Trends in Infant Mortality Rate in Jharkhand: A Comparative Study with Chhattisgarh, Uttarakhand and India (2006–2020)

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ABSTRACT

This study examines the trends in Infant Mortality Rate (IMR) in Jharkhand from 2006 to 2020, using data compiled in the National Health Profile (NHP) based on Sample Registration System (SRS) estimates. The analysis focuses on both total and gender-wise IMR, with a two-level comparison: first, between Jharkhand and the national average, and second, with Chhattisgarh and Uttarakhand—states that were formed in the same year, 2000. The findings reveal significant progress in Jharkhand's IMR reduction, with performance gradually surpassing the national average in recent years, particularly in male and total IMR. The study also highlights regional disparities and narrowing gender gap, offering insights into child health outcomes and the effectiveness of public health delivery across the selected states.

Keywords: *Infant Mortality Rate, Jharkhand, Chhattisgarh, Uttarakhand, India, Sample Registration System (SRS), National Health Profile (NHP), comparative study, gender disparity, 2006–2020*

Infant Mortality Rate (IMR)—the number of infant deaths under one year of age per 1,000 live births—is a key indicator of child health and the effectiveness of maternal and child healthcare services. Although India has made considerable progress in reducing IMR over the past two decades, substantial inter-state disparities persist.

The year 2000 marked the creation of three new Indian states—Jharkhand, Chhattisgarh and Uttarakhand—intended to enhance administrative efficiency and promote regional development. Since then, these states have shown varying degrees of success in addressing public health challenges, particularly those related to child survival.

This study focuses on Jharkhand and analyses IMR trends from 2006 to 2020, comparing its performance with Chhattisgarh, Uttarakhand and the national average. The data is sourced from the National Health Profile (NHP), published by the Central Bureau of Health Intelligence (CBHI), which

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compiles annual estimates derived from the Sample Registration System (SRS)—India's most credible source for vital statistics.

By narrowing the comparison to states formed in the same year, this study provides a focused, data-driven evaluation of Jharkhand's progress in reducing infant mortality within a comparable administrative and developmental context.

REVIEW OF LITERATURE

Infant Mortality Rate (IMR) is universally recognized as a core indicator of public health and socio-economic development. A nation's success in reducing infant deaths reflects not only the strength of its healthcare systems but also the broader   socio-political attention given to maternal and child welfare. Over the decades, global and national efforts have made significant strides in reducing IMR, but stark regional disparities persist—both across countries and within national boundaries. In India, these disparities are shaped by multiple factors, including geography, caste, income level, education and access to healthcare services. Understanding how newly formed states like Jharkhand have performed in this domain is crucial for evaluating the equity and impact of public health policies.

Onambele et al., (2019)[1] studied trends in the European Union between 1994 and 2015, reporting a significant decline in IMR from 8.3 to 3.6 per 1,000 live births, with Romania and Bulgaria showing persistently high rates. Mathews and Driscoll, (2017)[2] observed a 15% reduction in IMR in the United States between 2005 and 2014, though disparities persisted, especially among American Indian populations.

At the national level, Bhatia et al., (2018)[3] examined inequality trends in IMR across Indian states from 1992 to 2016, noting pro-poor progress in some states and continued inequality in others. Vishwakarma et al., (2019)[4] revealed that Scheduled Castes and Tribes had higher infant and under-five mortality, primarily due to limited access to institutional deliveries and immunization. Krishna et al., (2016)[5] linked India's high neonatal mortality to socio-economic conditions, traditional beliefs and poor maternal care infrastructure.

State-specific studies shed light on Jharkhand's health landscape. Minnery et al., (2013)[6] documented declines in child mortality post-state formation but pointed to persisting rural-urban and income disparities. Nandi, (2023)[7] emphasized progress in Jharkhand's health indicators, though infrastructure and human resource challenges remain. Gupta, (2024)[8] assessed child and women development in Jharkhand and Bihar, calling for stronger grassroots implementation of development schemes. Kumar, (2024)[9] noted that urban IMR, NNMR, and U5MR in Jharkhand outperformed national averages, while rural areas lagged slightly behind. Patnaik et al., (2025)[10], focusing on maternal mortality, illustrated Jharkhand's remarkable MMR decline but also highlighted ongoing fertility-related concerns.

While previous literature has examined national IMR trends, health disparities, and Jharkhand's broader development, few studies have offered a gender-wise, time-series analysis of IMR specific to Jharkhand. Notably, no work has compared Jharkhand with its peer states—Chhattisgarh and Uttarakhand—over a consistent   15-year span using annual SRS-based estimates. Moreover, most existing studies rely on NFHS data, which, despite its richness, is limited in frequency and sometimes diverges from SRS trends. This study addresses these gaps by using SRS-based data from the National Health Profile to present a comprehensive, gender-sensitive and comparative analysis of IMR trends in Jharkhand from 2006 to 2020.

Objectives of the Study

This study is guided by the following objectives:

(i) To examine the trends in Infant Mortality Rate (IMR) in Jharkhand from 2006 to 2020 using data from the National Health Profile.

(ii) To compare Jharkhand's IMR with that of Chhattisgarh, Uttarakhand and the national average during the period 2006 to 2020.

(iii) To analyse the gender-wise trends in IMR in Jharkhand and compare them with corresponding trends at the national level and in other states formed in the same year (2000).

(iv) To assess the relative progress made by Jharkhand in reducing infant mortality within the context of the states formed in the same year (2000).

Research Questions

The study seeks to address the following research questions:

(i) What are the trends in Infant Mortality Rate (IMR) in Jharkhand during 2006–2020?

(ii) How does Jharkhand's IMR compare with the national average?

(iii) How does Jharkhand's IMR compare with that of Chhattisgarh and Uttarakhand, which were formed in the same year?

(iv) What are the gender-wise differences in IMR in Jharkhand and how do they compare with the national average and with Chhattisgarh and Uttarakhand?

RESEARCH METHODOLOGY

This study is based on secondary data collected from the National Health Profile (NHP) published by the Central Bureau of Health Intelligence (CBHI). The NHP compiles annual estimates of Infant Mortality Rate (IMR) derived from the Sample Registration System (SRS), which is widely regarded as the most reliable source for annual vital statistics in India due to its dual-record methodology and nationwide coverage. The analysis covers the period 2006 to 2020, chosen due to the consistent availability of total and gender-wise IMR data across the selected regions. The study focuses on Jharkhand, while drawing comparative insights from Chhattisgarh, Uttarakhand, and the national average. These states were selected due to their simultaneous formation in the year 2000, providing a common administrative baseline. The methodology involves descriptive analysis of IMR trends, supported by graphical representations such as panel diagrams and a consolidated IMR table. Both total and gender-wise IMR are examined to assess the overall and relative progress of Jharkhand in reducing infant mortality over time.

RESULTS AND DISCUSSION

The following section presents a detailed analysis of Infant Mortality Rate (IMR) trends in Jharkhand over a fifteen-year period, from 2006 to 2020. The data has been compiled from the National Health Profile (Annual issues 2005–2023)[11], a series of annual reports published by Central Bureau of Health Intelligence. These reports are based on estimates provided by the Sample Registration System (SRS), which is regarded as the most reliable and consistent source of vital statistics in India. The analysis covers three dimensions of IMR: total, male, and female, allowing for a comprehensive understanding of temporal trends and gender-based disparities. To contextualize Jharkhand's performance, the IMR data is compared with the national average as well as with Chhattisgarh and Uttarakhand—two states that were formed alongside Jharkhand in the year 2000. This comparative framework enables a focused assessment of progress made by Jharkhand in reducing infant mortality, both in absolute terms and relative to its administrative peers. The use of panel diagrams and tabular representation enhances the clarity of trends and facilitates an integrated view of regional variations and gender differentials over time.

Table 1

Infant Mortality Rate (Total, Male and Female) in Jharkhand, Chhattisgarh, Uttarakhand and India (2006–2020)

Year	Chhattisgarh			Jharkhand			Uttarakhand			India		
	T	M	F	T	M	F	T	M	F	T	M	F
2006	61	59	62	49	46	52	43	42	44	57	56	59
2007	59	58	61	48	47	49	48	47	48	55	55	56
2008	57	57	58	46	45	48	44	44	45	53	52	55
2009	54	50	57	44	42	46	41	41	42	50	49	52
2010	51	48	54	43	41	45	38	37	39	47	46	49
2011	48	47	50	39	36	43	36	34	38	44	43	46
2012	47	46	47	38	36	39	34	33	35	42	41	44
2013	46	45	47	37	35	38	32	30	33	40	39	42
2014	43	41	44	34	32	36	33	31	34	39	37	40
2015	41	40	41	32	30	35	34	31	38	37	35	39
2016	39	39	38	29	27	31	38	36	41	34	33	36
2017	38	39	37	29	25	33	32	35	29	33	32	34

2018	41	42	39	30	27	34	31	33	28	32	32	33
2019	40	40	40	27	25	29	27	27	28	30	30	31
2020	38	35	41	25	24	26	24	24	24	28	28	28

Source: Compiled from data published in National Health Profile (2005–2023)

The table shows a consistent decline in IMR across all four regions over the fifteen-year period. Jharkhand's total IMR dropped from 49 in 2006 to 25 in 2020. Chhattisgarh started with the highest IMR and remained above the national average throughout the period. Uttarakhand reported relatively lower IMRs, with a gradual decline. Jharkhand's male and female IMRs, while initially showing gender disparities, gradually converged over the years, reflecting a positive trend in equity of child health outcomes. To evaluate Jharkhand's progress in comparison with the national average, the following figure illustrates gender-wise IMR trends between Jharkhand and India.

Figure 1

*Infant Mortality Rate in Jharkhand and India by Gender (2006–2020)*
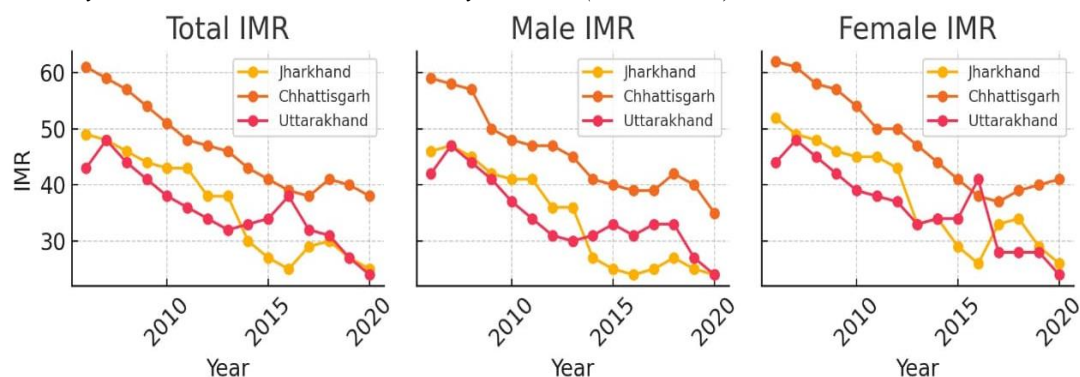
Source: Based on data presented in Table 1

Jharkhand's IMR declined from 49 in 2006 to 25 in 2020, surpassing the national average of 28 by the final year. Male IMR in Jharkhand remained consistently below the national average from 2008 onwards. Initially, the female IMR in Jharkhand was higher than the national average but showed consistent improvement, reaching parity by 2020. These trends highlight not only progress in overall child health but also increasing gender parity in survival rates. To further understand Jharkhand's relative standing among states formed in the same year, the next figure compares its IMR with that of Chhattisgarh and Uttarakhand.

Figure 2

Infant Mortality Rate in Jharkhand, Chhattisgarh and Uttarakhand by Gender (2006–2020)
Source: Based on data presented in Table 1
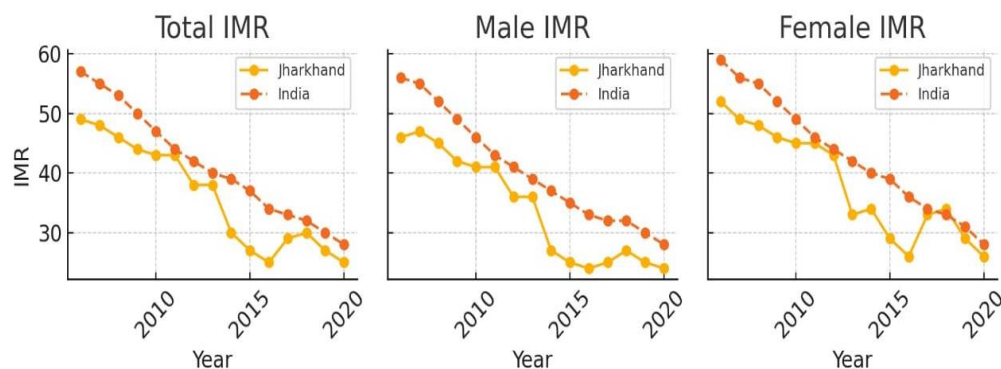
Jharkhand consistently outperformed Chhattisgarh in total, male and female IMRs. Although Uttarakhand reported the lowest IMRs across the period, Jharkhand demonstrated a steeper rate of improvement,

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especially in female IMR after 2015. The convergence of male and female IMRs in Jharkhand reflects targeted interventions aimed at reducing gender-based disparities in child health.

CONCLUSION & POLICY IMPLICATIONS

This study highlights a steady and meaningful decline in Infant Mortality Rate (IMR) in Jharkhand between 2006 and 2020. During this period, the state's IMR reduced from 49 to 25, ultimately surpassing the national average. While Jharkhand continues to lag behind Uttarakhand, it has shown stronger overall performance compared to Chhattisgarh, particularly in total and male IMR and has also made notable progress in narrowing the gender gap. These outcomes suggest that the improvements are not incidental but rather the result of focused interventions, increased health awareness and gradual strengthening of maternal and child health systems. To sustain and accelerate this progress, there is a continued need to enhance outreach in underserved rural areas, prioritize gender-sensitive service delivery, strengthen health infrastructure at the primary level and ensure consistent monitoring and effective implementation of child health programs. Jharkhand's experience offers valuable lessons for states with similar socio-economic profiles. Future research may further extend this analysis by incorporating socio-economic and demographic variables, as well as evaluating the outcomes of specific policy initiatives. Overall, this comparative and gender-disaggregated study provides a relevant evidence base to inform state-level planning and improve child health outcomes in India.

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