

Maternal Mortality in India

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ABSTRACT

The current maternal mortality ratio (MMR) of India is 97/100,000 live births. It has declined by 70% from 398 to 100,000 live births in 1997–98 to 97 in 2020 due to continuous evolving government scheme. About 1.30 million maternal deaths occurred between 1997 and 2020. Most of these deaths have occurred in EAGA states. The southern states of India have already met the sustainable development goals (SDG) goal 3.1. The risk of maternal death was higher in rural and tribal areas. The leading cause of maternal mortality was obstetric hemorrhage. Utilization of government schemes has increased through the years, but the EAGA states need prioritized attention to improve India's MMR to meet the SDG goals.

Keywords: Maternal mortality, Government schemes, EAGA states, sustainable development goals

INTRODUCTION

Maternal mortality in India is a critical public health concern, reflecting the complex interplay of socioeconomic, cultural, and healthcare factors. Maternal mortality refers to the death of a woman during pregnancy, childbirth, or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management.

India has made significant strides in reducing maternal mortality over the years, yet it continues to face challenges in ensuring safe motherhood for all women. Factors contributing to maternal mortality in India include inadequate access to quality maternal healthcare services, disparities in healthcare infrastructure and resources between urban and rural areas, insufficient antenatal care, limited availability of skilled birth attendants, cultural practices, and socioeconomic inequalities.

The burden of maternal mortality disproportionately affects women from marginalized communities, including those from low-income households, rural areas, and tribal populations. Complications during pregnancy and childbirth, such as hemorrhage, hypertensive disorders, sepsis, and obstructed

labor, are among the leading causes of maternal deaths in India. Additionally, delays in seeking and receiving appropriate medical care, as well as lack of awareness about maternal health issues, contribute to the persistence of maternal mortality in the country.

Efforts to address maternal mortality in India involve improving access to essential maternal healthcare services, enhancing the quality of antenatal and obstetric care, promoting community-based interventions, strengthening healthcare infrastructure, and addressing socio-cultural barriers to maternal healthcare utilization. Government initiatives such as the National Health Mission (NHM) and various maternal and child health programs aim to reduce maternal mortality through targeted interventions and investments in healthcare infrastructure and human resources.

Despite these efforts, reducing maternal mortality in India requires a multi-sectoral approach that addresses the underlying determinants of maternal health, including poverty, education, gender inequality, and access to healthcare. Sustained commitment from governments, healthcare providers, civil society organizations, and communities is essential to achieving significant and lasting reductions in maternal mortality rates across the country.

METHODS

NHFS data and SRS data World Health Organization (WHO) website Google scholar were used to get the data.

Pregnancy is tragically still a shockingly dangerous experience for millions around the world - said Tedros Adhanom Ghebreyesus Director General WHO.

Maternal death is "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the

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duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes”^[1] (WHO). Maternal mortality ratio (MMR) is defined as “the number of maternal deaths during a given time period per lakh live births during the same time period.”^[2]

Sustainable development goals (SDG) Target 3.1 aims to achieve a worldwide MMR of under 70/100,000 by 2030, ensuring that no nation surpasses an MMR of 140/100,000.^[3]

TRENDS IN MATERNAL MORTALITY RATE

India has witnessed a decline in the MMR over the years, dropping from 2000 in the 1930s to 97 in the period of 2018–2020, as per the SRS 2018–2020 data. Figure 1 illustrates the maternal mortality ratio of both the world and India across multiple years.

MMR TRENDS

Empowered action group (EAG) states.

	2014–16	2015–17	2016–18	2017–19	2018–20
Assam	237	229	215	205	195
Uttar Pradesh	201	216	197	167	167
Uttarakhand	201	89	99	101	103
Rajasthan	199	186	164	141	113
Odisha	180	168	150	136	119
Madhya Pradesh	173	188	173	163	173
Chhattisgarh	173	141	159	160	137
Bihar	165	165	149	130	118
Jharkhand	165	76	71	61	56
Other states					
	2014–16	2015–17	2016–18	2017–19	2018–20
Punjab	122	122	129	114	105
Haryana	101	98	91	96	110
West Bengal	101	94	98	109	103
Other states	96	96	85	77	77
Gujarat	91	87	75	70	57
	2014–16	2015–17	2016–18	2017–19	2018–20
Assam	237	229	215	205	195
Uttar Pradesh	201	216	197	167	167
Uttarakhand	201	89	99	101	103
Rajasthan	199	186	164	141	113
Odisha	180	168	150	136	119
Madhya Pradesh	173	188	173	163	173
Chhattisgarh	173	141	159	160	137
Bihar	165	165	149	130	118
Jharkhand	165	76	71	61	56

Other states					
	2014–16	2015–17	2016–18	2017–19	2018–20
Punjab	122	122	129	114	105
Haryana	101	98	91	96	110
West Bengal	101	94	98	109	103
Other states	96	96	85	77	77
Gujarat	91	87	75	70	57
Maharashtra	61	55	46	38	33
Southern states					
	2014–16	2015–17	2016–18	2017–19	2018–20
Karnataka	108	97	92	83	69
Telangana	81	76	63	56	43
Andhra Pradesh	74	74	65	58	45
Tamil Nadu	66	63	60	58	54
Kerala	46	42	43	30	19
India					
	2014–16	2015–17	2016–18	2017–19	2018–20
India	130	122	113	103	97

CAUSES OF MATERNAL MORTALITY

Obstetric hemorrhage constitutes the leading cause of maternal mortality nationally and regionally, responsible for 47% of deaths, especially prevalent in states with lower economic status.^[4]

Thaddeus and Maine’s “Three Delays” model acknowledges the intricate and interconnected factors that hinder access to high-quality maternal care for pregnant women and their families.

The delay in seeking care (type 1 delay) emerged as the primary contributor to maternal deaths, accounting for 48.6% (154 out of 317). The second significant contributor was the delay in reaching the first level health facility (type 2 delay), affecting 33.8% (107 out of 317) of maternal deaths. Meanwhile, the delay in receiving adequate care at the health facility (type 3 delay) played a role in 18.9% of maternal deaths. In addition, there exists a fourth delay, which involves taking responsibility or being accountable for maternal death.^[5]

GOI SCHEMES WHICH HAVE CONTRIBUTED IN LOWERING MATERNAL MORTALITY

The Government of India is steadfastly working toward reducing India’s MMR and achieving the SDGs. To address this challenge, numerous programs have been launched, some of which are highlighted below:

The Ministry of Health and Family Welfare (MoHFW), Government of India, has introduced a new initiative called SUMAN. The anticipated outcome of this initiative is “Zero Preventable Maternal and Newborn Deaths” along with the delivery of high-quality maternity care delivered with dignity and respect.

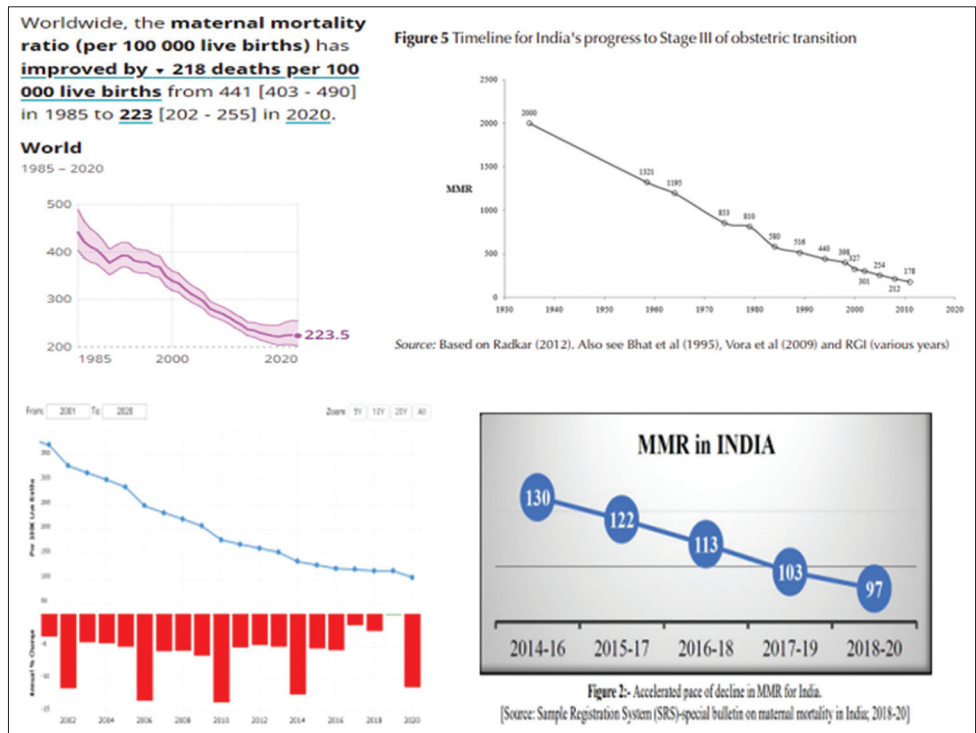
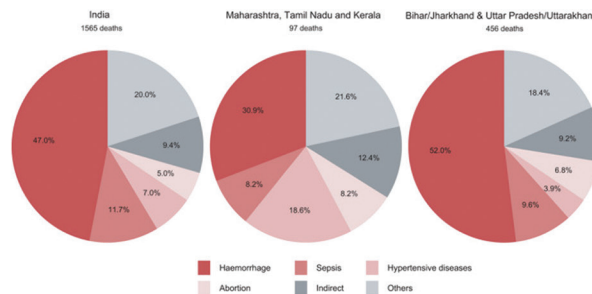


Figure 1: Maternal mortality ratio of world and India over the years



Causes of maternal death in India and in selected states, 2007-2014: sepsis (pregnancy-related infections); others (other obstetric complications); HDP (hypertensive disorders of pregnancy).

QUALITY SERVICE PROVISION

Quality ante natal care

The antenatal care (ANC) protocol mandates a minimum of four visits, with the early registration and the first ANC appointment scheduled within the first trimester. The ANC package encompasses a comprehensive physical examination, screenings for conditions such as gestational diabetes mellitus and thyroid disorders, along with assessments for viral markers, VDRL, and urine analysis. T.T/TAP immunizations are administered, and distribution of iron-folic acid (IFA) tablets and calcium supplements is ensured, covering a period of 6 months during both the antenatal and postnatal periods. Counseling on nutrition is also provided. In addition, early detection of high-risk pregnancies and follow-up management are integral components of ANC.

Essential obstetric care during delivery

The Government of India offers free institutional delivery services at its health facilities to mitigate maternal and neonatal morbidity and mortality. To ensure the provision of essential obstetric care services, the government is implementing round-the-clock services at primary health Centers (PHCs).

Postnatal care (PNC) for mother and new born

Ensuring PNC within the first 24 h of delivery and conducting subsequent home visits are crucial components for identifying and managing emergencies during the postnatal period. Auxiliary nurse midwives (ANMs), lady health visitors (LHVs), and staff nurses (SNs) are undergoing orientation

and training to address emergencies identified during these visits.

Provision of emergency obstetric and neonatal care at first referral units (FRUs)

Emergency Obstetric and Neonatal Care at FRUs is being ensured by operationalizing all FRUs across the country.

During the operationalization process, particular attention is given to critical components such as manpower, blood storage units, and referral linkages. To address the shortage of skilled manpower, especially Anesthetists and Gynecologists, the Government of India has initiated several key skill-based training programs:

1. An 18-week training program for MBBS doctors in life-saving anesthesia skills for emergency obstetric care.
2. A 16-week training program for MBBS doctors in obstetric management skills, including C-Section, in collaboration with the federation of obstetric and gynecological society of India (EmOC).
3. A 10-day training program in basic emergency obstetric care for medical officers (BEmOC).
4. A 3-week training program for ANMs/SNs/LHVs as skilled birth attendants referral.
5. Skills Labs (Daksh training) have been established by the Government of India at both the National and State levels. These labs aim to enhance the skills of health-care providers and improve their capacity to deliver quality RMNCH +A services.

REFERRAL SERVICES AT BOTH COMMUNITY AND INSTITUTIONAL LEVEL

Ambulances are being provided to PHCs in rural areas with the objective of ensuring swift service delivery to beneficiaries.

TRAINING

Capacity building program for various categories of health workers through various training program is as follows:

Skilled attendance at birth

The Government of India is committed to providing skilled attendance at every birth, whether within the community or at health-care institutions. To address common obstetric emergencies during childbirth, SNs and ANMs are authorized to administer specific injections and perform interventions under defined emergency circumstances. This initiative is aimed at saving the lives of mothers and promoting safe childbirth practices.

Dakshata

Acknowledging that a considerable proportion of maternal deaths result from complications during labor and delivery, the Government of India launched “Dakshata” in 2015. This initiative

aims to rapidly improve the quality of care during the intrapartum and immediate postpartum periods across diverse delivery points nationwide.

FLAGSHIP PROGRAMS

Janani suraksha yojana

Launched in April 2005, Janani Suraksha aims to reduce maternal and infant mortality rates by promoting institutional deliveries among economically disadvantaged pregnant women. It offers cash payments to both mothers and accredited social health activists to incentivize and increase institutional deliveries.

Janani shishu suraksha karyakram (JSSK)

The Government of India introduced JSSK on June 1, 2011. Under this program, all pregnant women delivering in public health institutions are entitled to completely free delivery services, including cesarean sections, along with free drugs, diagnostics, blood, and diet. In addition, they receive free transport from their homes to the institution, and if referred, between facilities, and back home. Similar entitlements are extended to all sick newborns accessing public health institutions for treatment up to 30 days after birth.

Pradhan mantri surakshit matritva abhiyan (PMSMA)

Carrying forward the vision of our Hon'ble Prime Minister, the PMSMA was launched in 2016 to ensure quality ANC and high-risk pregnancy detection in pregnant women on 9th of every month. With private public partnership.

LaQshya

To expedite the decline in MMR, the MoHFW has introduced the “LaQshya - Labor room Quality Improvement Initiative.” LaQshya is a focused and targeted program designed to enhance key processes within labor rooms and maternity operation theatres. Its goal is to improve the quality of care during childbirth and ensure Respectful Maternity Care.

COMPREHENSIVE ABORTION CARE

Comprehensive abortion care plays a crucial role in reproductive health, particularly in India, where 8% of maternal deaths (based on 2001–03 SRS data) are attributed to unsafe abortions. This component is integral to the Reproductive, Maternal, Newborn, Child, and Adolescent Health program, implemented in accordance with the mandates outlined in the Medical Termination of Pregnancy Act.

Obstetric high dependency units (HDU)/intensive care unit (ICU)

Obstetric ICUs/HDUs are being set up in high case load tertiary care facilities nationwide to manage complex pregnancies effectively.

MCH WINGS

Information systems for maternal health

Maternal death surveillance and response (MDSR)

Since 2017, all states have successfully implemented and institutionalized the MDSR process. As part of this system, states are actively reporting maternal deaths and conducting detailed analyses to determine their causes. Moreover, premier institutions are conducting reviews of maternal near-miss cases, further enhancing our understanding of critical maternal health issues.

RCH portal/MCTS portal

The Government of India has initiated the Name Based Tracking of Pregnant Women and Children as a policy decision. This initiative aims to track every pregnant woman, infant, and child by name up to the age of 2 years.^[6] The objective is to ensure timely access to ANC, institutional delivery, PNC, as well as immunization and other related services.

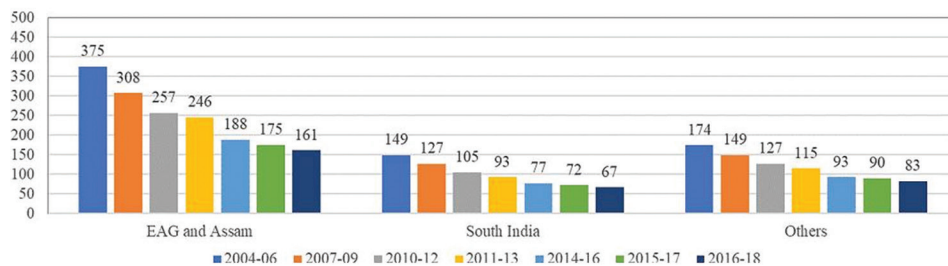
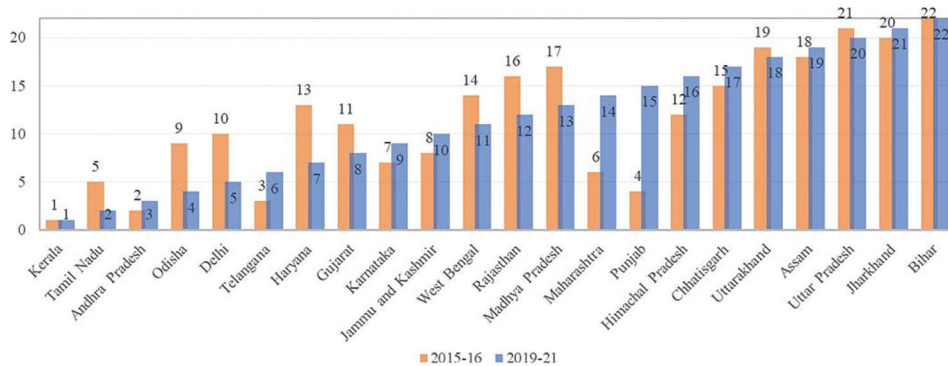
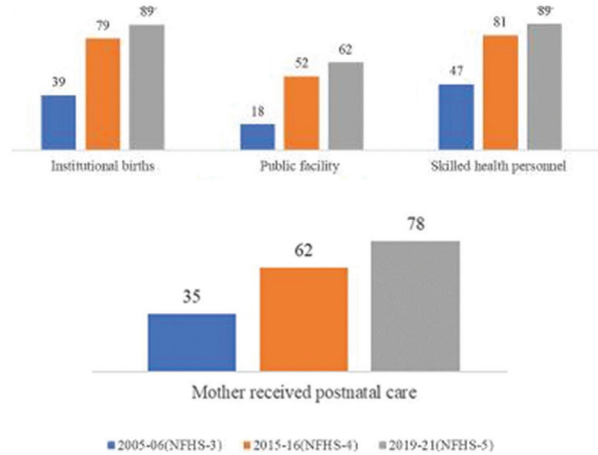
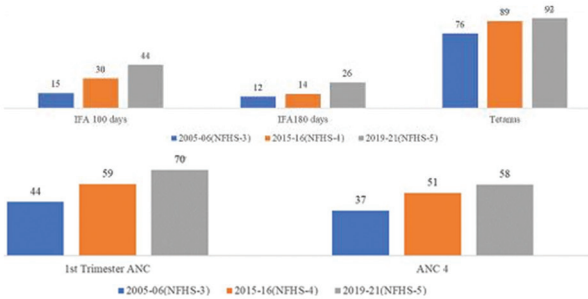
Utilization of government programs

ANC attendance in the first trimester witnessed a notable increase, rising from 44% to 70%. Moreover, adherence to the WHO

recommendation of having four ANC visits improved from 37% to 58%.

The administration of oral IFA supplementation, comprising 60 mg elemental iron and 0.4 mg of folic acid, for 100 days increased from 15% to 44%. Similarly, for a duration of 180 days, the supplementation rate rose from 12% to 26%. Furthermore, TT vaccination coverage increased significantly from 76% to 92%.

Institutional delivery: There has been significant progress in institutional delivery rates in India. The proportion of institutional deliveries increased from 39% to 89%. Likewise, skilled birth attendance rose from 47% to 89%, and deliveries in public facilities surged from 18% to 62%. In addition, there has been a substantial increase in PNC utilization, with 35% of women availing PNC in 2005–2006 compared to 78% in 2019–2021.^[7]



REGIONAL DISPARITIES: UTILIZATION OF HEALTH SERVICES AND MATERNAL MORTALITY

India's MoHFW has designated "EAG states" – Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Odisha, and Rajasthan – due to high fertility and mortality indicators. These states represent around 48% of India's population. Over the past 5 years, the maximum reduction in MMR has been observed in EAG states and the Assam region (214), followed by other states (91) and Southern states (82). However, MMR estimates for EAG and the Assam region (161) remain considerably high, 2.4 times higher than in Southern states.

A composite index ranking among 22 major states in India highlights disparities. While some states have shown improvement, others have deteriorated in their performance. The worst-performing states – Assam, Uttar Pradesh, Jharkhand, and Bihar – are significantly lagging behind the best-performing states, such as Kerala and Tamil Nadu. These regional patterns in maternal health services have persisted over the past four to 5 years, indicating ongoing challenges.

State-level MMR estimates demonstrate wide inter-state disparities, with concerns regarding equity. Southern states have already achieved the SDG target of MMR below 70/100,000 live births by 2030, while other states are nearing this target. Rural-urban disparities in maternal mortality rates persist due to inadequate healthcare infrastructure, a shortage of skilled health professionals, and limited availability of essential medicines and supplies. Rural women also exhibit lesser utilization of health-care schemes compared to their urban counterparts.

Current MMR of India is 97 several factors that have contributed to achieving a lower MMR in the country. First, the government has made a concerted effort to increase access to quality maternal health services. Second, women are entering into marriage at an older age and are more literate, empowering them with better control over their reproductive choices and decision-making. Third, the government has implemented initiatives like the PMSMA, which has had a significant impact by facilitating the positive engagement of both public and private health-care providers, making ANC more accessible to women.

However, various socioeconomic factors such as poverty, education, income inequality, access to healthcare services, cultural beliefs, and decision-making autonomy significantly shape regional and rural-urban disparities in maternal mortality rates. Southern states have notably succeeded in reducing maternal mortality due to their relatively well-developed healthcare systems and higher literacy rates.

Conversely, factors contributing to elevated MMRs in Northern states include poverty, inadequate health-care infrastructure, low literacy rates, and cultural barriers to accessing maternal healthcare services. In addition, geographical remoteness, ethnic diversity, and limited access to health-care facilities pose challenges for eastern and north-eastern states.

TOOLS TO REDUCE MMR TO MEET SDG GOAL BY 2030

Education and awareness campaigns and women's empowerment initiatives

Utilizing teleconsultation and telemedicine technologies, along with remote monitoring devices and wearable sensors, enable health-care providers to remotely track maternal health indicators such as blood pressure, fetal heart rate, and uterine contractions in real-time, facilitating early detection of complications and prompt intervention. These technologies also support the delivery of educational programs and training modules for health-care providers. Mobile health apps offer personalized health advice tailored to women's needs, while home visits and outreach services by community health workers enhance access to care.

Priority healthcare is directed toward EAG states, with workshops aimed at training medical staff to prevent and manage postpartum hemorrhage.

While India has made strides in improving maternal health, attention is needed in recognizing and addressing subnational disparities, particularly in EAG states, rural, and tribal areas where maternal deaths are prevalent. Targeted efforts to improve access and quality of care in these areas are essential. Educational programs should emphasize the benefits of seeking care and planned births in health-care facilities. Accurate estimation of maternal deaths and identifying drivers of mortality in EAG states is crucial for effective interventions.

Prioritizing improvements in maternal health outcomes in EAG states can accelerate the decline in MMR and ensure each state achieves the 2030 SDG. Prime Minister Narendra Modi's commitment to women's empowerment further underscores India's dedication to enhancing maternal health.

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