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4 Implementation of Government Health Schemes and its role in Reducing Infant and Child Mortality in North East India: A Secondary Data Analysis

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Abstract

Infant and child mortality are one of the important indicators of a country's general medical and public health conditions, and consequently, the country's level of socio-economic development. Infant and child mortality remain key indicators of the performance of the national health system in the country. Over the past two decades, the Government of India has rolled out several flagship health schemes the National Health Mission (NHM), Janani Suraksha Yojana (JSY), Mission Indradhanush, Integrated Child Development Services (ICDS), and others, specifically targeting maternal and child health outcomes. North East India, comprising eight states, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Tripura, Arunachal Pradesh, and Sikkim, presents a complex and uneven public health landscape shaped by geographical remoteness, ethnic diversity, poor infrastructure, and historically weak healthcare delivery. This paper undertakes a secondary data analysis using data from the National Family Health Survey (NFHS-4, 2015–16 and NFHS-5, 2019–21), the Sample Registration System (SRS), and various Ministry of Health and Family Welfare (MoHFW) reports to examine whether these schemes have meaningfully reduced infant mortality rates (IMR) and under-five mortality rates (U5MR) across the North Eastern states. The outcomes of this paper reveal a mixed picture: states like Sikkim, Mizoram, and Arunachal Pradesh have recorded notable declines, while Tripura, Manipur, and Meghalaya show stagnation or deterioration. The study argues that beyond policy formulation, the quality of implementation, last-mile service delivery, community engagement, and local governance capacity play decisive roles in shaping health outcomes. Strengthening these dimensions is essential for achieving sustained reductions in infant and child mortality in the region.

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Introduction

The death of a child before reaching one year of age, or before completing five years of life, is not merely a health statistic, it reflects the cumulative failure of nutrition, sanitation, medical access, maternal education, and governance. India has made substantial progress on child mortality over the past three decades, with the infant mortality rate falling from 80 per 1,000 live births in 1990 to approximately 35 per 1,000 live births by 2019–21, as documented by the NFHS-5.[1] Yet this national average conceals enormous regional heterogeneity. The North Eastern states of India have long occupied an ambiguous position in this story: some, like Sikkim and Manipur, have traditionally posted low IMR figures, while others, like Assam, Meghalaya, and Tripura, continue to lag behind national benchmarks.

North East India is the eastern most region connected to East India via a narrow corridor squeed between Nepal and Bangladesh, sharing more international borders than internal borders with the Indian mainland, and is home to over 200 distinct tribal groups.[2] The region's challenging terrain, dense forests, flood plains, hilly areas, makes healthcare delivery difficult. Many health facilities in these states suffer from inadequate staffing, drug stock-outs, and absence of specialists.[3] At the same time, cultural practices, low female literacy in pockets, and limited community health worker reach complicate the picture further.

In this context, the Government of India introduced a series of targeted health interventions beginning with the National Rural Health Mission (NRHM) in 2005, which was subsequently expanded into the National Health Mission (NHM) in 2013. Complementary schemes like Janani Suraksha Yojanqa (JSY), Janani Shishu Suraksha Karyakram (JSSK), Mission Indradhanush, POSHAN Abhiyaan, and the Pradhan Mantri Matru Vandana Yojana (PMMVY) have further attempted to close the gap between health entitlement and health outcome.

The main aim of this paper is: to see whether these schemes actually worked in reducing infant and child mortality in North East India?

If mortality rates have declined, policymakers must understand which interventions drove the change. If rates have stagnated or worsened, a critical examination of implementation gaps becomes urgent.

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The relationship between government health interventions and infant and child mortality outcomes has been studied extensively in the Indian context, though North East India has received relatively limited dedicated attention. Lim et al. (2010) evaluated JSY and found that institutional delivery rates rose significantly in high-focus states, with associated reductions in neonatal and perinatal mortality.[4] Singh et al. (2012) noted that while NRHM improved facility availability in remote areas, quality of care remained a major constraint, particularly in tribal-majority regions.[5]

Dhirar et al. (2018) conducted a systematic review of child mortality determinants in India and found that maternal education, access to skilled birth attendance, and immunization coverage were the three strongest predictors of under-five survival.[6] Mukherjee and Satpathy (2017) specifically examined NHM implementation in North Eastern states and found that while input indicators improved (ASHA deployment, sub-centre opening, JSY cash transfers), output indicators like IMR and U5MR lagged, pointing to what they termed an "implementation-outcome gap."[7]

Ram et al. (2013) used SRS data to show that the pace of IMR decline in Assam and Meghalaya was significantly slower than states like Kerala and Tamil Nadu, even after controlling for income levels, and attributed this largely to weaker institutional capacity.[8] A 2020 UNICEF-MoHFW joint report on child mortality in India noted that North Eastern states displayed high intra-state variation, with urban IMR often being twice as favorable as rural IMR within the same state.[9]

Saikia et al. (2019) used NFHS data to argue that the North East suffered a distinct epidemiological pattern — a high burden of neonatal deaths from birth asphyxia, infections, and prematurity, diseases that are amenable to facility-based care — making low institutional delivery rates particularly damaging.[10] The literature thus broadly suggests that government schemes have had partial but uneven effects in the region, constrained by structural and governance factors.

Various Government Health Schemes Targeting Child and Infant Mortality

National Health Mission (NHM): This scheme launched in 2013, encompassing the earlier NRHM (2005), NHM aims to universalize access to quality healthcare in rural and urban areas. It funds the deployment of Accredited Social Health Activists (ASHAs), sub-centres, Primary Health Centres (PHCs),

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Community Health Centres (CHCs), and referral systems. Special provisions exist for high-focus states — which includes all North Eastern states.[11]

Janani Suraksha Yojana (JSY): A conditional cash transfer scheme that incentivizes institutional delivery among BPL women. In North Eastern states, cash incentives are relatively higher to account for travel and access costs. As of 2020–21, approximately 7.38 lakh women in North Eastern states received JSY benefits annually, up from near zero in 2005.[12]

Mission Indradhanush (MI): Launched in 2014 and intensified through the Intensified Mission Indradhanush (IMI) from 2017, this scheme targets children who are either unvaccinated or partially vaccinated against seven (later twelve) vaccine-preventable diseases. North East India, with historically low full immunization coverage, has been a priority geography.[13]

Janani Shishu Suraksha Karyakram (JSSK): Entitles pregnant women and sick newborns to free delivery services, diagnostics, medicines, diet, and transport at public health facilities. It directly addresses the financial barrier to institutional care.

Rashtrya Bal Swasthya karyakram: screens children from 0 to 18 years for defects at births, diseases, deficiencies and development delays.

POSHAN Abhiyaan (National Nutrition Mission): Targets stunting, wasting, anaemia, and low birth weight — all proximate causes of infant and child mortality — through a convergent platform across health, ICDS, and education sectors.

SAANS (Social awareness and action to neutralize pneumonia successfully): It is an Indian national Health Mission Campaign launched in 2019 to reduce child pneumonia mortality. It focuses on awareness, early detection of symptoms like rapid breathing and prevention through vaccination to achieve a pneumonia free childhood.

Integrated Child Development Services (ICDS): A long-running scheme providing supplementary nutrition, immunization linkages, health check-ups, and pre-school education through Anganwadi Centres, which serve as the frontline of child health delivery in rural areas.

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Objectives of the present study:

1. To see the various government health schemes in the county
2. To find out the effects of these schemes in reducing infant and child mortality in North Eastern States

Data and Methodology

This study relies entirely on secondary data. The primary data sources used are:

- National Family Health Survey Round 4 (NFHS-4), 2015–16, Ministry of Health and Family Welfare, Government of India[14]
- National Family Health Survey Round 5 (NFHS-5), 2019–21, Ministry of Health and Family Welfare, Government of India[15]
- Sample Registration System (SRS) Statistical Reports, Office of the Registrar General of India, various years[16]
- Annual Reports, Ministry of Health and Family Welfare[17]
- National Health Profile 2022, Central Bureau of Health Intelligence (CBHI)[18]

The indicators analyzed are: Neonatal Mortality Rate (NMR, deaths per 1,000 live births in first 28 days), Infant Mortality Rate (IMR, deaths per 1,000 live births under one year), and Under-Five Mortality Rate (U5MR, deaths per 1,000 live births under five years). Institutional delivery rates, full immunization coverage, and JSY beneficiary data are used as proxy indicators of scheme penetration. The analysis is descriptive and comparative. States are compared against the national average and against each other to identify leaders, laggards, and anomalies.

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Results and Findings

Infant Mortality Rate: Trends Across North East India

Table 1: Neonatal and Infant Mortality Rates in North East India — NFHS-4 (2015–16) vs. NFHS-5 (2019–21) *(per 1,000 live births)*

State	NMR NFHS-4	NMR NFHS-5	IMR NFHS-4	IMR NFHS-5	Change in IMR
Assam	30.0	22.5	48.0	32.0	−16.0 ▼
Meghalaya	18.0	24.0	29.9	32.3	+2.4 ▲
Manipur	9.8	14.7	13.1	19.2	+6.1 ▲
Mizoram	11.3	11.5	34.7	21.4	−13.3 ▼
Nagaland	22.3	16.1	27.7	21.2	−6.5 ▼
Sikkim	21.6	8.5	22.1	9.0	−13.1 ▼
Tripura	18.4	29.8	26.1	40.2	+14.1 ▲
Arunachal Pradesh	28.7	17.4	40.1	29.2	−10.9 ▼
All India	**29.5**	**25.0**	**40.7**	**35.2**	**−5.5 ▼**

Sources: NFHS-4 State Fact Sheets (2015–16); NFHS-5 State Fact Sheets (2019–21), Ministry of Health and Family Welfare, Government of India.[14, 15]

The data in Table 1 reveals that five states — Assam, Mizoram, Nagaland, Sikkim, and Arunachal Pradesh — recorded declines in IMR between the two survey periods, with Sikkim's decline being the most dramatic (from 22.1 to 9.0, a fall of over 59%). Assam, historically the worst performer in the region, reduced its IMR from 48 to 32, still above the national average but a significant improvement. In contrast, Tripura, Manipur, and Meghalaya all saw their IMR worsen. Tripura's increase from 26.1 to 40.2 is particularly alarming and warrants serious policy attention.

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Nationally, IMR fell from 40.7 to 35.2 between the two rounds. Five of the eight North Eastern states had IMRs below the national average in NFHS-5, which is a positive signal. However, Assam (32.0) and Tripura (40.2) remain at or above the national average.

Under-Five Mortality Rate: Comparative Analysis

Table 2: Under-Five Mortality Rate (U5MR) in North East India — NFHS-4 vs. NFHS-5 *(per 1,000 live births)*

State	U5MR NFHS-4 (2015–16)	U5MR NFHS-5 (2019–21)	Change	National Average NFHS-5
Assam	56.5	43.6	−12.9 ▼	41.9
Meghalaya	40.6	42.7	+2.1 ▲	41.9
Manipur	18.3	25.3	+7.0 ▲	41.9
Mizoram	45.5	27.5	−18.0 ▼	41.9
Nagaland	40.3	27.6	−12.7 ▼	41.9
Sikkim	29.3	11.6	−17.7 ▼	41.9
Tripura	33.2	49.5	+16.3 ▲	41.9
Arunachal Pradesh	55.0	38.8	−16.2 ▼	41.9
All India	**49.7**	**41.9**	**−7.8 ▼**	—

Sources: NFHS-4 and NFHS-5, MoHFW, Government of India.[14, 15]

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The U5MR data broadly corroborates the IMR picture. Sikkim again stands out, with U5MR falling to just 11.6 — one of the lowest figures in India. Mizoram, Nagaland, and Arunachal Pradesh have achieved U5MR figures well below the national average. Assam has improved substantially. Tripura, however, now has a U5MR of 49.5 — higher than the national average and representing a 49% deterioration from its NFHS-4 figure.

Institutional Delivery and JSY Coverage

Table 3: Institutional Delivery Rates (%) and JSY Beneficiaries in North East India

State	Inst. Delivery % NFHS-4	Inst. Delivery % NFHS-5	Change	JSY Beneficiaries (2019–20, approx.)
Assam	70.4	91.9	+21.5 ▲	3,90,000
Meghalaya	66.9	78.0	+11.1 ▲	38,000
Manipur	72.0	93.5	+21.5 ▲	24,000
Mizoram	79.2	92.1	+12.9 ▲	15,000
Nagaland	47.7	64.6	+16.9 ▲	20,000
Sikkim	96.3	98.7	+2.4 ▲	6,500
Tripura	88.3	92.0	+3.7 ▲	45,000
Arunachal Pradesh	55.5	80.2	+24.7 ▲	25,000
All India	**78.9**	**88.6**	**+9.7 ▼**	~1,02,00,000

Sources: NFHS-4, NFHS-5 State Fact Sheets; MoHFW Annual Report 2020–21.[14, 15, 17]

What is particularly striking in Table 3 is that all eight states recorded improvements in institutional delivery rates — in some cases dramatic ones. Arunachal Pradesh went from 55.5% to 80.2%, Assam and Manipur both crossed 90%. This is a clear victory for JSY and JSSK. However, the correlation between improved institutional delivery and lower mortality is imperfect. Tripura has an institutional delivery rate

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of 92% yet its IMR and U5MR worsened. This suggests that quality of care at facilities, not merely access to them, drives outcomes.

Full Immunization Coverage

Table 4: Full Immunization Coverage (%) in Children 12–23 Months — NFHS-4 vs. NFHS-5

State	Full Immunization NFHS-4 (%)	Full Immunization NFHS-5 (%)	Change
Assam	47.7	72.5	+24.8 ▲
Meghalaya	43.4	67.6	+24.2 ▲
Manipur	77.5	91.9	+14.4 ▲
Mizoram	65.2	88.6	+23.4 ▲
Nagaland	35.1	57.2	+22.1 ▲
Sikkim	74.8	93.6	+18.8 ▲
Tripura	64.2	88.7	+24.5 ▲
Arunachal Pradesh	39.9	69.5	+29.6 ▲
All India	**62.0**	**76.4**	**+14.4 ▲**

Sources: NFHS-4 and NFHS-5 State Fact Sheets, MoHFW.[14, 15]

Immunization data provides the most uniformly positive picture of government scheme impact. Every state in the North East saw substantial gains in full immunization coverage, with some states (Arunachal Pradesh, Assam, Meghalaya, Tripura) gaining close to 25 percentage points. Mission Indradhanush and ASHA-led outreach appear to have delivered real results here. Manipur and Sikkim now exceed 90% full immunization coverage, comparable to the best-performing states nationally.

Yet even here the outcome disconnect appears. Tripura's full immunization rate rose from 64.2% to 88.7%, yet its child mortality worsened. The explanation may lie in the nature of the deaths being driven

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more by neonatal causes — birth asphyxia, sepsis, hypothermia — that immunization alone cannot prevent, requiring quality skilled care at delivery.

Nutritional Status: An Underlying Driver

Table 5: Stunting and Wasting Among Children Under 5 Years (%) — NFHS-4 vs. NFHS-5

State	Stunting NFHS-4	Stunting NFHS-5	Wasting NFHS-4	Wasting NFHS-5
Assam	36.4	35.3	17.0	22.3
Meghalaya	43.8	46.5	15.3	20.9
Manipur	28.9	28.3	9.0	12.4
Mizoram	28.0	23.9	6.2	8.1
Nagaland	28.8	31.9	11.1	16.3
Sikkim	29.6	22.3	14.4	9.5
Tripura	24.3	32.3	16.7	24.9
Arunachal Pradesh	30.6	30.0	20.5	20.8
All India	**38.4**	**35.5**	**21.0**	**19.3**

Sources: NFHS-4 and NFHS-5 State Fact Sheets, MoHFW.[14, 15]

The nutritional data is deeply concerning and provides critical context for understanding mortality patterns. While wasting (acute malnutrition) improved nationally, it worsened in six of eight North Eastern states between NFHS-4 and NFHS-5 — including in Assam, Meghalaya, Nagaland, and most severely, Tripura (16.7% to 24.9%). Stunting also worsened in Meghalaya, Nagaland, and Tripura. This nutritional regression, likely compounded by COVID-19 disruptions to ICDS and mid-day meal programmes in 2020–21, probably offset some of the gains from improved institutional delivery and immunization in several states.

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Discussion

The data presented above in this paper supports three broad conclusions about the impact of government health schemes on infant and child mortality in North East India.

First, the schemes have demonstrably improved health inputs and process indicators across the board. Institutional delivery rates, full immunization coverage, and JSY outreach have all improved in every North Eastern state between NFHS-4 and NFHS-5. This is not a trivial achievement in a region where, just fifteen years ago, barely one in two women delivered in a facility in many states. The ASHA network, now numbering over 90,000 in North East India alone, has been pivotal in mobilizing communities for immunization and antenatal care.[17] Mission Indradhanush's district-level targeting has particularly benefited Arunachal Pradesh and Meghalaya, both of which had some of the lowest immunization rates in India before 2015.

Second, improvement in process indicators has not automatically translated into proportional mortality reductions. This is the central paradox the data throws up. Tripura, with 92% institutional delivery and 88.7% full immunization, saw its IMR rise by 14 points and U5MR rise by over 16 points. Meghalaya and Manipur show similar disconnects. Three explanations emerge from the data and literature. One, facility quality — the mere act of delivering in a health facility does not guarantee skilled care; if facilities lack functioning oxygen, trained staff, or emergency obstetric capacity, institutional delivery statistics flatter actual outcomes.[19] Two, neonatal versus post-neonatal deaths — much of child mortality in North East India is driven by neonatal deaths (within 28 days of birth), which require skilled birth attendance and newborn care rather than immunization. Three, nutritional regression — the rise in wasting observed across several North Eastern states between the two survey rounds may have undone immunization and delivery gains, as a malnourished child is far more vulnerable to infectious disease mortality.

Third, state-specific governance and geography strongly moderate scheme effectiveness. Sikkim's remarkable performance — IMR of 9.0, U5MR of 11.6, among the lowest in India — reflects not just scheme implementation but a small, urbanized, high-literacy state with strong institutional capacity and relatively good road connectivity.[20] In contrast, the Garo Hills and Khasi Hills of Meghalaya, or the

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remote Changlang and Tirap districts of Arunachal Pradesh, present structural challenges that no centrally designed scheme alone can overcome without deep local adaptation. The one-size-fits-all design of JSY or JSSK, for instance, does not account for the reality that a woman in a remote tribal hamlet in Nagaland may face a twelve-hour journey to the nearest district hospital.

The data on Assam merits separate attention. Assam, historically burdened with the highest IMR in the region and among the highest in India, reduced its IMR from 48 to 32 and U5MR from 56.5 to 43.6. This represents substantial progress and appears linked to NHM's particularly intensive deployment in the state — Assam had the highest number of NHM-funded health sub-centres and ASHAs in the North East, and JSY beneficiaries in Assam numbered nearly 3.9 lakh per year, dwarfing all other North Eastern states combined.[17] Even so, Assam remains above the national IMR average, suggesting the journey is far from over.

The worsening picture in Tripura is the most urgent policy concern emerging from this analysis. The state's institutional delivery and immunization rates are among the best in the North East, yet its child mortality has sharply worsened. This anomaly demands further investigation — possible explanations include deteriorating nutritional status (Tripura's wasting rose from 16.7% to 24.9%), disruptions caused by the COVID-19 pandemic falling within the NFHS-5 data collection window, weaknesses in neonatal care quality at facilities, and possible sampling issues. The government should commission a dedicated cause-of-death survey in Tripura at the earliest.

Conclusion

Government health schemes have unquestionably improved the architecture of healthcare delivery in North East India. ASHA deployment, JSY cash transfers, Mission Indradhanush campaigns, and JSSK entitlements have together moved the needle on institutional delivery and immunization in ways that were unimaginable two decades ago. For several states — Sikkim, Mizoram, Nagaland, Arunachal Pradesh, and Assam — this has translated into real and measurable reductions in infant and child mortality. The schemes are working, but imperfectly and unevenly.

The evidence strongly suggests that the next phase of effort cannot remain focused purely on input and access indicators.

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