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Maternal Health Care Utilization in the North-Eastern States of India

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ABSTRACT

Maternal health refers to the health of women during pregnancy, childbirth, and the Postpartum period. It means ensuring that all women receive the care they need to be safe and to have a healthy motherhood. The Sustainable Development Goals (SDGs) 3 aims to reduce the MMR by 70 maternal deaths per 1,00,000 live births by 2030. However, about 830 women die from pregnancy or pregnancy-related complications around the world every day. Though maternal care is a part of basic health services, it remains far from universal. Specifically, access to improved maternal care remains low among poor, less educated rural women. Numerous studies have suggested that reducing inequality in access to and utilisation of maternal health care services can improve maternal and child survival. The maternal health status of the northeastern states is very unsatisfactory. Assam has the highest MMR in India. Inequalities in the assessment of health care facilities are related to many socio-economic factors. Since most tribal people live in rural areas, they face inconvenience when accessing health care facilities due to their remote locations. The study aims to examine the factors affecting the utilisation of maternal care services in the northeastern states of India and to examine the income inequality among the states of the Northeast. The study is based on the data from the National Family Health Survey (NFHS) and various other journals and articles. It will provide recommendations that shed light on maternal health in the North Eastern Region (NER), ultimately contributing to improved health outcomes for mothers in this critical region.

Keywords: *Maternal Health, North East Region, Mortality, Inequality*

Introduction

In the global context, maternal mortality has been reduced by 34% between 2000 and 2020. Even with this progress, 99% of maternal deaths occur in low- and middle-income countries (LMICs), accounting for nearly 800 deaths each day. India is the leading contributor to maternal mortality among South Asian nations, accounting for 24,000 deaths in 2020 and contributing 18% of all maternal deaths

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worldwide. However, there is still spatial variation. India's maternal mortality ratio (MMR) has been declining, falling from 372 in 2000 to 117 in 2020. Maternal health is a public health issue in the northeastern state of India. The north-eastern state of Assam has the highest maternal mortality in India. While the 'maternal mortality ratio' (MMR) has decreased from 301 to 195 per 100,000 live births between 2012 and 2020, it remains more than twice the national average of 97 per 100,000 live births in 2018-2020. The healthy future of society depends on the health of children and their mothers, who are guardians of their future. However, despite much good work over the years, 10.6 million children and 529,000 mothers are still dying each year, mostly from avoidable causes" (WHO, 2005). Women's health plays a pivotal role in the development of any society. They are more vulnerable compared to other groups of society, not only due to their low status but also due to their biological structure.

The maternal health status of the northeastern states is very unsatisfactory. The North Eastern Region (NER) of India covers an area of 2.62 lakh sq. km. It accounts for 7.9% of the country's total area. There is variation in demographic parameters across different states of the northeast due to their diverse mountainous terrain. At the same time, since the majority of the tribal people live in rural areas, there must be an inconvenience on their part while accessing the health care facilities due to their geographical location. Inequalities in the assessment of health care facilities are related to many socio-economic factors. Cultural and religious practices also play a role in determining their health-seeking behaviour, i.e., visiting hospitals and other healthcare institutions. And, as Assam becomes the state in India with the highest Maternal Mortality Ratio, utilisation of maternal health care services in the North Eastern states needs to be studied to find out the reason behind it.

Objectives

The present study aims to examine the factors affecting maternal care service utilisation in the North Eastern states of India and to examine income inequality among the states of the Northeast.

Methods and Methodology

Data Source: The study will be based on the National Family Health Survey (NFHS) 4 and 5, conducted by the International Institute for Population Sciences (IIPS), Mumbai, during 2015-16 and 2019-21, respectively. It is cross-sectional data. The survey provides information on family planning, maternal and child health, reproductive health, and the utilisation of maternal and child health care services, as well as communicable and non-communicable diseases, for all districts of India.

Multivariate logistic regression is used to examine the relationship between the outcome and explanatory variables.

The study uses three indicators to measure the utilisation of maternal health care services among women in the North Eastern region, based on three outcome variables: Full antenatal care (ANC), skilled birth attendants (SBA), and postnatal care (PNC).

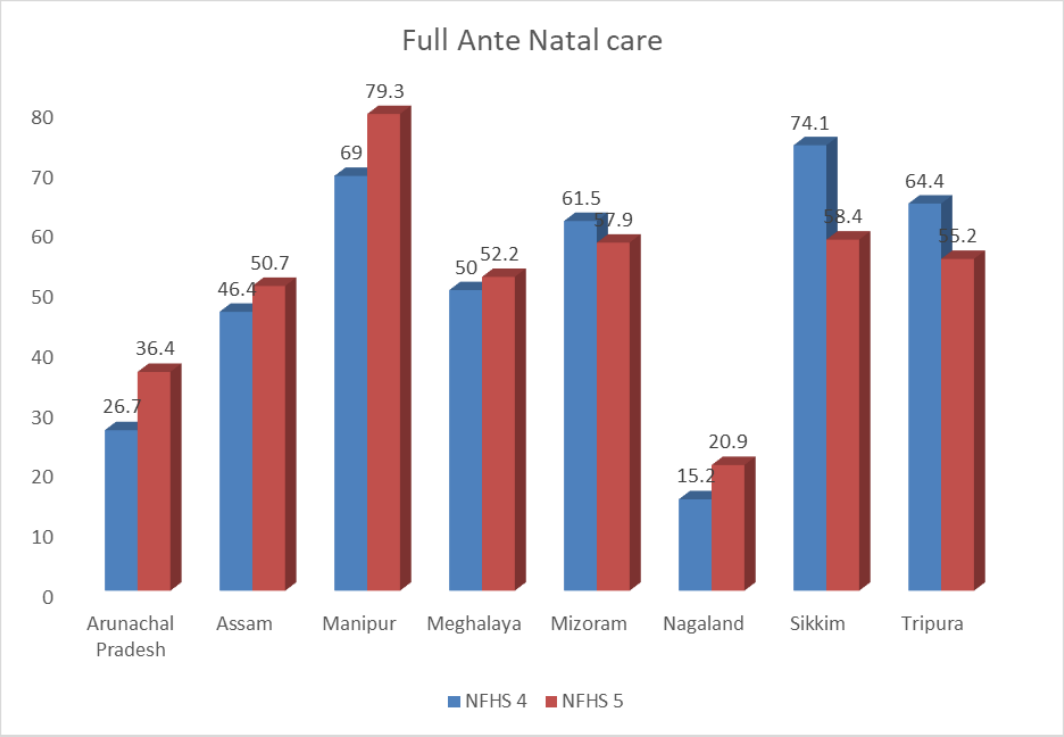
Full antenatal care (ANC or FANC): Pregnant women who received at least 4 ANC visits, 1 tetanus injection and consumed iron folic acid tablets or Syrup for 100 days.

Skilled Birth Attendants (SBA): This can be institutional delivery or delivery conducted by skilled health personnel.

Postnatal Care (PNC): It measures the proportion of mothers and children who have had postnatal check-ups within 2 days of delivery.

Results:

I. Graphical representation



Source: NFHS-4 and 5

Figure 1: Full ANC utilisation in the 8 states of NE

The full ANC indicator was measured as the proportion of women who had four or more antenatal check-ups, received at least one tetanus toxoid injection, and consumed iron and folic acid tablets or syrup for the last live birth during the 5 years preceding the survey period. Full ANC coverage increased from NFHS-4 to NFHS-5 in most states, showing better access to healthcare for mothers. Manipur saw the most significant improvement, rising from 69% to 79.3%. But Sikkim has decreased slightly from 74.1% to 58.4%, and Tripura has dropped from 64.4% to 55.2%. Lastly, Mizoram is somewhat lower at 57.9% compared to 61.5% in NFHS 4.

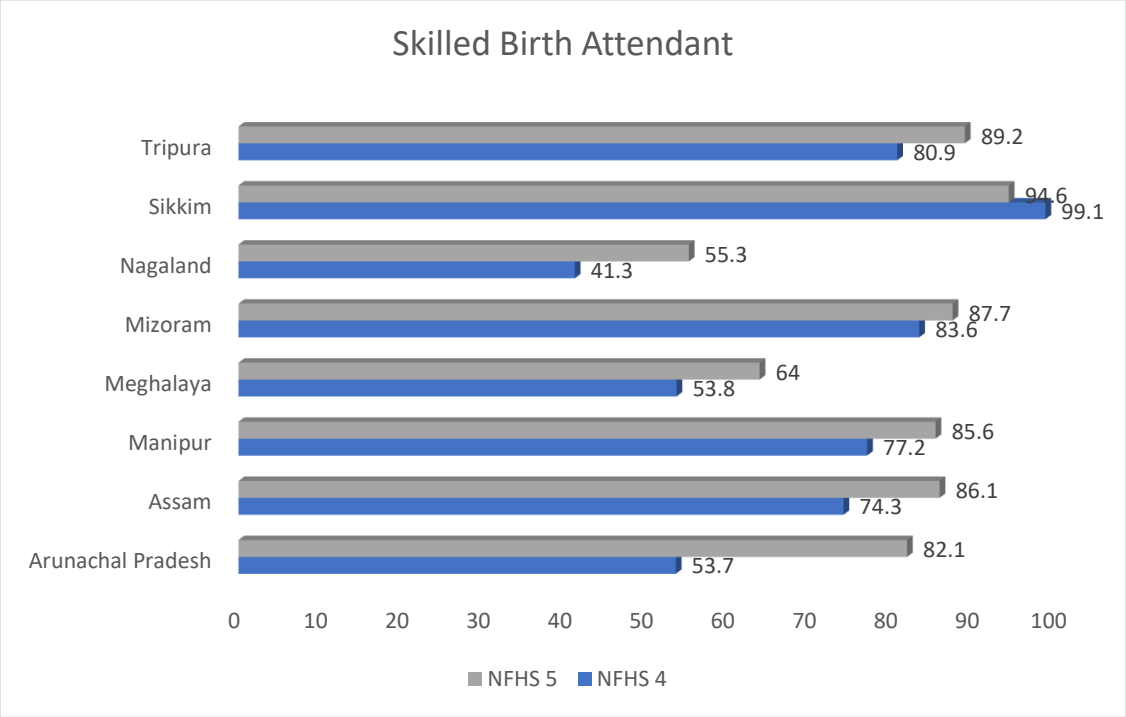


Figure 2: Utilisation of Skilled Birth Attendant in the NE region.

The skilled birth attendance (SBA) indicators included women whose deliveries were conducted in public or private hospitals/primary or community health centres/clinics/dispensaries, or at home, assisted by trained health personnel (doctors/nurses/lady health visitors/ auxiliary nurse midwives). From the figure, we see a significant improvement in the utilisation of skilled birth attendants for the state of Arunachal Pradesh. The table compares NFHS-4 and NFHS-5 data to show the percentage of births attended by a skilled birth attendant (SBA) across many northeastern Indian states. The SBA coverage in Sikkim decreased from 99.1% to 94.6%. Even though it is still high, this decline may indicate problems with

reporting or access to healthcare. Meghalaya's rise from 53.8% to 64% indicates improvement, but more slowly than in other states.

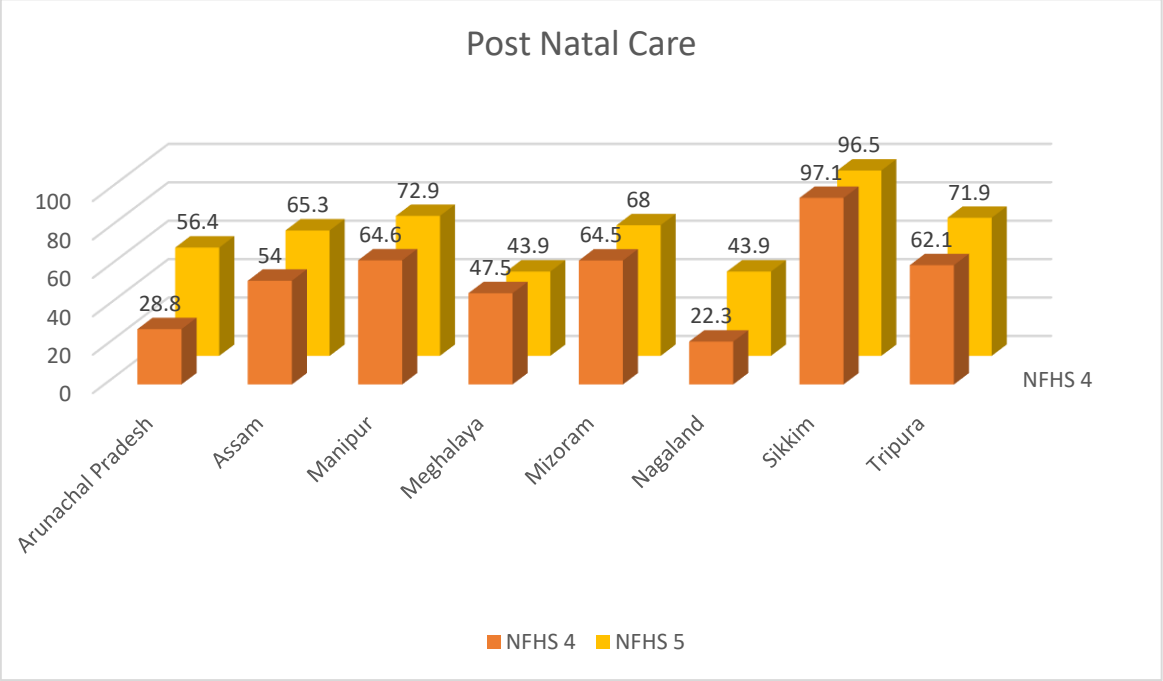


Figure 3: Postnatal Care (PNC) in NER, India

The figure above shows a significant improvement in postnatal care coverage across the northeastern states of India. Arunachal Pradesh has made the most critical progress, rising from 28.8% to 56.4%. Similarly, Nagaland also saw a considerable increase, from 22.3% to 43.9%. Assam, Manipur, Mizoram, and Tripura experienced moderate increases in PNC coverage. Meghalaya's PNC coverage dropped from 47.5% to 43.9%, indicating a possible decline in healthcare service utilisation. Despite a minor drop from 97.1% to 96.5%, Sikkim still has the highest postnatal care coverage.

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II. CONCENTRATION CURVE

Fig 1: Full Antenatal care

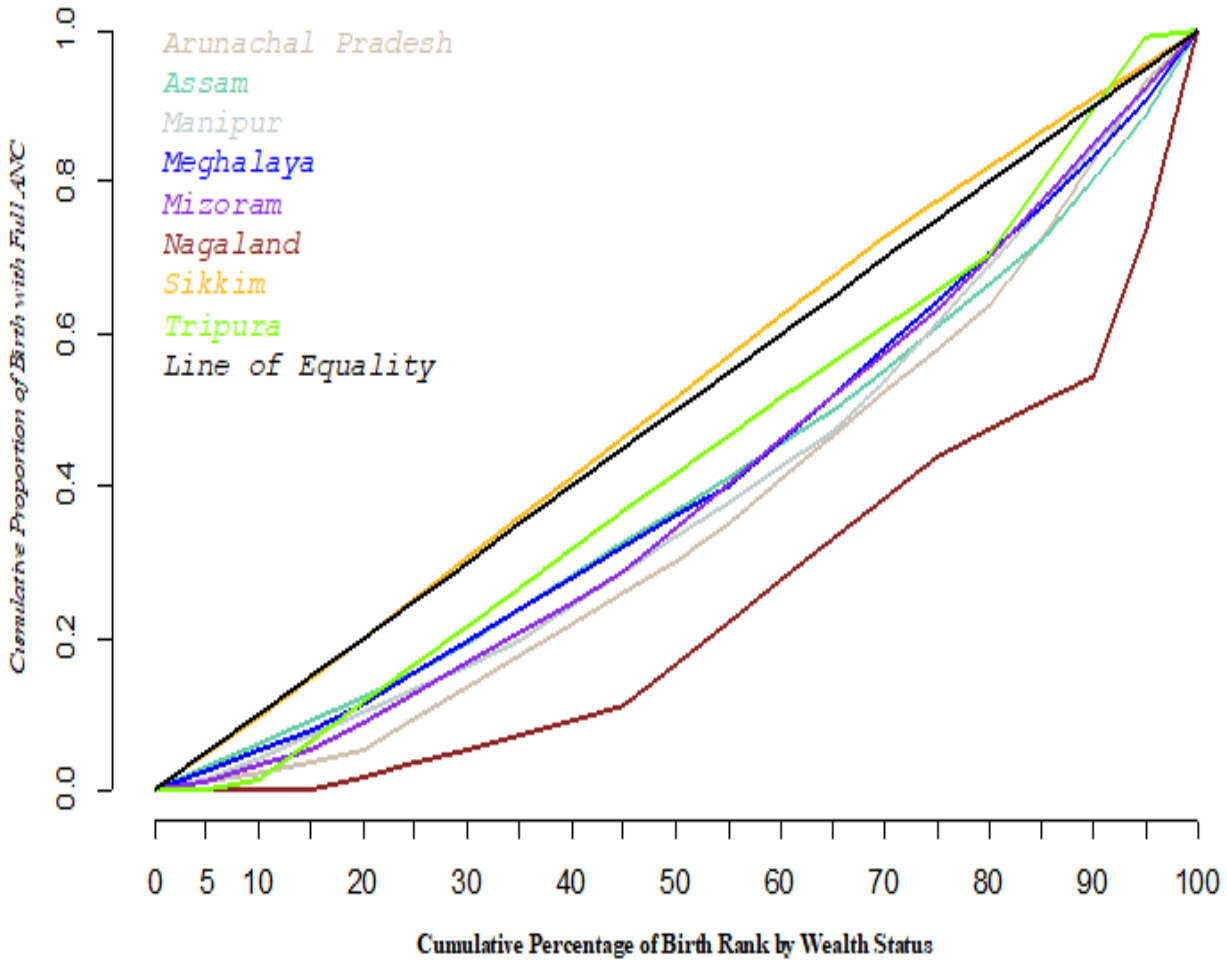

Figure 1 shows the concentration curve of the antenatal care. According to the concentration curve, Nagaland has the most significant economic inequality gap, followed by Arunachal Pradesh, Manipur, Assam, Mizoram, Meghalaya, and Tripura. Only, Sikkim is above the line of equality, indicating that in Sikkim, the use of Full antenatal care was more concentrated in the richer sections of society. The further the curve lies above the line of equality, the greater the concentration of wealth among the rich. Since Arunachal Pradesh is the curve below and the farthest from the line of equality, this shows that most utilisation of complete antenatal care services in this state is concentrated among people with low incomes.

Fig 2: Skilled Birth Attendant / Safe Delivery

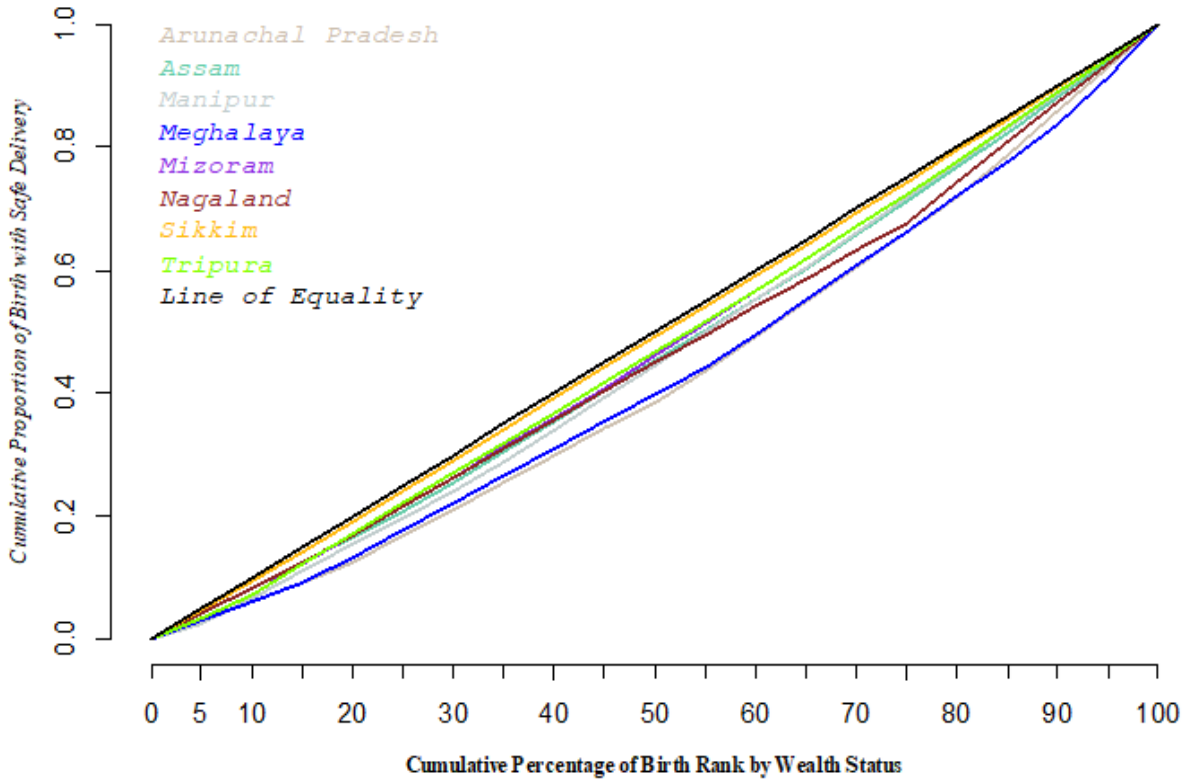

Figure 2 shows the utilisation of Safe delivery among the states of the Northeast. Arunachal Pradesh and Meghalaya are the farthest ones from the line of equality. It means there is a significant economic inequality gap while utilising the safe delivery indicators. Sikkim almost coincides with the line of equality. Among the three indicators chosen to measure economic inequality, Safe delivery has the highest prevalence rate. This may be due to government schemes such as Janani Suraksha Yojana (JSY), a safe motherhood intervention under the National Rural Health Mission (NRHM), implemented to reduce maternal and neonatal mortality by promoting institutional delivery among poor Pregnant women. It includes a cash incentive of Rs. 1400 for rural and Rs. 1000 for the urban areas, excluding the ASHA's Package.

Fig 3: Postnatal Care

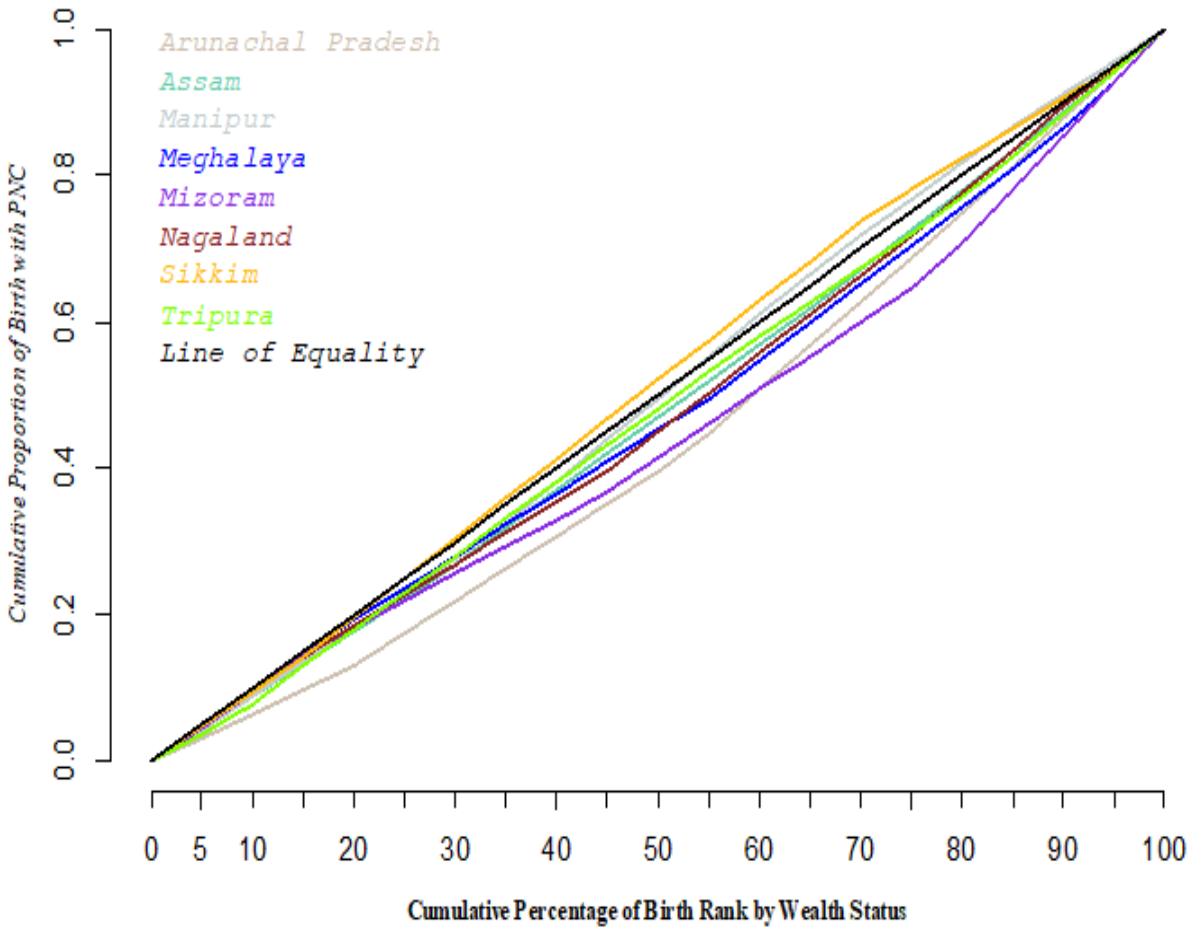

Figure 3 shows the utilisation of postnatal Care (PNC). Arunachal Pradesh and Meghalaya are the furthest from the line of equality. It means there is a significant economic inequality gap while utilising the safe delivery indicators. Sikkim and Manipur are above the line of equality, meaning that postnatal care in these states is more concentrated among the richer sections of society.

III. Statistical analysis

Table 1: Logistic regression for the maternal health care services and their socio-economic and demographic factors.

	Full ANC				SBA				PNC			
	OR		95% CI		OR		95% CI		OR		95% CI	
Women's Characteristics												
Age at Birth												
Less Than 20 ®												
20 to 30	1.13		0.83	1.56	1.10		0.79	1.52	0.91		0.56	1.45
31 to 34	1.17		0.72	1.79	1.17		0.78	0.75	1.08		0.59	1.96
35 to 49	1.29		0.86	1.95	1.23		0.81	1.88	0.84		0.44	1.61
Birth Order												
1 ®												
2 to3	0.75	***	0.62	0.90	0.68	***	0.55	0.85	0.99		0.73	1.36
4 and above	0.62	***	0.47	0.83	0.38	***	0.29	0.50	1.20		0.76	1.88
Women's Education												
No Education ®												
Primary	1.60	**	1.11	2.29	1.49	***	1.15	1.93	0.90		0.56	1.44
Secondary	1.66	***	1.89	2.32	2.01	***	1.58	2.57	1.80	**	1.11	2.79
Higher	1.70	**	1.10	2.62	3.32	***	1.78	6.40	4.80	***	2.30	10.04
Husband's Education												
No Education ®												
Primary	1.56	**	1.06	2.27	1.31		0.99	1.70	0.80		0.49	1.30
Secondary	1.20		0.84	1.72	1.33	**	1.03	1.72	0.82		0.50	1.33
Higher	1.27		0.83	1.94	2.07	***	1.29	3.32	0.88		0.45	1.74
Pregnancy Termination												
No ®												
Yes	1.27		0.83	1.94	2.07	***	1.29	3.32	1.07		0.73	1.57
Prior Caesarean Delivery												
No ®												
Yes	1.30	**	1.04	1.62	1.68	***	1.28	2.21	0.97		0.26	3.56
Multiple Birth												
No ®												
Yes	1.37		0.54	3.50	1.37		0.42	4.46	4.28		0.42	43.37
Intended Pregnancy												

No ®												
Yes	1.57	**	1.42	2.25	0.96		0.71	1.28	1.15		0.70	1.89
Household Characteristics												
Place of residence												
Rural ®												
Urban	1.18		0.98	1.43	2.10	***	1.60	2.77	1.48	**	1.04	2.12
Religion												
Hindu ®												
Muslim	0.45	***	0.29	0.70	0.21	***	0.14	0.31	0.47	**	0.26	0.83
Christian	1.08		0.83	1.42	0.28	***	0.21	0.36	0.28	***	0.19	0.43
others	1.43	**	1.06	1.92	0.42	***	0.30	0.59	0.32	***	0.19	0.55
Caste												
SC ®												
ST	0.91		0.63	1.30	0.82		0.55	1.20	0.95		0.53	1.69
OBC	1.52	**	1.07	2.15	1.47		0.95	2.26	0.77		0.44	1.35
Others	1.62	**	1.51	2.29	1.44		0.93	2.24	0.74		0.42	1.33
Wealth Index												
Poorest ®												
Poorer	2.02	***	1.40	2.90	1.72	***	1.37	2.15	1.29		0.84	1.99
Middle	2.72	***	1.85	4.00	3.37	***	2.55	4.44	1.39		0.84	2.32
Richer	3.79	***	2.50	5.74	8.81	***	5.84	13.30	0.90		0.50	1.63
Richest	6.08	***	3.80	9.72	12.31	***	6.01	25.22	1.04		0.49	2.19
Media Exposure												
No ®												
Yes	1.29	**	1.02	1.63	1.68	***	1.38	2.03	0.86		0.60	1.23
Sex of Head of Household												
Male ®												
Female	1.38	***	1.11	1.72	1.17		0.91	1.51	0.98		0.68	1.40
Constant	0.02	***	0.01	0.05	1.00		0.58	1.73	1.75		0.75	4.08

Note: level of significance: ***P<0.01; **P<0.05; SC = Scheduled Caste, ST = Scheduled Tribe, OBC = Other Backwards Classes.

Table 1 gives the results from the multivariate logistic regression. Age of the women was found to be highly associated with the maternal health care utilisation. For complete antenatal care (FANC or ANC), among women under 20, the odds of utilising complete antenatal care were 1.13, 1.17, and 1.29 higher in the age groups 20 to 30, 31 to 34, and 35 to 49, respectively. The odds ratios were higher among women in the higher age group. A similar situation occurs with the utilisation of the SBA service as well. However, for

postnatal care (PNC), the odds fluctuate. For birth order, the probability of utilising ANC and SBA was significantly lower than for the first birth, but this was not the case for the PNC. With increased education, the utilisation rate of maternal health care also rises. Women's education shows a positive association with all service utilisation and is highly significant, except for PNC among women receiving primary education. Similarly, the husband's education is also positively associated with maternal health care utilisation. There is a high significance for the utilisation of safe delivery for husbands who attended higher education. Pregnancy termination had a positive association with the maternal health care utilisation, as there is an increase in the odds for its utilisation. Those women who already had a pregnancy termination before were significantly more likely to go for safe delivery, 2.07 times more likely than women who had no pregnancy termination. Women who had prior caesarean delivery were 1.30 and 1.68 times more likely to use ANC and SBA, but there was a decrease for PNC. For the PNC utilisation, there is a high significance. Those women who had multiple births utilise all three components of maternal health more than women with a single birth. If the pregnancy was intended, the use of ANC was significantly increased by 1.57, but there was a decrease in the use of SBA and PNC in intended pregnancies. The results further revealed that urban people were more likely to use maternal health care services than their rural counterparts, by 1.18, 2.10, and 1.48 for FANC, SBA, and PNC, respectively, with significance for SAFED and PNC. For religion, with reference to Hindu, Muslim, Christian and others, utilise more full antenatal care with significance on Muslim and others. Still, there is fluctuation in the utilisation of SBA and PNC. There is a high significance for Safed and PNC. Use of PNC was lower among the Scheduled Tribes (ST), Other Backwards Classes (OBC), and others than among the Scheduled Castes (SC). But there is an increase in the use of ANC and SBA. The Wealth Index shows a significantly positive association with utilisation. For illustration (ANC), among the poorest, the odds were 2.02, 2.72, 3.79, and 6.08 of utilising ANC. And for safety, the odds were 1.72, 3.37, 8.81, and 12.31 for utilising safe delivery. There is significance for both the ANC and the SBA, but none for postnatal care. Media exposure had a positive impact on utilisation of complete antenatal care and safe delivery, but not for postnatal care. Those women with media exposure were 1.68 times more likely to use SBA. Households with a female head had a highly significant positive effect on the utilisation of complete antenatal care. The odds were 1.17 times more likely to use SBA for households with a female as their head. But there is a decrease in the use of postnatal care.

Conclusion

Compared to national-level trends, the utilisation of maternal healthcare services in the North-Eastern states is low. Arunachal Pradesh and Nagaland have the worst utilisation of services. Deep-rooted traditional beliefs and norms in the tribal areas further accelerate the poor utilisation. Assam has the highest MMR in

India, while states like Arunachal Pradesh and Nagaland show the least utilisation of health services in the NE states. The reason for the contrasting result shown in the MMR is underreporting and poor record-keeping of medical data in states like Nagaland, Arunachal Pradesh, etc. The utilisation of maternal health services in the urban areas is quite different from that in the rural areas. The significant determinants of utilisation of maternal health services are women's educational attainment and household wealth status.

Other vital determinants observed include caste and religion, suggesting a need to empower women from less advantaged groups. Since maternal deaths are preventable by proper utilisation of the health services, many awareness programmes should be organised through various media, and adequate training for the health workers/providers should be provided. If all births are attended and supervised by skilled health professionals, then there will be a negligible chance of maternal deaths. Timely management and effective treatment would save many lives. In addition, improvements in infrastructure and transport facilities, particularly in rural areas, access to health information, and the elimination of child marriage are highly recommended. The government should also focus on providing schemes to effectively utilise maternal healthcare services at the community level in the northeastern states. Assam's high maternal death rate, despite increasing service coverage, requires additional research to fully understand how the health system's quality, reporting procedures, and sociocultural factors interplay. Comparative micro-level research in Arunachal Pradesh and Nagaland is crucial to fully understand how geography, culture, and access barriers contribute to continuously poor maternal health service utilisation,

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