	0.001	1.193, 1.969
	Sex of 2nd live birth	0.182	0.028	0.040, 0.829
	Education of wife (in level)	0.553	0.098	0.275, 1.115
	Constant	0.262	0.573	

Discussion:

In the binary logistic regression model, only three variables were found to significantly impact third birth transition when controlling for other factors: age at marriage of wife, present age of wife, and sex of the second live birth. Additionally, the desire for sons was observed to influence higher fertility levels, particularly regarding third birth transition. However, stepwise regression revealed that wife's education also played a significant role in fertility regulation, alongside the previously identified causal factors. Comparing the effects of education between husbands and wives, it became evident that wife's education had a more significant impact on preventing third birth transition. This underscores the importance of female education in decision-making regarding reproduction, particularly in limiting third births. Education empowers women with opportunities for personal advancement, social mobility, and awareness of family planning methods.

Despite being beyond human control, the sex of the second live birth significantly influenced third birth transition, with a male child reducing the risk by 82%. This phenomenon is likely influenced by son preference, which has been shown to affect reproductive intentions and behaviours in various studies.

Conclusion:

The analysis reveals significant disparities between observed fertility rates and the national demographic goal of replacement fertility in the studied population. Women aged 40 and above exhibit a total fertility rate (TFR) of 4.2, well above the target of 2.1, while those below 40 have a TFR of 2.6, still exceeding the goal. Early marriage, low contraceptive use, and socioeconomic factors such as education and income are identified as key determinants of fertility levels, with wife's education and family income showing notable impacts. Logistic regression analysis highlights age at marriage, present age of wife, and sex of the second live birth as significant factors influencing third birth transition, indicating the complex interplay of socio-demographic variables in shaping fertility outcomes. Moreover, wife's education emerges as a crucial determinant, underscoring the importance of female education in reproductive decision-making and fertility regulation. Son preference, evident from the higher fertility associated with desire for sons, further complicates the achievement of replacement fertility goals. The influence of son preference on reproductive behaviors underscores the need for comprehensive strategies to address cultural and societal norms impacting fertility choices. Ultimately, the findings emphasize the imperative of promoting female education, delaying marriage, and addressing son preference to align population growth with national demographic targets. These insights contribute to a deeper

understanding of fertility dynamics and inform targeted interventions aimed at achieving sustainable population stabilization in the studied region and beyond.

References:

Bhagat, R. B., and Chattopadhyay, A. (2004). Characteristics and correlates of tribal fertility: A comparative study of selected tribes. *Demography India, 33*(2), 295-310.

Government of Manipur. (2011). *Economic Census Manipur '2010-2011* (p. 15). Directorate of Economics and Statistics (DES).

International Institute for Population Sciences (IIPS). (2008). *National Family Health Survey (NFHS-3), 2005-06, Manipur: 46*.

International Institute of Population Sciences (IIPS), & ICF. (2021). *National Family Health Survey (NFHS - 5), 2019-21: India*. Mumbai: IIPS.

Nath, D. C., and Deka, A. K. (2004). The importance of son in a traditional society: How elderly parents see it? *Demography India, 33*(1), 33-46.

Nath, D. C., and Leonetti, D. L. (2011). Correlates of coital patterns in a traditional Indian society. In R. C. Yadava (Ed.), *Dynamics of population change (Emerging issues of 21st Century)* (pp. 57-67). Shipra Publication.

Saha, K. B., and Verma. (2006). High fertility among scheduled tribes of Madhya Pradesh. *Indian Journal of Medical Research, 123*, 89-90.

Singh, N. S., Narendra, R. K., & Hemochandra, L. (2007). Determinants of waiting time to conception in Manipuri women. *Kuwait Medical Journal, 39*(1), 39-43.

Singh, N. S., Singh, N. S., and Narendra, R. K. (2011). Survival analysis of duration of waiting time to conception. *Electronic Journal of Applied Statistical Application, 4*(2), 144-154.

Vignoli, D. (2006). Fertility change in Egypt: From second to third birth. *MPIDR Working Paper 2006-011*.

Yadava, R. C., and Sharma, S. S. (2004). Closed birth interval versus most recent closed birth intervals. *Demography India, 33*(2), 249-263.

Youssef, R. M. (2005). Duration and determinants of interbirth interval: Community-based survey of women on Southern Jordan. *Eastern Mediterranean Health Journal, 11*(4), 559-572.