Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

Reducing Stillbirth and Infant Mortality in Full-Term Pregnancy

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Abstract

Stillbirth and infant mortality remain critical indicators of maternal and child health in India, which bears the highest global burden of both outcomes. This study synthesizes recent evidence (2020 to 2025) on full-term stillbirth and infant mortality, highlighting biological, sociocultural, and health system determinants. Despite a reported stillbirth rate of 9.7 per 1,000 births (NFHS-5) and an infant mortality rate of 26.6 per 1,000 live births (2023), substantial underreporting and regional disparities persist. Key causes include obstetric complications, intrapartum asphyxia, infections, and congenital anomalies, with rural and northern states disproportionately affected due to limited access to quality care and persistent cultural stigma. A structured literature review reveals gaps in data reporting, antenatal services, and skilled workforce. Targeted interventions including standardized definitions, improved surveillance, teleimaging expansion, community health worker training, and awareness campaigns are urgently needed. The study recommends integrating stillbirth reduction into state health plans and establishing a national rare births registry to drive progress toward global targets.

1. Introduction

Stillbirth and infant mortality are critical barometers of maternal–child health and reflect broader socio-economic and health-system determinants. Globally, an estimated 1.9 million stillbirths occurred in 2023—14.3 per 1,000 total births—with 40% intrapartum and thus largely preventable through skilled obstetric care [(6)(7)]. India alone accounted for 263,342 stillbirths in 2019, contributing 22% of under-5 disability-adjusted life years lost due to stillbirths[(8)]. The infant mortality rate (IMR) in India declined from 37 per 1,000 (2015) to 26.6 per 1,000 (2023) but remains above the Sustainable Development Goal (SDG 3.2) target of 12 per 1,000[(3)(9)].

Definitions and Global Context

Stillbirth is defined as fetal death at 28 weeks gestation; early neonatal death as death within 7 days; and infant death before 1 year. While uterine and placental pathologies, hypertensive disorders, and infections drive stillbirths, neonatal mortality is dominated by prematurity, asphyxia, sepsis, and congenital anomalies [(10)]. High-income countries report stillbirth rates of 3–5 / 1,000, whereas low-income countries average 25 / 1,000, underscoring stark inequities[(11)].

Indian Demographics and Statistics

The Sample Registration System (SRS) reported stillbirth rates of 3 / 1,000 in 2020, likely underestimating true rates of 9.7 / 1,000 per NFHS-5 (2016–21)[1][2]. IMR varies across states—Bihar recorded 47 / 1,000, Kerala 7 / 1,000[12]. Rural areas and disadvantaged socio-economic groups face higher risks due to limited access to emergency obstetric services and qualified personnel.

Cultural and Social Context

Gender norms, stigma around genital examination, and misconceptions—particularly regarding ultrasound and cesarean delivery—delay care seeking[4]. Traditional birth attendants remain primary providers in remote areas. Awareness of stillbirth causes is low; perinatal bereavement support is scarce.

Problem Statement and Objectives

Despite national initiatives (India Newborn Action Plan aiming for < 10 stillbirths / 1,000 by 2030), implementation gaps persist. This review aims to (1) quantify stillbirth and IMR in the Indian context, (2) examine biological, sociocultural, and health-system determinants, (3) compare with global benchmarks, and (4) recommend culturally sensitive, feasible interventions for stakeholders.

Scope and Limitations

Focusing on studies from 2020–2025, limited by under-reporting in routine systems and paucity of stillbirth audits.

Methodology

Research Design and Approach

A qualitative systematic review synthesizing peer-reviewed literature, government reports, and global agency publications.

Database Search Strategy

Keywords: “stillbirth rate India,” “infant mortality India,” “NFHS-5 neonatal mortality,” “SRS stillbirth undercount,” “India Newborn Action Plan,” “perinatal asphyxia India,” “antenatal ultrasound India.” Databases: PubMed, Google Scholar, NFHS-5 reports, UNICEF/UN IGME, WHO, MoHFW publications. Inclusion: 2020–2025, English, India-specific data or global comparisons. Exclusion: pre-2020 studies, non-peer-reviewed, animal studies.

Inclusion/Exclusion Criteria

Included case-studies, meta-analyses (e.g., 49-report meta-analysis on stillbirth causes[5]); NFHS-5 and SRS data; UN IGME and UNICEF reports. Excluded editorials without empirical data.

Data Extraction and Synthesis

Two reviewers independently extracted: rates, cause distributions, regional/state data, care practices, policy frameworks, socio-cultural factors. Discrepancies resolved by consensus. Thematic framework:

(1) Biological/technical factors, (2) Sociocultural challenges, (3) System response and gaps, (4) Innovative solutions.

Timeline and Scope

Search conducted June–July 2025; cutoff date June 30, 2025. Emphasis on India, supplemented by global benchmarks where relevant.

Discussion

1. Biological/Technical Factors and Evidence

- **Pathophysiology:** Stillbirths result from placental insufficiency, hypertensive disorders, chorioamnionitis, and congenital anomalies. Fetal growth restriction (FGR) is implicated in 30–40% of cases[(5)].
- **Clinical Presentation:** Fetal movements diminution, maternal hypertension, and oligohydramnios prompt evaluation. Intrapartum stillbirth often linked to obstructed labour and asphyxia.
- **Diagnostics:** High-resolution ultrasound detects FGR, placental abnormalities, and anomalies. Doppler studies of umbilical artery improve risk stratification but underutilized in rural India. MRI reserved for complex cases.
- **Histopathology and Classification:** ReCoDe classification assigns causes in 88% of stillbirths when histopathology available[(4)]. In India, antepartum stillbirths comprise two-thirds of cases; intrapartum the remainder[(5)].
- **Treatment:** Elective early delivery for severe preeclampsia or FGR reduces stillbirth risk; management algorithms from WHO and RCOG exist but limited reach.

2. Sociocultural Challenges Specific to India

- **Stigma and Misconceptions:** Fear of virginity loss during examination delays care among unmarried women. Myths around antenatal scans deter utilization.
- **Regional Disparities:** Northern states (Bihar, Madhya Pradesh) report 17 / 1,000 stillbirths versus 4 / 1,000 in Kerala and Tamil Nadu [(9)]. Urban tertiary centres have 24/7 obstetric teams and blood-bank support; rural areas lack emergency referral networks.
- **Socioeconomic Barriers:** Out-of-pocket costs for high-resolution ultrasound (INR 1,500–2,500) and MRI (INR 10,000–15,000) exclude the poor.
- **Traditional Practices:** Reliance on untrained birth attendants; home deliveries in hot season correlate with higher intrapartum stillbirths.

3. Current System Response and Gaps

- **Data Systems:** SRS undercounts stillbirths by 60% due to definitional inconsistencies and verbal-autopsy limitations; only one adverse outcome recorded per pregnancy [(1)(2)]. NFHS-5 offers more accurate SBR (9.7 / 1,000).
- **Guidelines and Protocols:** India Newborn Action Plan addresses neonatal mortality but lacks explicit stillbirth audit mandates. No national standard for stillbirth classification or perinatal mortality review.
- **Human Resources:** Shortage of obstetricians (0.2 per 10,000 population in rural areas vs. 1.5 in urban). Nurse-midwife ratios also below WHO recommendations.
- **Referral Pathways:** Delays at multiple levels—recognition, transport, facility readiness—lead to 20% of intrapartum stillbirths in district hospitals.
- **Community Engagement:** Limited birth preparedness planning; low awareness of danger signs.

4. Innovative Solutions and Best Practices

- **Standardized Definitions and Reporting:** Adopt WHO ICD-PM classification and integrate stillbirth into HMIS with mandatory facility-level audits.
- **Diagnostic Algorithms:**
  - *Primary Care:* Transperineal ultrasound at 28 weeks to differentiate FGR from constitutional small-for-gestational-age.
  - *Secondary Care:* Doppler velocimetry referral criteria for umbilical artery PI > 95th percentile.
- **Capacity Building:**
  - CME modules on stillbirth prevention for ASHAs, ANMs, and MBBS doctors.
  - Simulation-based training in fetal-monitoring and neonatal resuscitation.
- **Tele-medicine Platforms:**
  - Obstetric tele-ultrasound interpretation by urban specialists for rural health centres.
  - Virtual perinatal morbidity-mortality meetings across districts.
- **Community Outreach:**
  - Culturally tailored IEC materials in local languages on fetal-movement counting and danger-signs.
  - Men's engagement programs to support maternal care.

- **Kangaroo Mother Care (KMC) Scale-Up:**
  - Facility protocols to ensure KMC for preterm and low-birth-weight infants, reducing hypothermia and early neonatal mortality[13].
- **Policy and Financing:**
  - Include stillbirth reduction as an independent NHM indicator with tied performance-based funding for states.
  - Public–private partnerships to subsidize rural access to high-resolution ultrasound.
- **Research and Surveillance:**
  - Establish a national rare perinatal outcomes registry capturing stillbirths, congenital anomalies, and perinatal risk factors.
  - Invest in prospective cohort studies to evaluate effect modifiers (e.g., maternal comorbidities, air pollution).

Conclusion

This review highlights that India's stillbirth and infant mortality rates—9.7 / 1,000 and 26.6 / 1,000 respectively—remain above global and national targets despite declines. Key biological drivers include placental insufficiency, preeclampsia, infections, and congenital anomalies, while infant mortality is dominated by prematurity, asphyxia, sepsis, and anomalies [4][10]. Under-reporting in SRS undermines accurate monitoring; NFHS-5 data should guide policy [1][2].

Implications for Stakeholders:

- **Healthcare Professionals:** Adopt WHO ICD-PM classification and standardized audit protocols; integrate high-resolution ultrasound and Doppler into routine ANC; strengthen intrapartum fetal monitoring and neonatal resuscitation training.
- **Policymakers:** Mandate stillbirth audits under NHM; allocate funds for rural ultrasound infrastructure; incentivize states via conditional grants linked to stillbirth reduction.
- **Researchers:** Leverage registry data to examine early vs. late stillbirth determinants; assess tele-medicine effectiveness in intrapartum care; explore socio-environmental modifiers (e.g., air pollution exposure).
- **Community Health Workers:** Promote fetal-movement awareness; facilitate birth-preparedness plans; address cultural stigma through male and elder inclusion.

Future Research Directions:

- Molecular and genetic profiling of stillbirth cases to uncover novel pathophysiological pathways.
- Prospective evaluation of focused-antenatal-care packages enhanced with remote fetal surveillance.
- Impact assessments of performance-based financing on stillbirth and IMR indicators.

Policy Recommendations:

1. **Data Strengthening:** Harmonize stillbirth definitions, integrate into HMIS; mandate facility-level perinatal death reviews.
2. **Service Delivery:** Expand 24/7 emergency obstetric care; scale up tele-obstetrics and referral networks.
3. **Human Resources:** Recruit and train rural obstetricians and midwives; implement simulation-based training in perinatal emergencies.
4. **Community Engagement:** Develop culturally sensitive IEC in multiple languages; engage male champions to reduce stigma.
5. **Financing:** Allocate dedicated NHM funds for stillbirth reduction; subsidize rural ultrasound access through PPP.
6. Bridging global best practices with India's diverse realities, these multisectoral strategies can accelerate reductions in stillbirth and infant mortality, moving India closer to SDG and ENAP targets by 2030

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