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CURRENT STATUS OF INFANT MORTALITY AND NEONATAL MORTALITY IN KARNATAKA: AN ECONOMIC ANALYSIS

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ABSTRACT

Karnataka has recorded steady declines in infant and neonatal deaths over the past decade, reflecting improvements in maternal and child health services, institutional deliveries and antenatal care. NFHS-5 (2019–21) reports an IMR in Karnataka substantially lower than the national average, while SRS and Ministry releases show continued national downward trends through 2021–22. However, intra-state disparities, neonatal concentration of infant deaths, and persistent gaps in rural and disadvantaged populations indicate unfinished business. This paper provides an economic analysis linking mortality trends to health investments, service utilization, and socio-economic determinants. Policy implications stress targeted neonatal interventions, strengthening primary care and equity-focused financing to accelerate progress toward SDG child-mortality targets.

KEYWORDS: *Infant Mortality, Neonatal Mortality, Karnataka.*

INTRODUCTION

Infant and Neonatal mortality is both a public-health priority and an economic imperative: survival in the first year of life influences lifetime human capital, productivity and welfare. Karnataka—one of India's more economically advanced large states—has made notable progress in lowering IMR and NMR, driven by rising institutional deliveries, expanded antenatal and postnatal care, and state and central health programmes. Yet progress masks heterogeneity: neonatal deaths account for an increasing share of under-five mortality, and marginalized populations continue to face higher risks. Economic analysis helps identify how health system inputs (expenditure, facility access, workforce) and socio-economic determinants (female literacy, household wealth, sanitation) translate into mortality outcomes. This study synthesizes recent data, situates Karnataka's indicators in national context, examines drivers through an economic lens, and proposes policy recommendations for further reductions.

LITERATURE REVIEW

IIPS & ICF (NFHS-5 State Report, 2021), The NFHS-5 Karnataka report provides state IMR and NMR estimates and service-use indicators, documenting an IMR around the mid-20s per 1,000 live births and improvements in institutional care and antenatal coverage. The report highlights neonatal mortality concentration and points to urban–rural and caste/wealth gradients in outcomes. These findings form the primary empirical baseline for this analysis. DHS Program. Registrar General of India, SRS Statistical Report (2022), SRS supplies annual time-series for IMR/NMR and confirms continuing national declines up to 2021–22. SRS provides comparability across states and a longer trend perspective; it is used here to benchmark Karnataka versus national trajectories and check year-to-year changes reported by NFHS. Census India. Ministry of Health & Family Welfare (MoHFW), Press Releases (2021–2025), MoHFW summaries and PIB releases synthesize national mortality trends (declines in IMR and NMR) and link reductions to programme interventions (NHM, JSY/PNDT expansions). These policy documents contextualize Karnataka's progress within central funding and national targets (SDGs). Ministry of Health and Family WelfarePress Information Bureau. State health dossiers and academic mapping (2021–2024), Karnataka health dossiers and recent mapping studies provide district-level variation and link stillbirth/infant mortality clusters to health-system capacity and socio-economic differentials, arguing for localized, equity-focused interventions (facility strengthening, neonatal care units). These studies emphasize the economic returns to targeted neonatal care.

OBJECTIVES

1. To Study the Current Trends of IMR and NMR in Karnataka.
2. To Analyse Economic and Health-System Determinants Associated with Infant and Neonatal Mortality in the Karnataka State.

NEED OF THE STUDY

The analysis of IMR and NMR in Karnataka is essential to guide sub-national resource allocation and programme design.

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While aggregate declines are encouraging, neonatal deaths now form a larger share of infant mortality and benefits are unevenly distributed. An economic framing (costs, returns, and equity) helps policymakers prioritize interventions—especially those yielding high returns (neonatal intensive care, skilled birth attendance, early postnatal visits) and ensures limited resources are targeted where marginal gains are largest. This study fills the gap by combining the latest survey and registration data with a policy-relevant economic interpretation. DHS Program Census India

DISCUSSION AND ANALYSIS

- **Infant Mortality**

Infant mortality, defined as the number of deaths within the first year of life per 1,000 live births, represents one of the most critical indicators of child survival and overall public health. Infants, being the most vulnerable segment of the population, face a substantially higher risk of mortality compared to other age groups. At the national level, India has witnessed a steady decline in the infant mortality rate (IMR), largely due to health sector reforms, expanded immunization, and improved maternal care. Despite this progress, the IMR remained unacceptably high at 42 per 1,000 live births in 2015-16, highlighting persistent gaps in healthcare access, nutrition, and socio-economic conditions, particularly in disadvantaged regions.

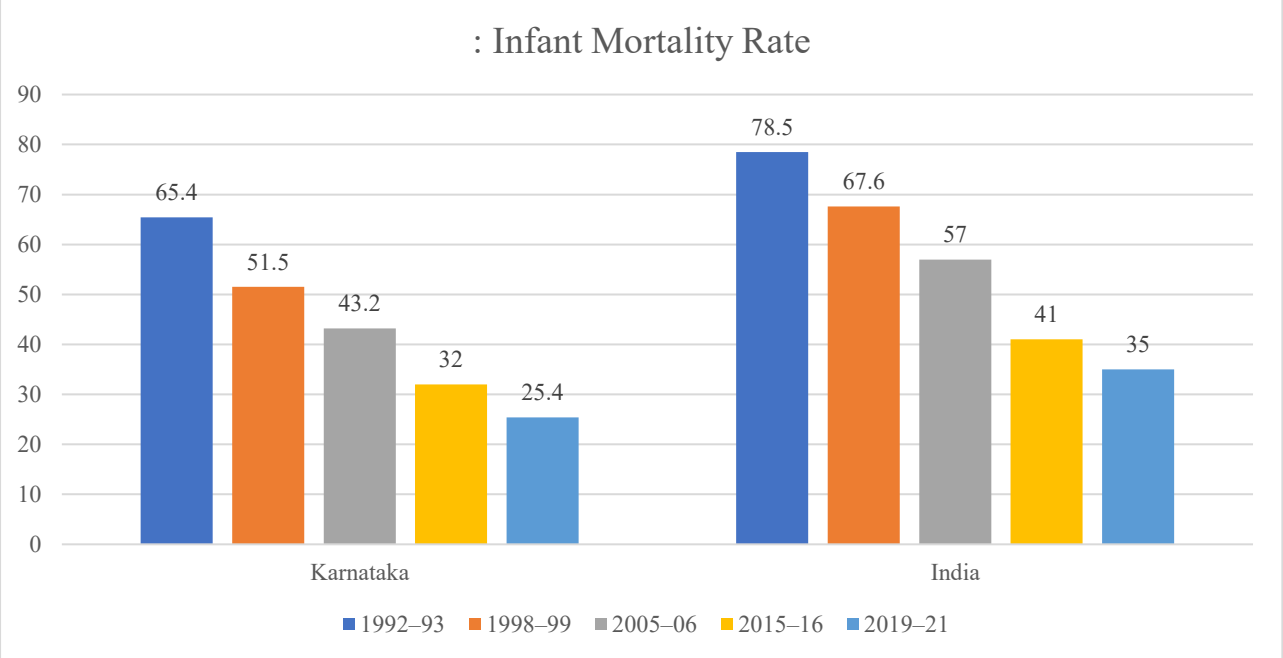
Table 1: Infant Mortality Rate in Karnataka and India

Year	Karnataka	India
1992–93	65.4	78.5
1998–99	51.5	67.6
2005–06	43.2	57.0
2015–16	32.0	41.0
2019–21	25.4	35.0

Source: IIPS 1992-2021.

Table 4.2 shows the trends in infant mortality rates (IMR) in Karnataka compared to the all-India average between 1992–93 and 2019–21. The data reveal a steady and significant decline in IMR over the period, with Karnataka showing relatively better performance than the national average. In Karnataka, the IMR declined from 65.4 per 1,000 live births in 1992–93 to 25.4 in 2019–20, while the national average reduced from 78.5 to 35.0 during the same period. Specifically, Karnataka recorded 51.5 in 1998–99, 43.2 in 2005–06, and 32.0 in 2015–16, consistently remaining below the all-India levels of 67.6, 57.0, and 41.0 respectively. This trend highlights that Karnataka has achieved faster progress in reducing infant deaths compared to the national average, reflecting the state's relatively stronger healthcare interventions, improved maternal and child health services, and better implementation of public health programs over the years.

Figure 1: Infant Mortality Rate in Karnataka and India



Source: Table 1

Table 2: Neonatal Mortality Rate (NMR) in Karnataka and All India (1992–2020)

Year	Karnataka	All India
1992–93	45.3	49.0
1998–99	37.1	43.0
2005–06	28.9	39.0
2015–16	18.5	30.0
2019–21	15.8	25.0

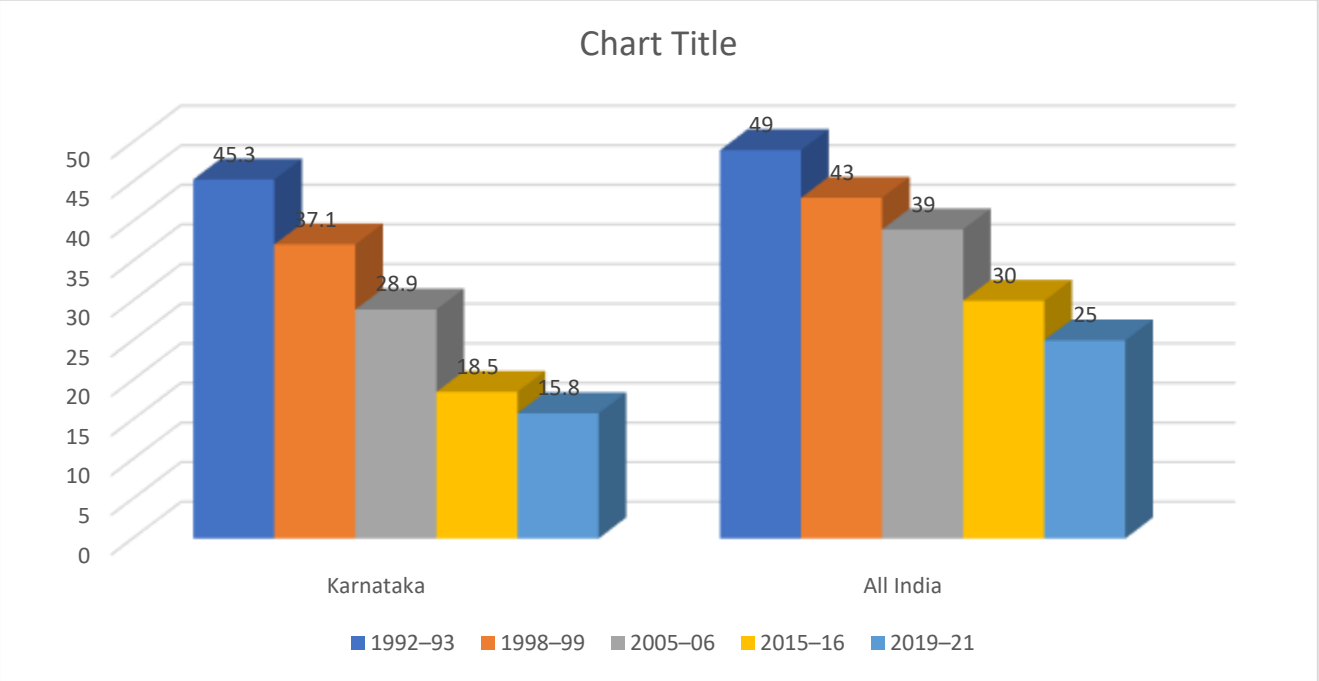
Source: IIPS 1992-2021

Above Table 4.9 shows the trends in neonatal mortality rate (NMR) in Karnataka and at the all-India level between 1992–93 and 2019–20. The data show a consistent decline in neonatal mortality over the years in both Karnataka and India, reflecting improvements in maternal and child healthcare services. In Karnataka, the NMR reduced significantly from 45.3 per 1,000

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live births in 1992–93 to 15.8 in 2019–20, marking a decline of nearly 65 percent over the period. Similarly, at the national level, the NMR declined from 49.0 in 1992–93 to 25.0 in 2019–21. A comparative analysis highlights that Karnataka has consistently performed better than the national average, with its NMR remaining lower across all periods. This progress can be attributed to improved institutional deliveries, wider immunization coverage, better access to healthcare facilities, and effective implementation of maternal and child health programs in the state.

Figure 1: Neonatal Mortality Rate (NMR) in Karnataka and All India (1992–2021)



Source: Table 1

- NFHS-5 (2019–21) indicates Karnataka's IMR is lower than the national average—NFHS state report places Karnataka's IMR in the mid-20s per 1,000 live births and shows improvements in antenatal care and institutional delivery rates. Neonatal mortality remains a substantial share of infant deaths. DHS Program
- SRS (2021–22) and MoHFW summaries show national IMR and NMR have declined through 2021; SRS is used to benchmark state trends and cross-validate NFHS findings. Census India Ministry of Health and Family Welfare

Economic Determinants and Pathways

- Health financing and human resources: Increased public spending under NHM and expanded coverage of maternal incentives correlate with higher institutional deliveries and antenatal contacts—proximal drivers of falling IMR. However, gaps in neonatal intensive care units (NICUs) and trained neonatal staff in some districts reduce impact on NMR. Ministry of Health and Family Welfare, National Health Systems Resource Centre
- Socio-economic gradients: Wealth, maternal education and sanitation strongly condition survival probabilities. Children of poorer households face higher IMR/NMR even within Karnataka. Equity analyses in state reports show these gradients persist. DHS Program

Concentration of Deaths in the Neonatal Period

- National and state data show a rising proportional share of neonatal deaths within infant mortality—implying that further reductions in IMR require neonatal-specific interventions (early essential newborn care, skilled attendance, resuscitation, and thermal care). DHS Program Ministry of Health and Family Welfare

District and Population Heterogeneity

- State dossiers and mapping studies identify district clusters with higher rates tied to health-infrastructure shortfalls and socio-economic disadvantage; programme design must therefore be sub-state and targeted. National Health Systems Resource Centre PMC.

Major Findings

1. Both Karnataka and India show substantial reductions in Infant Mortality Rate (IMR) from 1992–93 to 2019–21, indicating progress in child survival.
2. Karnataka's IMR dropped from 65.4 (1992–93) to 25.4 (2019–21), a decline of ~61%, while India's IMR fell from 78.5 to 35.0 (~55% decline).
3. Karnataka maintained lower IMR than the national average in all observed years, reflecting stronger state-level outcomes.
4. Improvements in institutional deliveries, immunization, maternal care, and targeted programs under the National Health Mission contributed to the decline.
5. Despite progress, an IMR of 25.4 indicates preventable infant deaths still occur, especially in rural, tribal, and marginalized groups.

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6. Both Karnataka and India show a steady decline in neonatal mortality between 1992–93 and 2019–21, reflecting overall progress in maternal and child health.
7. Faster Progress in Karnataka: Karnataka's NMR fell from 45.3 (1992–93) to 15.8 (2019–21), a ~65% reduction, compared to a ~49% reduction at the national level (49.0 → 25.0).
8. Below National Average: Karnataka consistently outperformed the all-India average across all periods, indicating relatively stronger healthcare outcomes in the state.
9. Programmatic Success: Improvements are linked to higher institutional deliveries, expanded immunization, better antenatal/postnatal care, and state-level implementation of national health missions.
10. Despite progress, Karnataka's NMR (15.8) in 2019–21 still indicates avoidable neonatal deaths, with rural and disadvantaged populations at higher risk.
11. Karnataka's IMR (~mid-20s per 1,000 live births) is below the national average reported in NFHS-5, indicating solid overall progress. DHS Program
12. Neonatal mortality constitutes a large share of infant deaths; further IMR reductions depend critically on neonatal interventions. DHS Program Ministry of Health and Family Welfare
13. Economic and socio-demographic factors (wealth, maternal education, rural residence) remain significant predictors — disadvantaged groups lag behind. DHS Program
14. District-level heterogeneity suggests efficiency gains from targeted investments (NICU access, skilled staff, outreach). National Health Systems Resource Centre PMC

Recommendations

1. Since most infant deaths occur in the neonatal period, expand neonatal intensive care units (NICUs) and ensure skilled staff availability across districts.
2. Strengthen primary health centers (PHCs) and sub-centers to improve care access in underserved rural and tribal areas.
3. Enhance antenatal care, maternal nutrition programs, and safe delivery services to prevent complications leading to infant deaths.
4. Strengthen ASHA workers' role in home-based newborn care and timely referrals, especially during the first month of life.
5. Prioritize high-burden districts and vulnerable populations through additional funding and performance-based incentives.
6. Address social determinants—maternal education, poverty, sanitation, and clean water access—to sustain IMR reduction.
7. Regularly track IMR through NFHS, SRS, and Health Management Information System (HMIS) to identify gaps and adjust interventions.
8. Focus on early neonatal care (0–7 days), since this is the riskiest period, through skilled birth attendance, resuscitation training, and essential newborn care.
9. Expand and upgrade Special Newborn Care Units (SNCUs) and ensure adequate staffing, especially in high-burden rural districts.
10. Direct additional resources to poorer districts, tribal areas, and vulnerable groups where NMR is relatively higher.
11. Improve maternal nutrition, antenatal check-ups, and anemia control programs to reduce complications that contribute to neonatal deaths.
12. Scale up home-based newborn care (HBNC) by ASHAs, ensuring timely postnatal visits and referral linkages.
13. Strengthen district-level monitoring of NMR through NFHS, SRS, and HMIS to identify hotspots and enable targeted interventions.
14. Ensure quality antenatal care, skilled birth attendance and early postnatal visits (first 48 hours). Conditional financing (linked to quality checks) can improve outcomes. DHS Program Ministry of Health and Family Welfare
15. allocate additional resources to poorest quintiles and tribal/rural pockets with performance metrics tied to reduction in neonatal deaths. DHS Program
16. non-health determinants (female education, sanitation) should be part of intersectoral strategies to reduce mortality. DHS Program

CONCLUSION

Karnataka has made important strides in reducing infant and neonatal deaths, with IMR lower than the national average in NFHS-5 and continued progress visible in SRS-based trends. Nonetheless, the neonatal period now accounts for a growing share of infant mortality, and substantive intra-state disparities persist. Economic analysis shows that targeted investments in neonatal care and equitable allocation of resources toward disadvantaged districts would yield high returns in survival and human capital. Strengthening the continuum of care—quality antenatal services, skilled birth attendance, early postnatal checks and functional neonatal units—combined with social investments in maternal education and WASH will accelerate progress. Policy focus must shift from broad coverage to quality and equity, with district-level microplanning and performance-linked financing to reach the SDG goal for child survival. Program Census Ministry.

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