

Achieving SDG 3.2: Challenges and Prospects for Reducing Neonatal and Under-five Mortality in India's States and Districts

Abstract

Child mortality remains a significant public health challenge in India, despite the country's economic and social progress. This study assesses the feasibility of meeting Sustainable Development Goal (SDG) 3.2, which targets reducing neonatal mortality to 12 per 1,000 live births and under-five mortality to 25 per 1,000 live births by 2030. Using data from the National Family Health Survey (NFHS-4 and NFHS-5), Sample Registration System (SRS), and other national health indicators, we analyze child mortality trends and their determinants across Indian states and districts. The analysis highlights substantial regional disparities: while states like Kerala and Tamil Nadu are nearing SDG targets, states such as Uttar Pradesh and Bihar lag significantly. Key factors influencing mortality rates, including maternal health, socioeconomic status, healthcare access, and immunization coverage, are examined. The impact of COVID-19 on child health services is also considered, as it poses a risk to reversing progress. The study underscores the need for targeted interventions, enhanced healthcare infrastructure, and stronger maternal and child health programs to address these disparities. Achieving the SDG target by 2030 will require concerted efforts to overcome persistent inequalities in healthcare access and outcomes.

Keywords: child mortality, Sustainable Development Goals, neonatal mortality, under-five mortality, healthcare disparities, India, public health

Introduction

Child mortality remains a critical issue in India, posing a significant challenge to the nation's progress towards the United Nations Sustainable Development Goals (SDGs) 2015, particularly SDG 3.2. This goal aims to reduce neonatal mortality to at least 12 per 1,000 live births and under-five mortality to at least 25 per 1,000 live births by 2030. Despite India's substantial economic and social advancements, the country's diverse demographic, socioeconomic, and geographic landscape presents unique challenges to meeting these targets.

National and state-level child mortality trends offer valuable insights, but district-level data provide a more nuanced understanding of regional variations. The National Family Health Survey (NFHS-4&5) offers district-level estimates, enabling a detailed analysis of disparities in child mortality and related health indicators (IIPS, & ICF., 2021). This paper explores child mortality trends in India using NFHS-4 (2015-16) and NFHS-5 (2019-21) data, examining regional variations and assessing the feasibility of achieving SDG 3.2. It also investigates key determinants of child mortality, including healthcare access, maternal health, nutrition, and the impact of the COVID-19 pandemic on child health services.

Data and Methodology

This analysis utilizes data from NFHS-4 and NFHS-5, which provide comprehensive information on maternal and child health, fertility, family planning, and socio-demographic factors (IIPS, & ICF., 2017). NFHS surveys are critical for monitoring progress towards international health targets, including the SDGs.

The methodology involves comparing child mortality indicators across both surveys, focusing on neonatal, and under-five mortality rates. Percentage changes in child mortality rates are calculated, and regional disparities are assessed by categorizing states into high-, medium-, and low-mortality groups. A geospatial analysis maps high-priority districts with elevated child mortality rates. Additionally, multivariate logistic regression is employed to identify key determinants of child mortality.

Results

National Trends in Child Mortality

NFHS-5 data show a decline in India's under-five mortality rate (U5MR) from 50 per 1,000 live births in NFHS-4 to 41 per 1,000 in NFHS-5. Neonatal mortality (NMR) also decreased from 29 to 24 per 1,000 live births. Despite these improvements, current rates still exceed the SDG 3.2 targets of 25 and 12 per 1,000, respectively. District-level data reveal significant disparities: while districts in Kerala and Tamil Nadu report U5MRs below 20 per 1,000 live births, regions in Uttar Pradesh, Bihar, and Madhya Pradesh exhibit rates above 60 per 1,000.

Regional Disparities

Significant regional disparities are evident in child mortality rates across India presented in Figures 1 & 2. States like Kerala, Tamil Nadu, and Maharashtra have achieved or are close to achieving Sustainable Development Goal (SDG) targets, with districts such as Malappuram (Kerala) and Chennai (Tamil Nadu) reporting under-five mortality rates (U5MR) of 10 or below. Conversely, states like Uttar Pradesh, Bihar, and Madhya Pradesh face higher rates, particularly in rural areas, with districts in Uttar Pradesh (e.g., Bahraich, Balrampur) and Bihar (e.g., Kishanganj, Araria) reporting U5MRs well above 60 per 1,000. The district-level analysis further reveals wide variations in neonatal mortality rate (NMR), and U5MR, with alarming figures in Punjab, Haryana, and Uttar Pradesh, such as Firozabad (U5MR 90.8) and Shahjahanpur (U5MR 97.4). In contrast, districts like Kupwara and Badgam in Jammu & Kashmir exhibit relatively low rates. The data underscores the stark disparities in child health outcomes across regions and highlights the urgent need for targeted interventions in the most affected areas.

Determinants of Child Mortality

The multivariate analysis identifies key factors associated with high child mortality (Figure 3). Higher maternal education levels and more frequent antenatal care (ANC) visits are linked to lower child mortality rates. Full immunization coverage increased from 62% in NFHS-4 to 76% in NFHS-5. However, coverage remains uneven, particularly in high-mortality states. Among the Socioeconomic factors, Children born to mothers in the lowest wealth quintile experience higher mortality rates, with poverty and malnutrition exacerbating vulnerability. Access to quality healthcare services, especially in rural areas, is inadequate. While institutional deliveries have improved, gaps remain in high-mortality states.

Impact of COVID-19 on Child Health

The COVID-19 pandemic has significantly impacted maternal and child health services, particularly in rural and underserved areas. Disruptions in routine immunization, child nutrition programs, and healthcare access have potentially reversed progress in reducing child mortality. NFHS-5, conducted during the pandemic, underscores the need for resilient health systems to maintain essential services during crises.

Discussion

India has made notable progress in reducing child mortality yet achieving SDG 3.2 by 2030 remains a formidable challenge. While some states with stronger healthcare systems and socioeconomic development are close to the targets, many high-burden states lag significantly. Regional disparities reflect broader inequalities in health infrastructure, socioeconomic conditions, and education (Kumar & Patel, 2022). High-risk districts, especially in poorer states like Uttar Pradesh and Chhattisgarh, are projected to fall short of SDG targets by 2030, with 97% of districts in these states expected to miss the mark (Bora & Saikia, 2018). Contributing factors include child and maternal malnutrition, which is responsible for 68.2% of under-five deaths (Dandona et al., 2020).

Key areas for policy intervention include enhancing maternal health services, expanding immunization coverage, addressing malnutrition, and improving healthcare delivery in rural and marginalized communities. The lessons from the COVID-19 pandemic highlight the importance of building resilient health systems capable of maintaining essential services during crises. To improve child mortality rates, targeted healthcare interventions are crucial, including enhanced access to immunization and maternal health services. Addressing socio-economic disparities and cultural barriers can further boost healthcare utilization and outcomes for children.

The district-level analysis reinforces the national narrative of progress tempered by significant regional and local disparities. High-priority districts in states such as Uttar Pradesh, Bihar, and Madhya Pradesh show limited improvement, emphasizing the need for targeted interventions. Achieving SDG 3.2 by 2030 will require focused efforts to address persistent inequalities in healthcare access and outcomes.

Conclusion

India's progress towards reducing child mortality is evident but achieving the SDG 3.2 target by 2030 demands concerted efforts at both national and district levels. Addressing regional inequalities through targeted interventions, improving healthcare infrastructure, and enhancing socioeconomic development are crucial steps. District-level data from NFHS-4 and NFHS-5 offer valuable insights into the progress and challenges, highlighting the need for continued focus on high-mortality districts to meet the 2030 goal. Strengthening maternal health services, improving immunization and nutrition coverage, and addressing healthcare access disparities are essential for reducing child mortality across India.

Figure1. District level map for neonatal mortality rate by gender, 2019-21, India

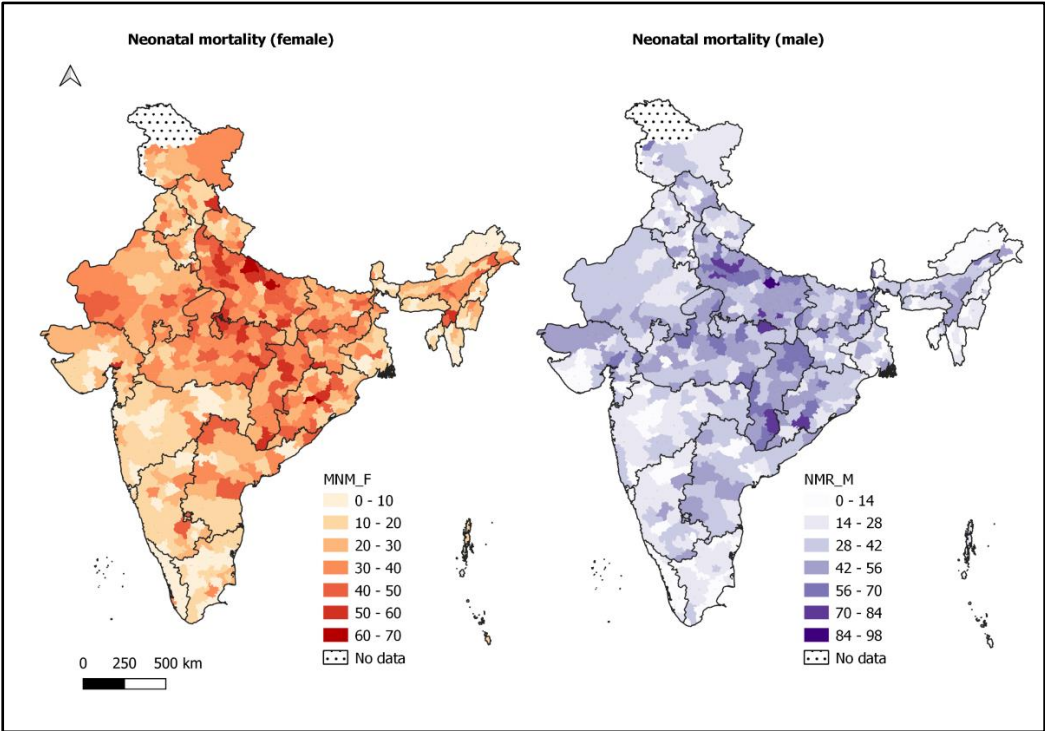


Figure2. District level map for under-five mortality rate by gender, 2019-21, India

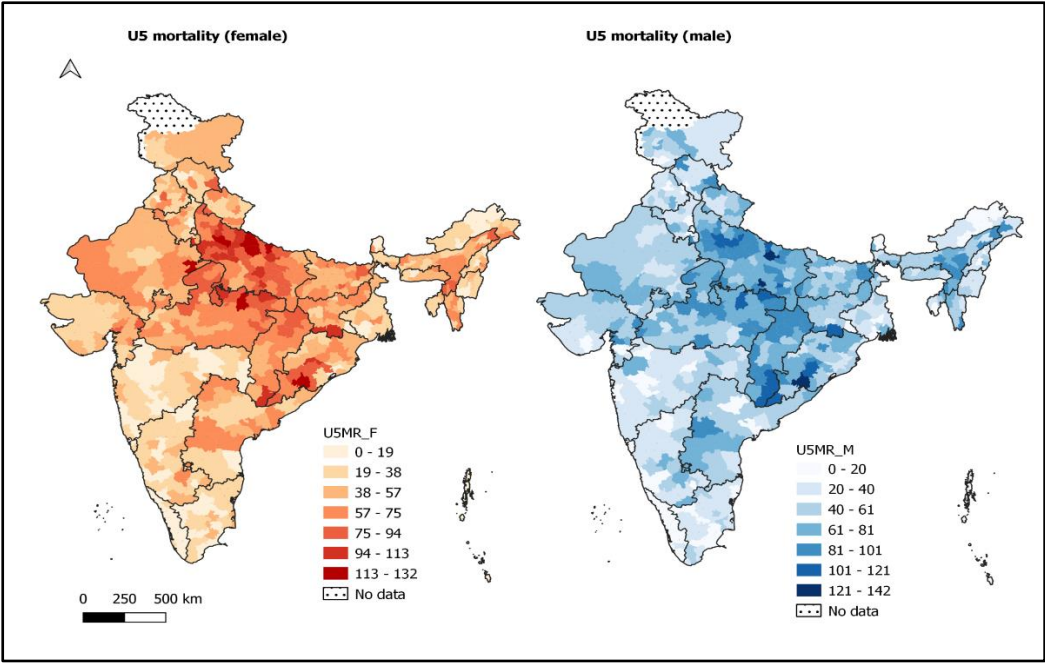
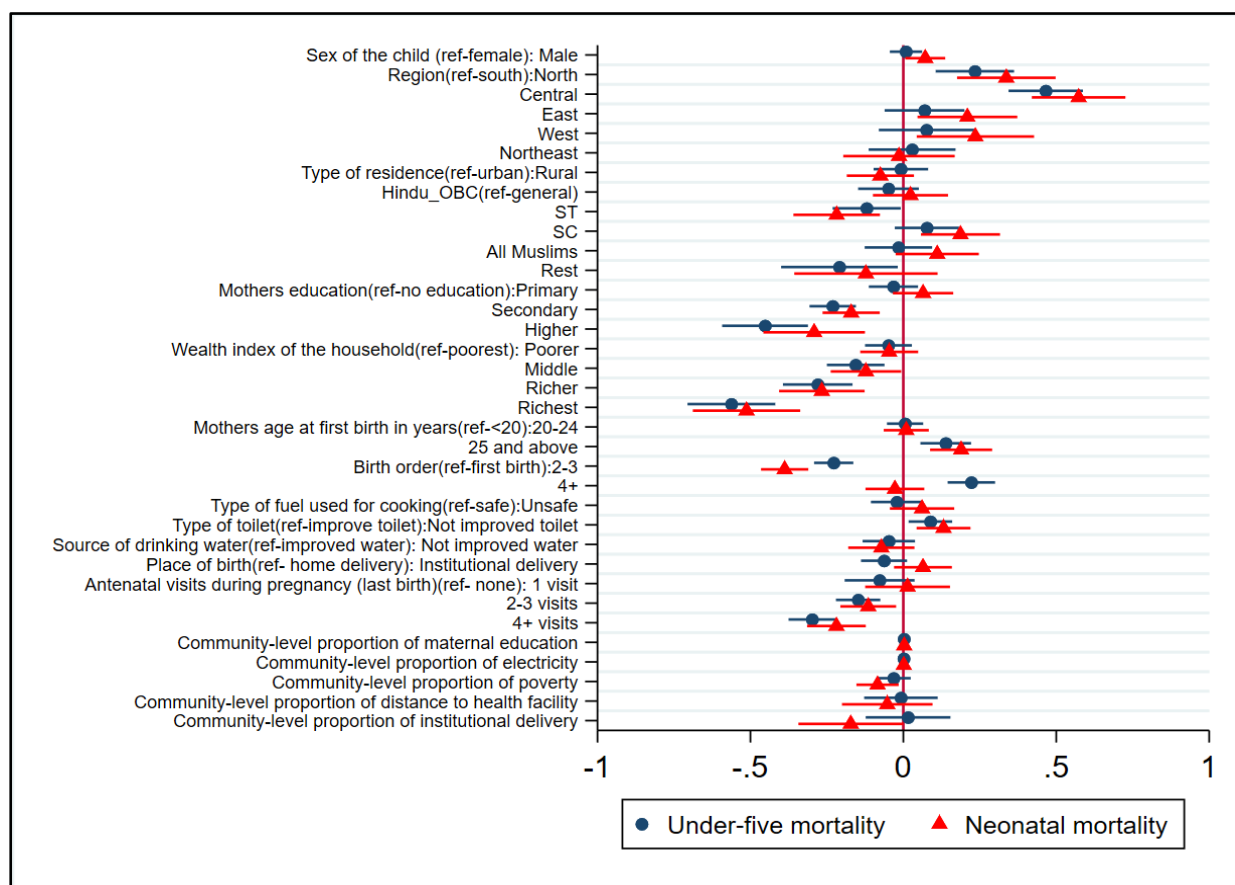


Figure 3. Odds ratio results of under-five mortality and neonatal mortality with selected characteristics, 2019-21, India



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